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CONTENTS

Leaf Anatomical Characteristics Of Five Variants Of The Genus Viscum L. (Loranthaceae)

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Abstract: Leaf anatomical characteristics of five variants of five variants (A-E) of the genus *Viscum* (Loranthaceae) were investigated in this study to ascertain the usefulness of these characters and determine the intervariant relationships among the investigated variants. The anatomical features of the leaves showed that these variants possess useful biosystematic characters that can be used to establish intervariant relationships among investigated variants. An interesting aspect of this study is the presence of calcium oxalate crystals inside the chloroplast of variant A, C and D which differ from the usual localization of crystals in the mesophyll of leaves. Also the presence of uniseriate epidermal cells observed in variants B and C which differ from the multiseriate epidermal cells in A, D, and E coupled with the sunken stomata that characterized both variants are discussed in relation to their biosystematic significance. [Academia Arena, 2009;1(5):1-4]. ISSN 1553-992X.

Key words: Leaf, anatomy, characters, Viscum, variants, Loranthaceae

INTRODUCTION

The African mistletoes are parasitic plants that derive all or most of their nutrition from other flowering plants. Although many parasitic plants contain functional chlorophyll, they depend on their host plants for some of their carbon and other requirements. According to Takht and Zimmera (1996), the mistletoe plant belongs to the kingdom Plantae, division Magnoliophyta, class Rosopsida, order santales, genus Viscum and family Loranthaceae. However, Hutchinson and Dalziel (1958), placed the genus Viscum into the family Viscaceae. However, the taxonomic identity of the genus Viscum has been controversial as most authorities claim that it belongs to the family Loranthaceae while others placed it to the family Viscaceae (Engler 1964, Nikrent and Musselman, 2004). Hutchinson and Dalziel (1958) stated that the African countryman does not necessarily differentiate one species from another thus, group name mistletoe tend to be used and critical distinction where necessary is made not between species but between hosts identified as a prefix or suffix to the group name or even just by the host name.

Extracts from the genus *Viscum* impact both positively and negatively on human activities. For example, Recombinant Mistletoe lectin (rml) has been used to treat ovarian cancer (Robert and Gorter, 2002). Viscotoxins extracted from *Viscum* have immunomodulatory effects. In Africa, Mistletoes have magical and fetish values as their uses are primarily for illness thought to be of mystic origin. Their general uses include counter sorcery, mental conditions, fatigue, sterility and problems of urinogenital system. The leaves are used for treating skin diseases, stiffness, phlebitis, fractured limbs and rheumatism. This work is based on the hypothesis that the variations in this leaf anatomy are significant and revealed that leaf anatomy possess many attributes of potential taxonomic importance that are diagnostic at the genus and species levels (Mbagwu and Edeoga, 2006; Edeoga and Okoli, 2001, Nwachukwu and Mbagwu, 2007).

Although the usefulness of utilizing vegetative and anatomical features in the biosystematic considerations of various taxa have been reported (Edeoga and Okoli, 1998; Edeoga and Eboka, 2000; Edeoga and Ikem, 2001), there is no specific investigation conducted on the anatomical features of the leaves of these *Viscum* variants hence this paper reports the anatomical characters of the leaves of five variants of *Viscum*. It assesses the relevance of and discusses the extent to which leaf anatomical features might be utilized in biosystematic consideration of these *Viscum* variants.

MATERIALS AND METHODS

Fresh Leaves from the five variants of the Viscum species were collected from the Agricultural Garden of Imo State University, Owerri, Nigeria. This investigation was conducted at the Crop Science laboratory at University of Nigeria, Nsukka in January, 2007. The most healthy roots were collected and fixed in FAA (1:1:18) glacial acetic acid: 40% formaldehyde: 70% ethanol (v/v) for 48-72 hours. The roots were washed several times in distilled water then with two changes of 30% ethanol and dehydrated in the order 30%-50%-70%-95%-absolute alcohol. To infilterate wax into the specimens, they were placed for 3

hours in each of the following solutions containing a ratio of absolute alcohol to pure chloroform (v/v: 3:1, 1;1, 1;3) and then pure chloroform. At the stage of pure chloroform, wax pellets at 60°c melting point were added and the wax changed with new ones at intervals. The specimens were left in the oven for 2-7 days to remove the chloroform. To embed in wax, the contents of the vials were transferred into moulds and the specimens kept in place with hot needles. As the wax solidified, it was transferred to a cold water bath for hardening and later stored for two days in a refrigerator.

For sectioning, a reichert rotary microtome was used and 10-20 mm thick sections were made. The ribbons were placed on clean slides smeared with a thin film of Haupt's albumen, allowed to dry and drops of water added prior to mounting. The slides were placed on a hot plate at 40°c for few minutes for the ribbons to expand and were stored overnight. The slides were immersed in pure xylene for 2-5 minutes in a solution of xylene and absolute alcohol with 1;1 ratio (v/v) for few minutes. The slides were then transferred to another solution of xylene and alcohol in the ration 1:3 (v/v) for few minutes, to 95%, 90%, 70% and 50% alcohol. Drops of alcian blue were added on the specimens, washed off with water and counterstrained with safranin for two minutes, then dehydrated in 50% alcohol, 70%, 80%, 90% xylene/alcohol solution and mounted in Canada balsam. The slides were dried on a hot plate at 30°c. Then photomicrographs of the specimens were taken from the permanent slides (Figs 1 and 2) using a Leitz Wetzler ortholux microscope fitted vivitar-V-335 camera. (Cutler, 1978).

RESULTS

The results showed that in variant A, the vascular bundles are not well developed. The epidermal cells are multiseriate. The central cells are with dark stained content believed to be stains of oxalate crystals (fig 1a). in variant B, the vascular bundles are well developed, about 3-5 arranged to form a ring with distinct xylem and phloem cells. The epidermal cells are uniseriate and characterized by well developed parenchyma and sclerenchyma cells(fig 1b). in variant C, the vascular bundles are well developed, 8-10 arranged to form a ring pattern within the cortex. The epidermal cells are uniseriate. There are also presence of oxalte crystals (fig 1c). in Variant D, there are presence of 2-3 distinct and well developed vascular bundles. These are stains of oxalate crystals and the spongy mesophyll are confined at the center of the lamina (fig 1d). in variant E, there is one large vascular bundles at the center of the cortex. Sinkers are lignified, projecting from the cortex into the central cylinder. The epidermal cells are 4-6 layers thick. There are presence of circular and crystal sand crystals scattered within the cortex (fig 1e). Both variants are characterized by sunken stomata and presence of starch grains inside stomata. (fig 1 a-e).

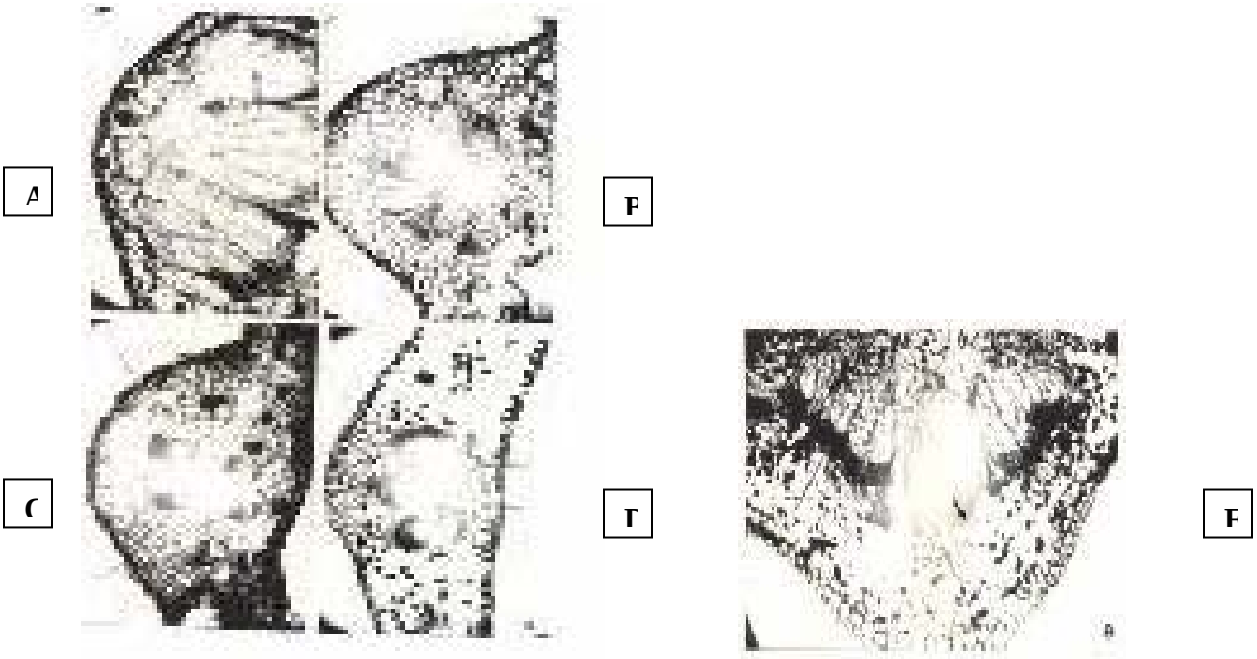

Figure 1. Both variants are characterized by sunken stomata and presence of starch grains inside stomata

DISCUSSION

The presence of calcium oxalate crystals inside the chloroplast of variants A, C and D is a new observation because crystals are usually observed in the mesophylls of leaves and not in the chloroplasts. This localization of crystals inside the chlorplasts of these three variants is a good taxonomic character that can be exploited to didtinguish these three variants from the other two hence there is an outstanding intervariant relationships among these three variants. Again, the presence of sunken stomata in both variants could be an ecological advantage that enables these variants to regulate water loss. This observation is in agreement with the work of Mbagwu and Edeoga (2006) who observed starch grians inside the chloroplasts of some *Vigna* species and used it to delimit these taxa.

Also the uniseriate epidermal cells as observed in Variant B and C compared to the multiseriate epidermal cells in other variants is distinct and serves as a good biosystematic character. Therefore, the use of anatomical features in systematic considerations of different taxa is no more a rare event by taxonomists. The work of Mbagwu and Edeoga (2006) in *Vigna* species, Nwachukwu and Mbagwu (2007) in Indigofera species, Mbagwu and Edeoga (2006) in the roots of some vigna species are classified examples. Although the differences in these variants are not enough to upgrade these variants into species rather the similarities in anatomical features showed reasons for both to be in the same genus *Viscum.* The overall findings support the principles, relationships and generalizations of other scientists that leaf anatomical features are useful tools in systematic botany.

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In Vitro Sterilization Protocol for Micropropagation of *Solanum tuberosum* cv. 'Kufri Himalini'

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ABSTRACT

For obtaining contamination free cultures the most important step is sterilization of explants. In the present study the sterilization procedure was standardize for potato cultivar Kufri Himalini. Comparison was done between two important sterilant sodium hypochlorite and mercuric chloride with three time duration 2, 5 and 8 minutes. After sprouting the sprouts of 0.5 to 1 cm. were taken for the study and treated by chemicals of surface sterilization with three selected timings i.e. 2, 5 and 8 minutes. Sterilized explants were inoculated on without hormones MS medium to evaluate the response of different chemicals. The observations were recorded regularly till to 30 days for the non-growing cultures, infected cultures and healthy cultures. Result showed that amongst the two sterilants i.e. NaOCl and $HgCl_2$, NaOCl was found better for controlling the infection and it had not any adverse effect on explants even in long duration. Sodium hypochlorite (NaOCl) for 8 minute (T3) was selected for suitable sterilization chemical after 5 minute of savlon wash, 30-second dip in ethanol and at last washed with double distilled water. [Academia Arena, 2009;1(5):5-8]. ISSN 1553-992X.

Keywords: Sterilant, contamination, surface sterilization and explants

INTRODUCTION:

In vitro propagation technique for potato involves various steps i.e. selection of explant, its sterilization and establishment and shoot proliferation and production of *in vitro* tubers. Beside the hormones, the culture conditions namely temperature, relative humidity and photoperiod also influence the growth and development process of *in vitro* cultures (Hussey and Stacey, 1981). The first condition for the success of a culture is asepsis. The maintenance of aseptic (free from all microorganisms) or sterile conditions is essential for successful tissue culture procedures. To maintain an aseptic environment, all culture vessels, media and instruments used in handling tissues, as well as explant itself must be sterilized. The importance is to keep the air, surface and floor free of dust. All operations should be carried out in laminar airflow sterile cabinet (Chawla, 2003).

Sterilization is the process of making explants contamination free before establishment of cultures. Various sterilization agents are used to decontaminate the tissues. These sterilants are also toxic to the plant tissues, hence proper concentration of sterilants, duration of exposing the explant to the various sterilants, the sequences of using these sterilants has to be standardized to minimize explant injury and achieve better survival (CPRI, 1992). Two different chemicals i.e. Mercuric chloride (0.1%) and Sodium hypochlorite (1%) were used for the present study to standardize the best sterilization protocol for *in vitro* culture of potato cv. Kufri Himalini.

MATERIAL AND METHOD:

The present study was carried out at Seed Biotechnology Laboratory, Department of Seed Science and Technology, H.N.B.Garhwal University, Srinagar Garhwal with the objective to evaluate the effect of different sterilants on explants in potato for *in vitro* culture. The ICAR has identified a new hybrid variety of potato- Kufri Himalini. Nearly 8% of the total area under Potato in the country lies in the hills, where potato is an important cash crop. This species is best for commercial cultivation in hilly regions. The new variety, with medium maturity of 110-120 days has been recommended for cultivation in the north- western and eastern hills during summer. It provides a yield advantage of over 10% over Kufri Jyoti and Kufri Giriraj. In the plains and its keeping quality is better then all the cultivars develop so far for hill regions.

For obtaining sprouts, the tubers were cut into pieces and were dipped in a solution of 0.1% Bavistin for 2-3 minutes and then sown in sand filled plastic pots followed with single wash in distilled water. These were grown under poly house following optimum cultural practices. The sprouts were ready for inoculation after 10-12 days of growth. The sprouts of about 0.5-1 cm. were collected from the mother plant of Kufri Himalini in water filled beaker and kept under running water prior to sterilization in the laminar airflow cabinet. For the experiment following treatments were used during the work:

T1 Sodium hypochlorite- 2 minutes
T2 Sodium hypochlorite- 5 minutes
T3 Sodium hypochlorite- 8 minutes
T4 Mercuric chloride- 2 minutes
T5 Mercuric chloride- 5 minutes
T6 Mercuric chloride- 8 minutes

The explants were surface sterilized with three selected timings of 2, 5 and 8 minutes. All glassware and instruments were thoroughly washed and dried at 80^0C. Distilled water and glassware used for explants were autoclaved at 15 psi for 45 minutes. To evaluate the response of different chemicals, implantations of sterilized explants were done using without hormones MS medium. The cultures were placed in culture growth room. The observations were recorded regularly till to 30 days for the non-growing cultures, infected cultures and healthy cultures.

RESULT:

The present study was conducted to standardize the sterilization procedure of explants of potato cv. Kufri Himalini. Two different chemicals i.e. Mercuric chloride (0.1%) and Sodium hypochlorite (1%) were used for study with duration of 2, 5 and 8 minutes.

Effect on non-growing cultures:

On increasing the duration of $HgCl_2$ the mortality increased and was recorded higher in 8 minutes (T6) duration. $HgCl_2$ showed higher mortality rate (0.7, 0.9 and 0.9 in T4, T5 and T6 respectively) than those in NaOCl (0.8, 0.4 and 0.5). The lowest mortality rate (0.4) was observed in T2 (5 minute) duration of NaOCl (Fig.1).

Effect on Infection of cultures:

Result showed that with incensement of time the infection was decreases in both the chemicals. The infection was notably much lower in NaOCl with 8 minute duration (T3). The higher duration i.e. T6 (8 minute) of $HgCl_2$ showed lower infection (Plate-1a).

Effect on healthy cultures (overall survivals):

The data indicate (Table-1; Fig.1) that with the increase in duration of both the chemicals the survival rate was also increased. The survival obtained with 8 minute (T3) of NaOCl was significantly higher than all the duration of both the chemicals.

Suitable sterilization chemical:

While comparing the effect of $HgCl_2$ and NaOCl, the NaOCl was always found better than $HgCl_2$. Sodium hypochlorite (NaOCl) for 8 minute (T3) was selected for suitable sterilization chemical after 5 minute of savlon wash, 30 seconds dip in ethanol and at last washed with double distilled water (Plate-1b).

DISCUSSION:

Mercuric chloride is a very strong sterilant yet Gopal *et al.*, (1998) disinfected the single nodal cuttings of 22 cultivars with a mixture of 0.1% Mercuric chloride and 0.1% Sodium lauryl sulfate for 5 minutes. Calcium hypochlorite being a mild sterilant has been used for potato. Nozeram *et al.*, (1977) sterilized potato sprouts by dipping them in alcohol and a few drops of Teepol and then placed them in Calcium hypochlorite solution for 15-25 minutes. Roca *et al.*, (1978) sterilized single node segments with 0.25% calcium hypochlorite for 5 minutes. Wang (1984) recommended that the shoot tip obtained from green house grown plants should be surface disinfected for 3 minutes by soaking in a calcium hypochlorite (or 10% commercial bleach) solution with a small amount of detergent (e.g. Tween- 20). According to

Maroti *et al.* (1982) and Naik and Chandra (1993), ethanol is a mild surface sterilant recommended for initial general use.

Sodium hypochlorite has turned out to be a better sterilant than calcium hypochlorite due to bleaching effects of the later and hence has been extensively used for potato sterilization. Wescott *et al..*, (1977) and Goodwin *et al..*, (1980) disinfected the sprouts with Sodium hypochlorite in which available chlorine was sterilized single node cuttings of eight different cultivars in 1% aqueous sodium hypochlorite. Miller and Lipschutz (1984) surface sterilized excised shoot tips in 1% sodium hypochlorite solution containing 0.1% Tween-20 for 7 minutes with gentle shaking. Naik and Chandra (1993) recommended first rinsing of sprouts with 20% ethanol for 30 seconds followed by 10 minutes shaking with 25% sodium hypochlorite solution with 1-2 drops of Tween-20. Villafranca *et al..*, (1998) surface sterilized the sprouts with 1% sodium hypochlorite, 0.1% Tween-20 solutions for 5 minutes.

Amongst the two sterilants i.e. NaOCl and $HgCl_2$, NaOCl was found better for controlling the infection and it had not any adverse effect on explant even in long duration. There are a number of reports (Miller and Lipschutz, 1984; Naik and Chandra, 1993 and Villafranca, 1998) for steriliztion of potato sprouts and shoot tips with 1% NaOCl for 5-10 minutes. Gopal *et al..* (1998) have reported the use of $HgCl_2$ for 5 minutes, it being a strong sterilant was used by them in combination with Sodium Lauryl Sulphate.

Table-1 Effect of sterilization on growth, infection and survival of culture:

Observations	**Treatments**					
	T1	**T2**	**T3**	**T4**	**T5**	**T6**
Non-growing cultures	0.8	0.4	0.5	0.7	0.9	0.9
	SD ± 1.8	AD= 5.8				
Infected cultures	0.8	0.8	0.1	0.8	0.6	0.5
	SD ± 1.7	AD= 5.0				
Healthy cultures	0.4	0.8	1.6	0.5	0.5	0.6
	SD ± 1.9	AD= 6.0				

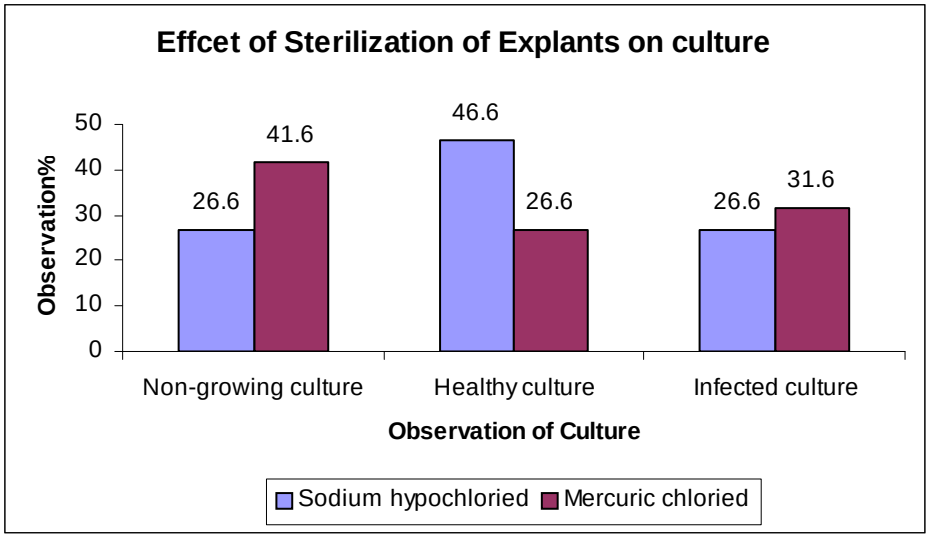

Fig.1 Effect of Sterilization on Culture

(b) **(d)**

Plate 1: Sterilized explants after 30 days **(a)** infected shoot tips **(b)** selected best plantlet of NaOCl chemical with 8 minute

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Preparation and evaluation of the hypocholesterolemic effect of fermented formula

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Abstract

The present research was postulated to prepare fermented formula, which is a mixture of yoghurt/cereals and vegetables. The aim also includes studying the hypocholesterolemic effect of the prepared fermented formula in hypercholesterolemic rats. The results of chemical analysis of the fermermented formula revealed that crude protein, crude fiber, calcium, zinc, iron and selenium presence in the sample by 21.9g, 2.5g, 250mg, 3.69mg, 3.93mg and 45.8ug, respectively. The level of total phenolic compounds of the fermented formula as determined by the Folin-Ciocalteu method was 1870 mg of gallic acid equivalents/ 100g dry weight. The pH of the fermented product was 6. The results of feeding hypercholesterolemic rats on balanced diet containing fermented formula showed significant reduction in plasma total lipids, total cholesterol, low density lipoprotein cholesterol and triglycerides. Diet containing fermented formula produced significant increase in high density lipoprotein cholesterol. Hypercholesterolemic rats fed on diet containing fermented formula showed significant decrease in plasma level of malondialdehyde as indicator of lipid peroxidation. These results reflect the possible beneficial use of fermented foods towards cardiovascular diseases. [Academia Arena, 2009;1(5):9-17]. ISSN 1553-992X.

Key Words: Fermentation, Fermented formula, hypercholesterolemic rats, plasma lipid profile.

Introduction

Food fermentation is regarded as one of the oldest ways of food processing and preservation. More than anything else, man has known the use of microbes for preparation of food products for thousands of years and all over the world a wide range of fermented foods and beverages contributed significantly to the diets of many people (Achi, 2005). Fermented foods are food substrates that are invaded or overgrown by edible microorganism whose enzymes, particularly amylases, proteases and lipases hydrolyze the polysaccharides, proteins and lipids to non-toxic products with flavors, aromas and textures pleasant and attractive to the human consumer (Steinkraus, 1997).

Fermentations involving production of lactic acid are generally safe. Lactic acid fermentations include those in which the fermentable sugars are converted to lactic acid by organisms such as *Lactobacillus brevis*, *Lactobacillus bulgaricus*, *Lactobacillus acidophilus*, *Bifidobacterium bifidus* etc. (Steinkraus, 1996). In the present research we prepared fermented formula, which is a modification of Egyptian Kishk. Egyptian Kishk is basically parboiled wheat/yoghurt mixtures that combine the high nutritional value of wheat and milks while attaining excellent keeping qualities. Our fermented formula besides wheat and yoghurt contain soybean and carrot to increase vitamins and phenolic compounds, which have antioxidant activity. So the studied fermented formula is yoghurt/cereal/vegetable mixture. It was reported that fermented foods especially fermented milk products such as Kefir have been shown to affect serum cholesterol concentration (St-Onge *et al*., 2002). So the objective of the present research was to prepare fermented formula. The aim also includes studying the hypocholesterolemic effect of fermented formula on hypercholesterolemic rats as functional fermented food product for cardiovascular diseases.

Materials and Methods

Materials

- All ingredients of the fermented formula (wheat, soybean, whey protein concentrate, carrot, milk, and vanilla essence as flavor was supplied from local market and Ministry of Agriculture.
- **Yeast** *Saccharomyces cervisia F-25* (260 mg Se/Kg powder and activity 550 cm^3 CO_2/hrs.) were obtained from NRC, Cairo, Egypt.
- **A commercial ABT-2** starter culture **(***Streptococcus Thermophilus, Bifidobacterium Bifidus* and *Lactobcillius acidophilus***)** was purchased from Chr. HANSEN Pty. Ltd., Bayswater, Australia.

- Male Sprague-Dawely rats of 112.7±1.029 g average body weight were used in the experiment. The animals were kept individually in stainless steal cages. Water and food were given ad-libitum.

Preparation of bioactive ingredients

- **Soybean.** Soybean seeds were cleaned by tap water, and soaked in tap water for 2 days at room temperature. Germination was carried out by spreading the soaked seeds in wet blotting paper and kept at 25 ºC for 72 h. It was boiled for 30 minutes in water with added 1% sodium bicarbonate. The soybean seeds were dried in air oven at 45 ºC then ground to powder and stored in polyethylene bags at 4 ºC to be used in the formulation.
- **Germinated wheat**. Whole wheat seeds were soaked in tap water (1:3 w/v) for 2 days. Germination was carried out by spreading the soaked seeds in wet blotting paper and kept at 25 ºC for 72 h. The seeds were kept wet throughout germination by spraying them with water every 12 h. The germinated wheat was then dried in air oven at 45 ºC, then ground into fine powder and kept at 4 ºC to be used in the formulation.
- **Cereal – soybean mixture.** The ground material of germinated wheat and soybean was mixed using a ratio of 70: 30 (w/w).
- **Carrots.** Carrot was washed with tap water and cut into small slices then dried in air oven at 45 ºC and ground into fine powder and kept at 4 ºC until used in the formulation.
- **Milk mixture.** One kilogram buffalo milk was heated at 85 ºC for 5 min. and rapidly cooled down to 4 ºC. After removing the butter film (which was formed on the milk surface) 300 g whey protein concentrate and 5 g turmeric rhizomes powder were mixed.
- **Yoghurt** was processing according to the method of Dave and Shah (1998).
- **Preparation of the fermented formula.** Cereal–soybean mixture (1 Kg), carrot (50 g), vanilla (5 g), sodium chloride (23 g) and yeast (10 g) were mixed with warm water 30-35 ºC (dilution 30% w/v). Fermentation was carried out for 20 h at 28-30 ºC, steamed for 20 minutes, dried in air oven at 45 ºC and ground into a fine powder. This fine dried powder was mixed with milk mixture (200 ml) and yoghurt (100 g) and fermented at 28-30 ºC for 20 h. After the fermentation the dough was dried in air oven at 40-50 ºC until the moisture content was reduced to 6%. The final product was stored in a glass jar and refrigerated until used for analysis.
- **Analytical procedure.** Moisture, protein, fat, crude fiber and ash contents were determined according to AOAC, (1995). Carbohydrates were calculated by difference. Dietary fiber was determined according to AOAC (1997). Minerals (Ca, Fe, Mg, Se and Zn) content of the fermented formula was determined by atomic absorption spectrophotometer (Varian spectr AA 220). Total phenolic content was determined in the fermented formula according to the method of Singleton and Rossi (1965) using Folin-Ciocalteu reagent. Absorbance was measured at 765 nm using UVPC spectrophotometer. The total phenolic content was expressed as gallic acid equivalents (GAE) in milligrams per 100 gram dry material. The pH value of the fermented product was determined as described by Ibanoglu *et al*. (1999). Microbiological quality was done following the method of James (2000).
- **Preparation of diets for animal experiment.** Different experimental diets appeared in Table (1). Salt mixture and vitamin mixtures were prepared according to Briggs and Williams (1963) and Morcos (1967) respectively. Oil soluble vitamins were given orally in a dose of 0.1 ml/rat per week.

Table (1): Composition of different experimental diets. (g/100 g).

Ingredients	Diets		
	Balanced	Hyper-cholesterolemic	Fermented formula
Casein	11.9*	11.9*	-
Corn oil	10	-	7.26
Butter	-	25	-
Sucrose	23.5	35	23.5
Starch	47.1	22.35	20.37
Salt mix.	3.5	3.5	1.31
Vit. mix.	1	1	1
Fiber	3	-	1.86
Cholesterol	-	1	-
Cholic acid	-	0.25	-
Fermented formula[1]	-	-	47

* 11.9 casein has been shown to contain 10 g protein (AOAC, 1995).

[1]An appropriate amount of fermented formula was added to the diet so diet would contain 10% protein, 10% fat, 23.5% sucrose, 3% fiber, 1% vitamin mix. 3.5% salt mix. and completed to 100% by starch.

Design of animal experiment

The experiment was divided into two stages

- **First stage.** Rats were assigned to two dietary groups. The first group (6 rats) received a balanced diet (CC group), while eighteen animals (HH the second group) were fed a hypercholesterolemic diet reported by Zulet *et al*. (1999). This stage continued for a month.
- **Second stage**. After development of hypercholesterolemia, hypercholesterolemic rats were divided into three sub-groups each of 6 rats. Rats of the first sub-group continued on the same hypercholesterolemic diet (HH group) and the remaining hypercholesterolemic 2 sub-groups of rats received the balanced diet (HB group), or balanced diet supplemented with fermented formula (HFF group) for four weeks. During this experimental period the control group continued on the same balanced diet (CC group). During the experiment, body weight and food intake were recorded weekly. At the end of first and second stages, total food intake, body weight gain and food efficiency ratio (Body weight gain/total food intake) were calculated. After an overnight fast blood samples were withdrawn from eye vein orbital from all rats at the end of first and second stages for the determination of plasma total lipids (Toro and Ackerman, 1975), total cholesterol (T-Ch) (Watson, 1960), high density lipoprotein cholesterol (HDL-Ch) (Burstein *et al*., 1980), low density lipoprotein cholesterol (LDL-Ch) (Gerard and Gerald, 1981) and triglycerides (TG) (Megraw *et al*., 1979). HDL-Ch / T-Ch ratio was calculated. Malondialdehyde (MDA) (Satoh**,** 1978**)** was determined in all plasma samples as indicator for lipid peroxidation.
- The results of animal experiment were expressed as the Mean ± SE and they were evaluated statistically using Student's t-test, $p < 0.05$ was used as the criterion of statistical significance.

Results and Discussion

The result of chemical analysis of the fermented formula sample is given in Table (2). Crude protein, crude fiber, calcium, zinc, iron and selenium concentration in the sample were 21.9g, 2.5g, 250mg, 3.69mg, 3.93mg and 45.8ug, respectively. The whole wheat grain was a good source of selenium and during germination several enzymes become active and brought about profound changes in the nutritive value of cereal (Subramanian, 1976). Also soybean was an excellent source of minerals including calcium, iron and copper. During fermentation bacterial enzymatic hydrolysis enhance the bioavailability of protein and increase the production of free amino acids and short chain fatty acid (Parvez *et al*., 2006). The result of chemical analysis showed that moisture of the fermented product was 6%; in another work this level was suitable for long term storage without deterioration for 2 and 3 years (Degirmencioglu *et al*., 2005). In the

present study the level of total phenolic compounds of the fermented formulae as determined by the Folin-Ciocalteu method (Table 2) was 1870 mg of gallic acid equivalents/ 100g dry weight. The pH of the fermented formula was 6. Ashraf (2006) found that the combination treatment of germination and fermentation brought an increase in nitrogen solubility both at acid and alkali pH.

Table (2): Chemical composition of the fermented formulae.

Ingredients	Weight / 100 g sample
Moisture (g)	6.20
Energy (Kcal)	400.8
Total Protein (g)	21.90
Crude Fat (g)	6.0
Crude Fiber (g)	2.50
Dietary fiber (g)	25.25
Ash (g)	4.80
Total Carbohydrate (g)	64.8
PH	5.80
Total phenolic compounds (mg/100g sample as gallic acid equivalent)	1870
Minerals	
Zinc (mg)	3.69
Iron (mg)	3.93
Magnesium (mg)	85.30
Calcium (mg)	250
Selenium (μg)	45.8

The results of microbilogical evaluation of the fermented formula are shown in Table (3). Microbiological analysis was done in the fermented formula and there is no indicator organisms found.

Table (3): Microbiological evaluation of the fermented formula.

	Complete process of fermentation
Total bacterial count (CFU/g)	4.7×10^8
Streptococcus spp.	$< 10^6$
Lactobacillus spp.	$< 10^6$
Bifidobacteria spp.	$< 10^6$
Yeast/mould count (CFU/g)	0/0
Coliform count (CFU/g)	Free
Escherichia coli	Free
Salmonella and shigella	Free
Bacillus cereus (CFU/g)	Nil (0)
Staphylococcus aureus (CFU/g)	Nil (0)
Listeria monocytogenes	Free

Evaluation of hypocholesterolemic effect of fermented product:

It has been repeatedly reported that nutrition plays an important role in the eitology of hyperlipidemia and atherosclerosis. Several animals and human studies have confirmed the hypercholesterolemic properties of saturated fatty acids and cholesterol by increasing serum total cholesterol and altering the lipoprotein pattern (Bhadra *et al*., 1993 and Da-Silva *et al*., 1996). Moreover, nutritional recommendations have been given to prevent and treat some lipid metabolism disturbances (Dwyer, 1995).

Nutritional parameters of normal and hypercholesterolemic rats of first stage are shown in Table (4). The results revealed that non-significant change was found in final body weight, while body weight gain, total food intake and food intake/day were significantly lower in hypercholesterolemic rats in comparison with normal rats ($p < 0.025$, <0.001 and < 0.001 respectively).

Table (4): Nutritional parameters of normal and hypercholesterolemic rats (First stage).

Parameters	Groups	
	Normal Mean ± SE	Hypercholesterolemic Mean ± SE
Initial body weight (g)	122.83 ± 2.006	122.6 ± 1.152
Final body weight (g)	224.83 ± 8.049	205.4 ± 3.724
Body weight gain (g)	102 ± 6.596	82.833* ± 3.365
Total food intake (g)	418.27 ± 15.765	329.606** ± 7.637
Food intake (g/day)	13.942 ± 0.526	10.987** ± 0.255
Food efficiency ratio	0.2433 ± 0.011	0.251 ± 0.007

Values significantly differ from normal rats:
*: $p < 0.025$, **: $p < 0.001$.

Plasma lipid profiles of hypercholesterolemic rats (First stage) are shown in Table (5). The rats fed the hypercholesterolemic diet showed significant increase in the plasma levels of total lipids (+ 108 %, $p < 0.001$), Tch. (+ 82 %, $p < 0.001$), and LDL-ch (+ 274 %, $p < 0.001$), which was accompanied by a decrease in HDL-ch and HDL/T.ch ratio (- 32 %, - 62% respectively, $p < 0.001$) when compared to normal rats. Plasma TG level showed non-significant change. These results are in agreement with the results of Zulet *et al*. (1999) who reported significant increase in plasma levels of Tch and LDL-ch (+ 362 % and 2660%, $p < 0.001$ respectively) of rats fed similar hypercholesterolemic diet. The rats fed the hypercholesterolemic diet showed significant increase in the plasma levels of malondialdehyde (+ 119%, $p < 0.001$) when compared with normal rats, which indicate that lipidperoxidation elevates significantly in hypercholesterolemic rats.

The assessment of the lipid profile in plasma of rats fed a high-fat diet enriched in saturated fat and cholesterol revealed a situation of hypercholesterolemia, which was accompanied by a decrease in HDL-ch and an increase in LDL-ch. These alterations resembled a situation of type II hyperlipidemia in human (Tholstrup *et al*., 1995), which could be associated with a down-regulation in LDL receptors by the cholesterol and saturated fatty acids included in the diet (Stucchi *et al*., 1995).

Table (5): Plasma lipid profile of normal and hypercholesterolemic rats (First stage).

Parameters	Groups	
	Normal Mean ± SE	Hypercholesterolemic Mean ± SE
Total lipids (g/dl) % Change	0.399 ± 0.009	0.829* ± 0.016 + 108
TCh (mg/dl) %Change	90.08 ± 1.345	163.71* ± 4.274 + 82
HDL-Ch (mg/dl) % Change	48.03 ± 0.705	32.49* ± 0.339 - 32
HDL/TCh ratio % Change	0.534 ± 0.013	0.201* ± 0.006 - 62
LDL-Ch (mg/dl) % Change	25.04 ± 0.312	93.59* ± 1.237 + 274
TG (mg/dl) % Change	93.52 ± 1.475	94.79 ± 0.930 + 1
MDA (nmol/ml) % Change	4.87 ± 0.307	10.670 ± 0.239 + 119

Values significantly differ from normal rats: *: $p < 0.001$.

Nutritional parameters of hypercholesterolemic rats after feeding different dietary treatment (second stage) are shown in Table (6). Hypercholesterolemic rats fed on balanced diet (HB) showed significant

increased in body weight gain and food efficiency ratio ($p < 0.005$ and 0.001 respectively) when compared with hypercholesterolemic rats (HH) fed on hypercholesterolemic diet, while total food intake and food intake/day reduced significantly ($p < 0.005$). Hypercholesterolemic rats fed on balanced diet containing fermented formula (HFF) showed significant reduction in final body weight ($p < 0.001$), body weight gain ($p < 0.001$) and food efficiency ratio ($p < 0.001$) when compared with hypercholesterolemic rats (HB) fed on balanced diet.

Plasma lipids of hypercholesterolemic rats after feeding different dietary treatments in 2nd stage are shown in Table (7).

When comparing plasma lipids of different hypercholesterolemic rats that fed on balanced diet containing fermented formula (HFF) with rats continued fed on hypercholesterolemic diet (HH), as it was expected all plasma lipids were significantly improved. To exclude variation of plasma lipids that may occur as a result of changing the diet from hypercholesterolemic to balanced, we decided to compare the group of rats fed diet containing fermented product (HFF) with the group of hypercholesterolemic rats fed on balanced diet (HB) to know the actual change in plasma lipids. Hypercholesterolemic rats fed balanced diet (HB group) showed significant reduction in plasma levels of total lipids, T-Ch and LDL-Ch (-16%, -20%, -21%, respectively), while HDL-Ch and HDL/TCh ratio increased significantly (26%, 57% respectively $p < 0.001$), in comparison to hypercholesterolemic rats feeding the hypercholesterolemic diet (HH).

Table (6): Nutritional parameters of different experimental groups (2nd stage).

Groups	Parameters						
	Mean ± SE	Initial body weight (g)	Final body weight (g)	Body weight gain (g)	Total food intake (g)	Food intake (g/day)	Food efficiency ratio
CC	Mean	224.8	276	51.2	343.1	11.437	0.149
	± SE	± 5.365	± 7.722	± 2.509	± 8.746	± 0.292	± 0.006
HH	Mean	209.2	253.8	44.6	328.8	10.959	0.136
	± SE	± 4.193	± 3.009	± 3.551	± 5.305	± 0.177	± 0.011
HB	Mean	206.8	259.8	53**	305.4*	10.2*	0.174*
	± SE	± 3.734	± 5.164	± 2.118	± 5.242	± 0.175	± 0.007
HFF	Mean	200.3	214.2††	13.9††	319.7	10.66	0.043††
	± SE	± 3.583	± 4.331	± 2.667	± 8.718	± 0.291	± 0.006

Values significantly differ from HH rats: *: $p < 0.005$, **$p < 0.001$

Values significantly differ from HB rats: ††: $p < 0.001$

Feeding hypercholesterolemic rats on diet containing fermented formula (HFF) showed significant increased in plasma level of HDL-Ch ($p < 0.025$). Hypercholesterolemic rats feeding on balanced diet containing fermented product showed improvement in all plasma lipid profile determined ranged from 4 to 11%. Fermented formula produced reduction in malondialdehye level in plasma as indicator of lipid peroxidation by 2% when compared with hypercholesterolemic rats feeding balanced diet. Our results are in agreement with the results of (Jang *et al*., 2007), who reported that fermented rice was very effective for improving the lipid metabolism and reducing stress by up-regulating the hepatic antioxidant enzymes in high-cholesterol-fed rats.

Table (7): Plasma lipids of hypercholesterolemic rats fed on different experimental diets (2nd stage).

Parameters	Groups (Mean ± SE)			
	CC	HH	HB	HFF
Total lipids (g/dl) % Change	0.425 ± 0.017	0.897* ± 0.018 + 112	0.749¨ ± 0.018 -16	0.689 ± 0.035 -8
T-Ch (mg/dl) %Change	90.49 ± 2.589	191.6* ± 8.525 +112	153.9˙ ± 6.959 -20	146.6 ± 7.009 -5
HDL-Ch (mg/dl) % Change	47.8 ± 0.525	29.7* ± 0.779 -38	37.4¨ ± 0.475 +26	39.7[a] ± 0.629 + 6
HDL/TCh ratio % Change	0.531 ± 0.021	0.157* ± 0.009 -71	0.245¨ ± 0.013 +57	0.273 ± 0.013 +11
LDL-Ch (mg/dl) % Change	25.2 ± 0.364	110.2* ± 3.040 +338	87.22¨ ± 2.134 -21	83.5 ± 2.365 -4
TG (mg/dl)	94.57 ± 1.462	94.2 ± 1.467	90.2 ± 2.219	90.6 ± 2.221
MDA (nmol/ml) % Change	5.2 ± 0.189	11.8* ± 0.530 +128	9.1¨ ± 0.226 -23	8.9 ± 0.327 -2

Values significantly differ from normal rats: *: $p < 0.001$.

Values significantly differ from HH rats: ˙ $p < 0.005$, ¨ $p < 0.001$

Values significantly differ from HB rats: a: $p<0.025$

The improvement in plasma lipid profile in hypercholesterolemic rats feeding on balanced diet containing fermented formula may be due to presence of probiotics and fibers, especially dietary fibers. It was reported that plasma cholesterol levels can be reduced by consumption of probiotic-containing dairy foods by people with elevated blood cholesterol (Parvez *et al*., 2006). Taranto *et al*. (1998) found that administration of low levels of *L. retueri* for 7 days decreased total cholesterol and triglyceride levels by 38% and 40% respectively, and increased the high-density lipid: LDL ratio by 20% in hypercholesterolemic mice.

The studied fermented formula contain high amount of dietary fiber 25.25g/100g sample as shown in Table (2). Dietary fiber plays an important role in lowering plasma cholesterol concentration through interference with bile acid absorption by binding or sequestering bile acids in the intestinal lumen (Anderson *et al*., 1990), dietary fiber reduces their active reabsorbtion in the lower small intestine, leading to fecal excretion. This leads to increased diversion of cholesterol to bile acid synthesis in the liver, up-regulation of lipoprotein receptors and depressed plasma cholesterol concentrations (Truswell and Beynen, 1992).

Feeding hypercholesterolemic rats on diets containing fermented formula showed significant reduction in malondialdehyde level as indicator of lipid peroxidation. This results indicate that studied formula possess antioxidant activity, which may be due to presence of phenolic compounds as shown in Table (2). Phenolic compounds possess antioxidant activity due to their redox properties which allow them to act as reducing agents, hydrogen donators and singlet oxygen quenchers. Some phenolic compounds act as metal chelator and reduce lipid oxidation. It was reported that bioactive phenols can quench reactive oxygen species and protect from pro-oxidative damage (Wolfe and Liu, 2007 and Soobrattee *et al*., 2008).

Conclusion Fermented formula showed improvements in plasma lipid profile of hypercholesterolemic rats and reduced lipid peroxidation. Therefore fermented formula can be recommended as functional food to treat hypercholesterolemia or reduce the risk of atherosclerosis.

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Trace Elements Concentration As Guides To Rare Metals Mineralization In The Soils Of Nasarawa Pegmatite Field, Central Nigeria

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Abstract

The Nasarawa pegmatite field belongs to the east-north-east trending pegmatite province of Nigeria, which extends from Abeokuta in the south-west to Bauchi in the north-east. Trace elements in relatively newly-formed pegmatite eluvial soils sampled close to eluvial workings, and unbiased soil samples taken over the whole area were compared to note the effects of the secondary surface processes on the redistribution of the trace elements in the soils. Soils of the B-horizon and eluvial soils over mineralized pegmatites were analyzed for major and trace elements Results of univariate analysis and bivariate correlations of some selected trace elements indicate that. Ba, Cs and Rb can be used to characterize the soils. On the average Rb and Cs show very high increase (>110%) and depletion in Ba in the pegmatite eluvial soils. These high values of Rb and Cs as well as depletion of Ba in the eluvials reflect their distribution in buried pegmatites and they are thus useful pathfinder elements in detecting buried Sn – Nb – Ta – Be mineralized pegmatites. [Academia Arena, 2009;1(5):18-26]. ISSN 1553-992X.

Keywords: pegmatites, trace elements, eluvial soils, Nasarawa-Nigeria**,** univariate analysis, bivariate correlations

INTRODUCTION

The Nasarawa pegmatite area is part of the pegmatites of Central Nigeria known for its mineralization of specialty minerals like tantalite, cassiterite and columbite and also some gemstones like beryl, tourmaline and topaz. The major mineral being produced from this area is tantalite and this is from a few exposed weathered pegmatite outcrops. World production of these specialty minerals is declining and hence attention is now being placed on their exploration in order to increase their reserve and production so as to earn valuable foreign exchange. However, much of the area is overlain by a thick residual soil which makes exploration difficult.

Lateritic soils are typically residual weathering products of the underlying rock units. Their most important components are clay minerals and accumulations of colloidal Al, Fe, and Mn hydroxides and oxides which show a high degree of adsorption and ion-exchange capacity (Norton 1973). Generally, the movement of the cations in soils is more in the vertical than the horizontal direction. However, the element distribution in soils depends on the physico-chemical nature of the element, and very important are the ionic potential, Eh and pH conditions. The depletion and enrichment of an element will be determined foremost by the climatic conditions, drainage, the type of parent rock and the available pH value. In water solution, material is transported as ions, complexes or colloids and depending on Eh and pH conditions, new minerals may even be formed.

Matheis (1981) stated that the results of detailed trace-element studies in lateritic soil profiles indicate that most of the trace elements retain more or less their bedrock concentrations during pedogenetic development; thus characteristic differences in bedrock composition are still reflected by the trace-element pattern of the sampling horizons. This is because the secondary geochemical dispersion processes in these typically tropical weathering environments adjust the trace-element distribution during lateritic soil

development to narrow fluctuation ranges. Thus the study of trace-element characteristics in soils could be useful in identifying the underlying bedrock (Zeissinck, 1971).

The main objective of this work is to, through better understanding of elemental distribution in this environment, find some geochemical and/or statistical methods which will enable such potentially significant pegmatite occurrences to be rapidly and cheaply found. To achieve this objective, some soil samples were collected, analyzed and subjected to statistical analyzes in order to characterize them.

CLIMATE AND PHYSICAL FEATURES

The study area is situated in the savannah belt of Nigeria with a wet season from May to September followed by a long dry season from October to April. From November to early March, the northeast trade wind, known as the "harmattan" keeps the humidity extremely low. The rainfall is almost entirely confined to the wet season with an annual average of about 133 centimeters. Considerable variations sometimes up to 26 centimeters and more occur from year to year. Most of the streams flows generally southwards except few that take their source from the northeast/southwest trending watershed that exists in the northern half of the area and hence flow northwards. All the streams in the study area dry up during the long dry season. Thus, shortage of water usually poses an acute difficulty in the dressing of mineral concentrates and in many cases; the pegmatites are worked only during the wet season.

The primary vegetation has been greatly modified by the agricultural activities of the inhabitants. Consequently, a mixture of long grasses and short trees of the derived Savannah type now cover the area the grasses reach their maximum development between the months of August and December making mineral prospecting and exploration difficult during these months.

The area is gently rolling and undulating except in the east and northwest where ranges and inselbergs of the Younger and Older Granites break this feature respectively. The hills of the study area could be subdivided into two distinct types vis the inselbergs and the long ranges. The granites form the inselbergs while the long ranges are formed by masses of amphibolites/granodiorite gneisses and the pegmatites. The high ranges of units of Afu complex in the east and the fringe forests that grow at the foot of these ranges make the eastern part relatively inaccessible. Most of the streams flow generally southwards taking their source from northeast/southwest trending watershed that exists in the northern half of the area.

In the Nasarawa area, the soils over pegmatites are fine reddish brown with quartz fragments while those over the schists are generally fine and grayish. Those above gneisses and granites are yellowish brown to grayish, coarse, sandy and gravelly. The undulating nature of the terrain induces some variability in the depth to the water table, therefore, chemical decomposition will be more active in the more acidic rocks like pegmatites and there is more erosion along the slopes. In the gently rolling terrain over the gneiss-schist complex and the amphibolites, the thickness of the soil increases progressively and the soil horizons are better developed.

GEOLOGIC SETTING

The pegmatites of Nasarawa area form the northern part of the pegmatites of Central Nigeria (Fig. 1). These pegmatites are better exposed than those of Egbe and Ijero that lie in the tropical rainforest of the southwest and on which much work has been done (Dada, 1978; Emofurieta, 1977; Matheis, 1978; 1979, 1980b; Ohiwerei, 1978). Rocks of the area include the schists, Younger and Older Granites and the pegmatites. These rocks have been fully described by Akintola and Adekeye (2005a). However, because of the significance of pegmatites to this study, they are hereby briefly described.

The Pegmatites:

There are simple and complex pegmatites in the area. The pegmatites generally range in dimensions from a few meters to over a kilometer in length, while the width varies from a few centimeters to 10 metres and more. Dykes with a strike length between 300 and 700 metres are quite common. Although, the majority of the pegmatites occur in the form of regular tabular dykes with fairly constant dips and strikes, many of the richly mineralized pegmatites occur as sill-like bodies with pronounced, pinch and swell structures. The swellings are generally loci of intense albitization and mineralization. While the majority of the pegmatites strike north-east/southwest, some have north-west/south-east and east-west strike directions. Strike and dip may change even in one dyke, following planes of weakness (joints, fractures and foliation planes) in the country rock. There is a tendency towards the arrangement of the pegmatites in subparallel groups akin to an en-chelon emplacement. In some cases, there are two or more

intersecting sets of dykes. Majority of the pegmatites generally crossscut the foliation of the host schists and gneisses.

The simple pegmatites are found in the proximity of the biotite Older Granites at the western part of the area. They are barren, and composed essentially of quartz, microcline-microperthite and minor plagioclase. The minor plagioclase appears to be replacing the perthite with sericite as by-product. Many of the complex pegmatites display a textural and mineralogical zonation parallel with the walls of intrusion. Quartz-mica marginal facies are a common feature of the pegmatites and consist of a zone of quartz and muscovite along the walls of the dyke. The mica is coarse-grained and oriented at right angles to the contact.

In the case of the simple pegmatites, wall rock alteration is negligible but there is usually a narrow zone of altered rock along the contacts of the complex pegmatites. Although tourmalinization is by far the most common type of contact alteration in complex pegmatites, it is generally accompanied by silicification, albitization, greisenization and sometimes formation of apatites/fluoropatites which gives rise to gradational contacts. Otherwise, the passage from pegmatite to countryrock is generally rapid and sharp. Recrystallization of the wall-rock minerals especially the micas is a common feature. Pegmatite-country rock relationships suggest an emplacement level transitional between ductile and brittle host-rock behaviour (Kuster, 1990). Xenoliths of the foliated host-rock, (quartz-biotite schist) are present in some pegmatites suggesting that the pegmatites are younger than the schists. The formation of cookite in one of the pegmatites shows that the pegmatites were emplaced in the high-temperature, low pressure (Abukuma type) metamorphic environment. The appearances of greenschist facies minerals like chlorite and green biotite almost certainly confirms them to be products of retrograde metamorphism.

METHODS

A total of 54 soil samples were collected from the upper 50cm of the B-horizon. 32 of these samples were collected without any bias at points tied to a 1km by 1km grid. The remaining 22 samples were taken from eluvial soils over mineralized pegmatites. The samples were sieved through 212μm (-70mesh) sieve size. 6g of each sample material was added to 1.5g of Hoechst wax-c micropowder in a container and mixed by pressing the container to a Silamat high speed vibrating instrument with the timer set at 20 seconds. The powder was then pressed with an hydraulic press at 20 tons in steel liner to obtain a pellet of about 4cm diameter and 3mm thickness. The pellet was analysed by X-ray fluorescence. The soil data were then subjected to univariate analysis of variance and bivariate correlation analysis using SPSS statistical software.

RESULTS

Results of some elements analyzed in some unbiased soil samples of the study area and eluvial soils over the pegmatites are shown in Tables 1 and 2 respectively. Their mean values are also indicated on both tables. Generally, Ba, Mn and Zr have higher values over the unbiased soils than the eluvials. Cr, Ga, Sr, V and Zn show marginal increases in the eluvials than the unbiased soils. However, Cs and Rb show highly anomalous values in the eluvials in the whole area.

There are high positive correlations and associations of Cr and Ga, Ga and V, Rb and V, Ga and Ni and Rb and Ni especially in the eluvials. In the unbiased soil samples, Rb and Ga (0.881), Cr and V (0.922) Ni and V (0.943), Cr and Ni (0.867) have high correlation indices. On the other hand, some of the elements, for example, Cs and Ba (-0.666), Rb and Zr (-0.543), Cs and Zr (-0.526) in the eluvials show moderate negative correlation indices. For the unbiased soils, Rb and /Zr (-0.078), Cs and Zr (-0.113) Ga and Zr (-0.245), and V and Zr (-0.312) show low negative indices. (Table 3).

Univariate analyses of variance was performed on the two soil types (Table 4) and the results are shown as graphs of elemental distribution in Figure 3. Results of univariate analysis indicate that Ba, Cs and Rb can be used to characterize the soil type. For unbiased soils, range of element content of Ba (360-480), Cs (–46-73) and Rb (6-135) effectively characterize it while element content of Ba(191-311), Cs (89-209) and Rb (251-371) effectively characterize the eluvial soils.

DISCUSSION

Although chemical weathering progresses very fast in the tropical environments, extensive leaching of the primary constituents is mainly restricted to the major elements Mg, Ca, Na and K (Andrew-Jones, 1968; UNESCO, 1971; Zeegers, 1979). Most of the lithologically determined trace elements, to some extent, retain the contrast of their primary concentration levels during weathering processes,

especially in areas that have not been disturbed by erosion or mass movement. Hence, soils enriched in Rb, Cs, Ga and Sn are depleted in Mn, Ba and Zr. Secondary dispersion haloes of typical pegmatitic rare elements in soils facilitate locating pegmatites, although the contrast between their decomposition products and those of the country rocks is much lower than in unaltered fresh rocks.

The contrasts in the geochemical association of the trace elements are more noticeable in the eluvials as indicated by the higher correlation indices between the elements compared with those of the soils generally from the area as shown in Table 3. In the older soils, associations of the elements depend on their mobility in the secondary environment.

For example, elements of hydrolysates such as Mn, Ga, V, which are relatively immobile in the secondary environment have more positive correlations with many other trace elements. These elements are most probably held on the surface of hydrolysate elements by adsorption. Thus the contrasts noticeable in the distribution of elements in the eluvial soils which amply reflect the elements distribution in the bedrock are obliterated to some extent by the redistribution of the elements in the soils by the secondary processes of weathering, erosion and the different rates of dissolution and mobilities of the elements in the secondary environment (Gordon et al, 1958; Andrew Jones, 1968; Cadile, 2003; Oyarzabal and Cadile, 2004). Although, the streams in the area are seasonal, the combined effects of the relief and drainage must have accentuated the leaching of the mobile elements especially along the well-drained slopes and leading to elements redistribution in the secondary environment. Nevertheless, Matheis (1981), said (1994) and Oyarzabal (2004) showed that Li, Be, Rb, Cs, Mg/Li and K/Rb in the B-horizon of lateritic soils effectively outline pegmatite bodies. Also, Marshall and Herman (1986) and Adedoyin (2004) used the distribution of Be, La, Nb, Sn and Li in dispersion aureoles, surrounding weathered pegmatites in gneiss derived sapropellites to differentiate between soils formed over primitive pegmatites, complex pegmatites and the country rocks. They concluded that such elements are useful as pathfinders for rare metal pegmatites mineralization and exploration.

Rare metal trace elements Cs, Rb and Ga in eluvial soils collected over the pegmatites at Liberia, Lc 19 and Lc 20 have mean values of 157 (ppm), 58(ppm) and 20ppm respectively. These elements also have high positive correlation indices: Cs and Ga (0.881), Cs and Rb (0.962) and Rb and Ga (0.966). Generally, geochemical dispersion patterns detected from clay and hydroxide-rich fractions of lateritic soil covers have been shown to reflect the concealed bedrock composition adequately and serve as the primary sampling media in soil surveys. Values of Ga, Cs and Rb in the Nasarawa area have been found to be anomalous and therefore effectively delineate the concealed pegmatites from the other basement rocks.

There is high positive correlation between Ba and Mn (0.759), Cr and Ni (0.938), Cr and V (0.933). Cr also has high positive correlations with Co, Cu, and Zn (Table 3). The high positive correlation of Cr and Ni has been traced to their geochemical associations in basic rocks by Matheis (1980b) Siad (1994) and Akintola (2003) who found Cr and Ni contents in soils to reflect their parent rocks. The high positive correlations and associations of Cr and Ga, V and Ga, V and Rb, Ni and Ga and Ni and Rb especially in the eluvials may partly be due to isomorphous substitution of these elements in muscovite of the pegmatites since micas weather directly to clays. The association of Ba and Mn in the eluvials also reflects their association in the bedrock and mobility in the oxidizing environment (Zeegers, 1979). Siad (1994) has observed that Ba, Ti and Mn in soils are useful for delineating amphibolites and granites in southwestern Nigeria. Correlation indices of Ba and Mn (0.759) and Ba and V (0.841) are higher in the pegmatite eluvials than in the unbiased soils which are 0.259 and 0.067 respectively. However, the negative correlation of Ti, Ba, Mn and Zr against Cs, Rb and the ore elements observed in the eluvials are not so clearly observable in the more matured unabiased soils from the general area. This further confirms the geochemical characteristics of the elements. Univariate analysis of variance performed on the two soil types has allowed their characterization. At 95% Confidence Interval, three elements, Ba, Cs and Rb were found to be effective. For unbiased soils, element contents in the range of (360-480)pm, (46-73)ppm and (6-135)ppm for Ba, Cs and Rb respectively effectively characterize it, while for the eluvials, the values are (191-311)ppm, (89-209)ppm and (251-371)ppm. Thus, for rapid identification of mineralized pegmatites in the study area, the above result of the univariate analysis is adequate.

CONCLUSION

The abundance of pegmatites in the study area has made it necessary to seek for fast and cheap methods of discovering them. However, because of intense weathering in the tropical environment, many of these pegmatites are covered by thick layers of lateritic soils. The characteristics of the trace elements in the different soils are not significantly different although the more matured unbiased soils are more

depleted. Only a few of the elements, for example, Cs and Rb differ significantly in the eluvials from the unbiased soils. The contrast confirms their mobility characteristics in the oxidation environment.

Correlation studies have shown the associations of the elements in the different soil types. These associations of the elements are useful for delineating the bedrock types. Univariate analysis in this study has confirmed Ba, Cs and Rb as elements that are significant in characterizing the two soil types. Anomalous occurrences of Cs and Rb and depletion of Ba were noticed in the eluvial soils while enhancement of Ba and depletion of Cs and Rb occur in the unbiased soils and hence these three elements have effectively characterized the two soil types.

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Table 1: Trace Elements Compositions (ppm) of Some Unbiased Soil Samples From the Study Area

Sample No	1	4	7	10	13	17	21	24	32	35	39	Ave
Ba	343	286	378	237	396	302	171	317	229	378	627	324
Co	<10	<10	<10	<10	<10	13	<10	<10	14	18	21	12
Cu	18	17	17	22	17	27	21	16	36	31	30	22
Cr	-	-	-	-	-	-	-	-	-	-	-	-
Cs	12	<8	12	<9	<8	15	<8	8	<8	<8	<8	10
Ga	10	9	18	13	10	13	14	8	21	16	18	13
Mn	309	757	918	334	239	804	461	294	225	805	1149	515
Ni	25	14	14	32	18	28	30	14	61	29	31	27
Rb	49	53	178	54	41	59	50	33	66	51	95	63
Sn	-	-	-	-	-	-	-	-	-	-	-	-
Sr	41	42	65	19	43	14	13	43	108	62	52	45
V	68	49	54	79	69	81	68	62	161	97	107	79
Zn	<40	<40	43	<40	<40	<40	<10	<40	85	55	65	43
Zr	250	219	235	248	267	214	330	209	160	266	201	240

Table 2: Trace Elements Compositions (ppm) of Some Eluvial Soil Samples From the Study Area

Ele	11	13	15	19	110	112	116	118	120	122	124	Ave
Ba	370	298	324	185	338	523	350	206	183	435	250	305
Co	13	13	0	11	11	21	12	21	0	20	12	12
Cu	28	30	25	22	30	44	25	43	14	38	29	30
Cr	61	79	50	124	68	117	61	102	32	77	65	76
Cs	9	0	0	184	0	64	9	279	0	10	13	52
Ga	13	12	12	42	15	21	13	43	6	16	15	19
Mn	568	344	377	270	364	861	545	471	328	706	277	465
Ni	30	36	25	58	38	64	31	71	15	50	36	41
Rb	63	58	58	342	53	189	65	513	24	84	63	138
Sn	0	0	0	35	0	0	0	45	0	0	0	7
Sr	61	54	43	60	43	50	65	56	56	65	40	54
V	100	106	88	0	120	115	100	0	69	129	103	85
Zn	52	51	0	63	50	106	44	90	0	73	46	52
Zr	260	268	354	177	238	234	267	140	250	168	200	232

Table 3: Trace Elements Bivariate Correlations in the Eluvial Soils and Unbiased Soil Samples Taken Generally in the Nasarawa Area

Eluvial Soils				General Soils			
Rb and Ga	0.966	Ba and Zr	0.618	Rb and Ga	0.858	Ba and Zr	0.112
Rb and Cs	0.962	Mn and Zn	0.587	Rb and Cs	0.592	Mn and Zn	0.411
Cr and Ni	0.938	Cr and Ga	0.585	Cr and Ni	0.867	Cr and Ga	0.434
Cr and V	0.933	Ba and Cr	0.552	Cr and V	0.922	Ba and Cr	0.184
Ni and V	0.932	Mn and V	0.503	Bi and V	0.943	Mn and V	0.502
Ga and V	0.925	Cs and Ba	-0.666	Ga and V	0.536	Cs and Ba	0.257
Ni and Zn	0.900	Rb and Zr	-0.543	Ni and Zn	0.634	Rb and Zr	-0.078
Cs and Ga	0.881	Cs and Zr	-0.526	Cs and Ga	0.366	Cs and Zr	-0.113
Ba and v	0.845	Ga and Zr	-0.494	Ba and V	0.067	Ga and Zr	0.245
Cr and Zn	0.844	Cs and Mn	-0.431	Cr and Zn	0.663	Cs and Mn	0.230
Rb and V	0.826	Rb and Mn	-0.173	Rb and V	0.135	Rb and Mn	0.546
V and Zn	0.793	Ga and Mn	0.165	V and Zn	0l727	Ga and Mn	0.611
Ba and Mn	0.759	Ga and Ba	-0.162	Ba and Mn	0.281	Ga and Ba	0.519
Ga and Ni	0.723	V and Zr	-0.128	Ga and Ni	0.520	V and Zr	-0.312
Rb and Ni	0.633			Rb and Ni	0.144		

Table 4: Univariate Analysis of Variance of the Soils Above the Barren and Mineralized Pegmatites.

	Barren Pegmatites			Mineralized Pegmatites		
	Mean	95% confidence Interval		Mean	95% Confidence Interval	
Element	ppm	Lower Bound	Upper Bound	ppm	Lower Bound	Upper Bound
Ba	420.0	360.0	480.0	250.9	190.9	310.9
Co	13.9	-46.1	73.9	9.3	-54.8	73.4
Cu	23.3	-36.7	83.2	31.4	-28.6	91.3
Cr	-	-	-	76.8	20.2	133.3
Cs	13.5	-46.5	73.5	148.8	88.8	208.7
Ga	21.1	-36.4	77.7	30.0	-30.0	90.0
Mn	419.3	359.3	479.2	402.6	346.0	459.1
Ni	27.3	-32.7	87.2	47.7	-8.9	104.2
Rb	70.7	6.6	134.8	311.1	251.2	371.1
Sn	-	-	-	32.1	-27.9	92.1
Sr	72.3	12.3	132.2	49.4	-10.6	109.3
V	82.8	22.8	142.7	36.9	-23.1	96.9
Zn	50.0	-10.0	100.0	63.6	3.7	123.6
Zr	234.1	174.1	294.1	173.0	113.0	233.0

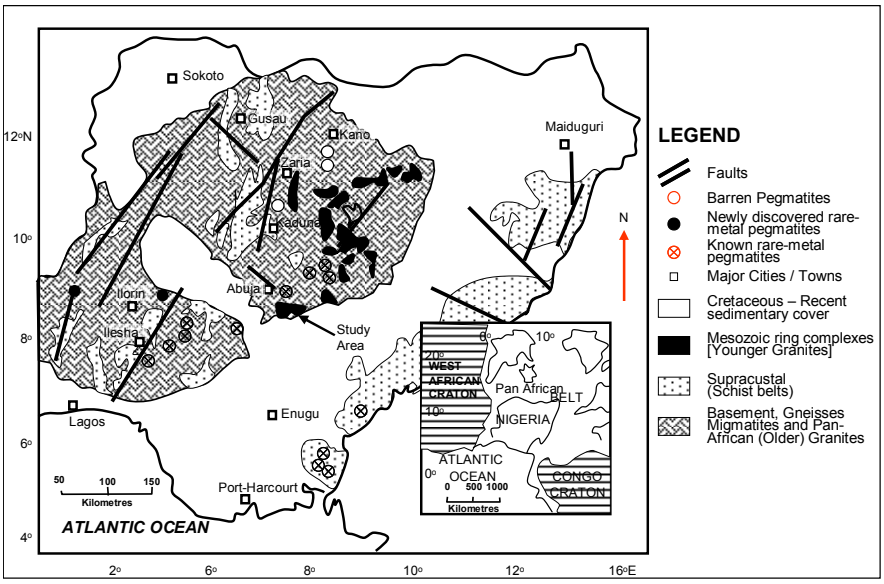

Fig. 1: Geological Map of Nigeria Showing the Study Area (after Garba, 2003)

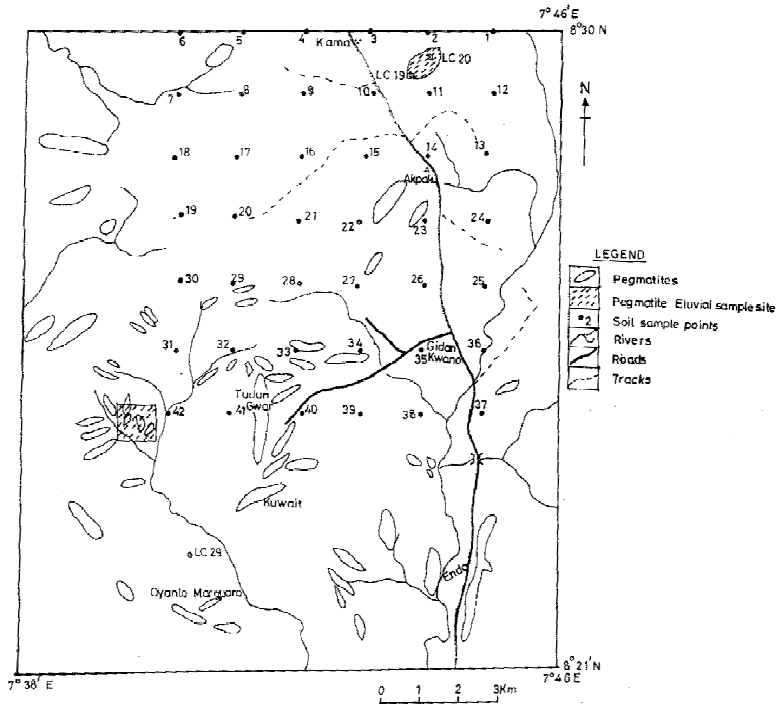

Fig 2 Soil sampling points in Nasarawa area, Nigeria

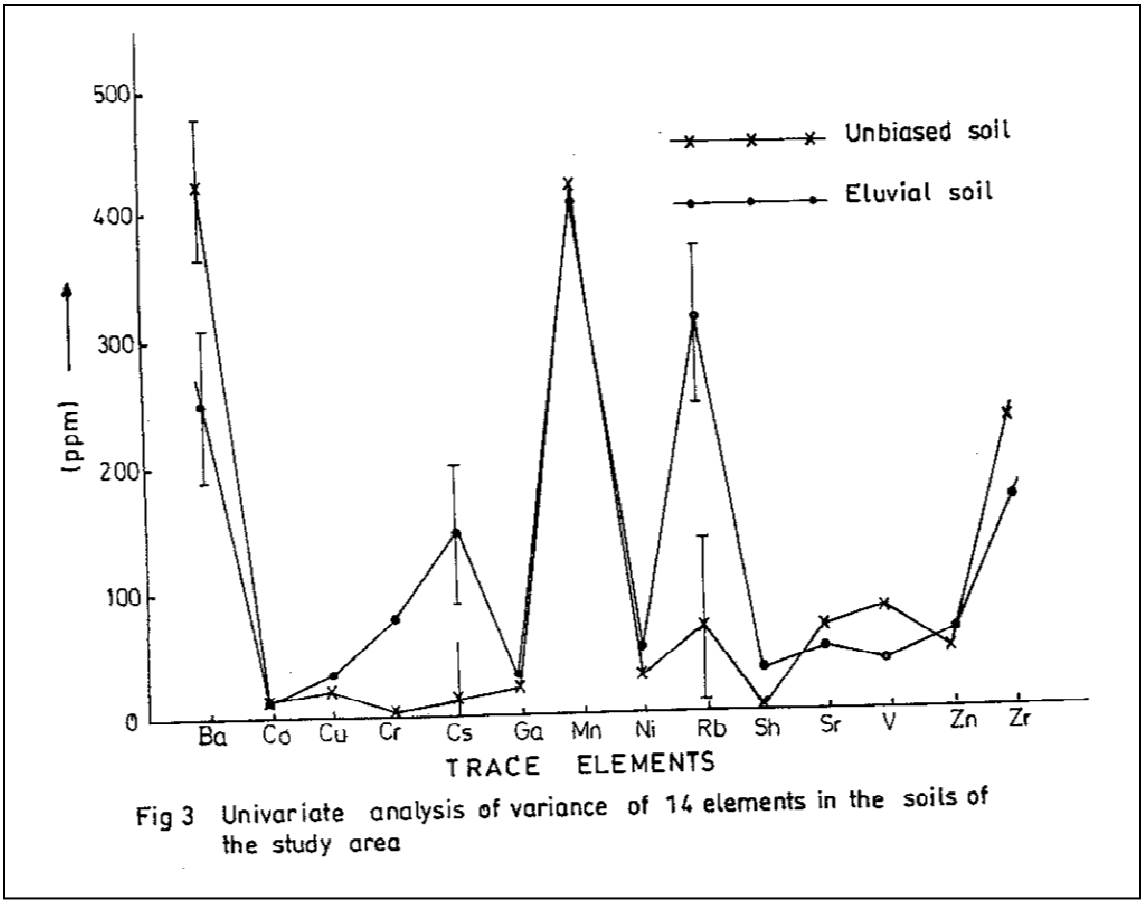

Fig 3 Univariate analysis of variance of 14 elements in the soils of the study area

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Occurrence Of Beta- Lactamase Resistance Among Isolates From Cancer Patients in Lagos, Nigeria

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Running title: Beta-lactamase resistance from isolates of cancer patients

Occurrence of beta -lactamase resistance among isolates from cancer patients in Lagos Nigeria.

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ABSTRACT: Background: Bacteria infections associated with multidrug resistance have been implicated in the high mortality and morbidity reported among cancer patients. In recent years gram negative organisms isolates from patients with neoplasia have been found to produce beta-lactamases (β-lactamase) and this is of interest in developing countries where it is unreported or underreported. This study determined beta-lactamase mediated resistance in gram negative bacteria isolates from patients attending the radiology and Oncology clinic of Lagos University Teaching Hospital between April and November 2006. **Methods**: One hundred and nineteen samples were analyzed and sixty one gram negative isolates were recovered and were characterized with the analytical profile index(API) tests .Antimicrobial susceptibility testing was determined using the disk diffusion method according to CLSI standard. Production of beta-lactamase and Extended spectrum beta-lactamase (ESBL) were investigated using the nitrocefin stick and double disk synergy test (DDST) respectively. Plasmid analysis was done on each bacteria isolate showing multidrug resistance. **Result**: Of the sixty one gram negative isolates, 55((90.2%) produced beta- lactamases; 20(32.8%) were found to be ESBL producers while 14(23%) showed AmpC enzyme production. Twenty five out of twenty seven strains harbored plasmids of sizes ranging between 3.0-4.9kb. Statistical analyses showed occurrence of ESBL and AmpC production to be significant. **Conclusion**: The result of this study has shown a high occurrence of beta-lactamase mediated resistance among clinical isolates from cancer patients. Many of these

harbored plasmids which may encode genes for antibiotic resistance or virulence factors which are becoming persistent problems in the healthcare sector. [Academia Arena, 2009;1(5):27-34]. ISSN 1553-992X.

Keywords: ESBL, AmpC, Beta-lactamase, Cancer, multidrug resistance.

INTRODUCTION

Of the various mechanisms of acquired resistance to β-lactam antibiotics, resistance due to β-lactamases is the most prevalent. Gram negative bacteria resistant to agents such as extended spectrum cephalosporin, monobactams, carbapenems and β-lactam-β-lactamase inhibitor combinations have emerged through the production of a variety of β-lactamases(Pitout *et.al*, 1997; Wood ,AJ. 1996) Emergence of resistance to these agents has resulted in a major clinical crisis(D'agata,FEMC.2000).
Bacteria infections associated with multi-drug resistance in cancer patients have been reported as high (Figuera *et.al*, 2006) and this is caused mostly by the effect of the cytotoxic chemotherapy and radiotherapy which lowers the immunity(Rice *et.al*,1990). With the increased use of β-lactams among these patients an increase in bacteria resistance has developed. Extended spectrum beta-lactamase resistances are now a problem among patients with chronic cases and carcinomas.(Naumovski *et al*. 1992)

In this study, we examined the occurrence of different β-lactamases among gram negative isolates from patients with cancer of the breast and cervix. We also determined the plasmid profiles of isolates producing extended spectrum beta-lactamase.

MATERIALS AND METHODS

Isolation and Identification

A total of 61 gram negative bacteria isolates from 119 breast and cervical cancer patients samples who attended the Radiology and Oncology Clinic of the Lagos University Teaching Hospital, Nigeria between April, 2006 and November, 2006 have been included in this study. These isolates were from the urine, breast wound swabs and cervical swabs of non-hospitalized cancer patients attending the Radiology and Oncology Clinic of the Lagos University Teaching Hospital.
The strains were identified by conventional methods and confirmation to the species level was done biochemically with the use of API 20E and 20NE system. (API bio merieux, Nurtingen, Germany).

Beta-lactamase was determined using a chromogenic cephalosporin method (Nitrocephin-stick oxoid, UK) and positive control of *Staphylococcus. aureus* ATCC 29213.

Susceptibility testing was performed using the standard agar disc diffusion method as described by the NCCLS standard. (2000). ESBL production was detected using the double disk synergy test as described by Jarlier *et.al*. (1988) with modification by Thomson and Sanders. (1992). All strains showing resistance to third generation cephalosporins was screened fro ESBL production. An amoxicillin-clavulanate disk was placed at the centre of inoculated plate and disks containing ceftazidime (30μg), cefotaxime (30μg) ceftriaxone (30μg) and aztreonam (30μg) were placed 20mm apart (center to center) from the amoxicillin-clavulanate disk. Enhancement of the zone of inhibition of the oxyimino-β-lactam caused by the synergy with the clavulanate in the amoxycilin clavulanate disk was considered as an evidence of ESBL production. (Jarlier *et.al*.1988., Thompson and Sanders., 1992). *E.coli* ATCC 25922 and *Pseudomonas aeruginosa* ATCC 27853 were used as control strains.

Presumptive Phenotypic Determination of CTX-M ESBL: Bacteria isolates resistant to cefotaxime, ceftriaxone and aztreonam were presumptively identified as producers of CTX-M ESBL (Livermore and Brown., 2001)

The inducibility of AmpC β-lactamase production was performed by disk antagonism tests in which disks containing an inducing agent, cefoxitin (30μg) and ceftazidime (30μg), were placed on Mueller Hinton agar plates. Blunting of the ceftazidime zone at adjusted distance between the disks and resistance to cefoxitin was observed. (Livermoreand Brown., 2001)

Plasmid DNA of isolates producing ESBL was extracted using the alkaline phosphate method of Birnboin and Doly(1979). Agarose gel electorphoresis was used to determine the profiles of the plasmid. The profiles were compared to a DNA of known molecular weight plasmids.

Statistical analysis using analysis of variance (ANOVA) as test of significance was done. All statistical analysis was performed at 95% confidence interval and significant p values less than 0.05 were considered significant.

RESULT

Sixty one gram negative bacteria made up of seventeen (17) different species were recovered from one hundred and nineteen (119) clinical samples. Amongst them were *Klebsiella pneumoniae, Citrobacter amalonaticus, E.coli, P. mirabilis, A.baumanii, Serratia liquefaciens* and *Stenotrophomonas maltophilia*. Out of the sixty one (61) isolates 55, (90.2%) produced beta-lactamase (TEM/SHV like type), 20 (32.8%) and 14 (23%) were found to be extended spectrum beta-lactamase and AmpC producers respectively (Table 1). Most of the ESBL-producers were multi-resistant to the fluoroquinoles and aminoglycosides, 93.4% of isolates were found to be sensitive to imipenem and all isolates showed resistance to tetracycline (100%) (Table 2) . Plasmid analysis was performed on each bacteria showing multi-drug resistance (Table 3). Twenty five (25) of twenty seven (27) strains harboured plasmids of sizes ranging between 3.0 – 4.9kb. (Table 4)

Statistical analysis showed occurrence of ESBL and AmpC production among isolated strains from cancer infections to be significant.

TABLE 1:BETA-LACTAMASES DETECTED IN ORGANISMS ISOLATED

Organisms	Beta-lactamase enzyme detection using nitrocephin.n=55	ESBL enzyme detection using double disk synergy test (DDST).n=20	AmpC (enzyme detection using cefoxitin resistance.n=14
E.coli (16)	16 (29%)	11 (55%)	6 (42.9%)
Enterobacter aerogenes (2)	2 (3.6%)	0%	0%
Enterobacter agglomerans (1)	1 (1.8%)	0%	0%
Enterobacter cloacae (2)	2 (3.6%)	0%	2 (14.3%)
Citrobacter amalonaticus / koserii (3)	3 (5.5%)	1 (5%)	1 (7.2%)
Citrobacter freundii (1)	1 (1.8%)	1 (5%)	0%
Klebsiella pneumoniae (6)	6 (10.9%)	4 (20%)	2 (14.3%)
Klebsiella planticola (6)	3 (5.5%)	2 (10%)	2 (14.3%)
Klebsiella oxytoca (4)	4 (7.3%)	0%	0%
Klebsiella rhinoscleromatis (1)	1 (1.8%)	0%	0%
Klebsiella ozaene (3)	1 (1.8%)	1 (5%)	0%
Pseudomonas aeruginosa	9 (16.4%)	0 (0%)	0%
Acinetobacter iwofii (1)	1 (1.8%)	0%	0%
Acinetobacter Baumanil (1)	1 (1.8%)	0%	0%
Proteus mirabilis (3)	2 (3.6%)	0%	0%
Serratia liquefaciens (1)	1 (1.8%)	0%	1 (7.2%)
Stenotrophomonas maltophilia (1)	1 (1.8%)	0%	0%

TABLE 2:RESISTANCE PATTERN OF ISOLATES

Isolates	Antibiotic Resistance Profile
E. coli	TZP, CAZ, CRO, CTX, ATM, PEF, OFX, CIP, AMX, GEN, NIT, COT, CXM, AUG, TET
Enterobacter spp	AMX, CXM, AUG, TET
Serratia liquefaciens	TZP, FOX, AK, GEN, COT, AUG, TET
Klebsiella spp	TZP, CTX, CIP, AMX, GEN, NIT, COT, CXM, AUG, TET
Proteus mirabilis	AK, PEF, OFX, CIP, GEN, NIT, CXM, TET,
Pseudomonas aeruginosa	TZP, FOX, CAZ, CRO, ATM, AK, PEF, OFX, CIP, AMX, GEN, NIT, COT, CXM, AUG, TET
Stenotrophomonas maltophilia	TZP, PEF, OFX, CIP, AMX, GEN, NIT, COT, TET
Citrobacter spp	TZP, FOX, CTX ATM PEF CIP AMX GEN, NIT, COT, CXM, AUG, TET
Acinetobacter spp	TZP, CTX, IMP, AMX, GEN NIT, COT CXM AUG, TET

TABLE 3: ANTIMICROBIAL RESISTANCE PATTERN OF ISOLATES IN RELATION TO PLASMIDS.

Isolates	Antimicrobial Resistance Pattern	Number of Isolates	Number with Plasmids.
Pseudomonas aeruginosa	TZP, FOX, CAZ CRO, ATM, AK, PEF, OFX, CIP, AMX, GEN, NIT, COT, CXM, TET	4	4
Citrobacter spp	TZP, FOX, CTX, COT, ATM, PEF, CIP, AMX, GEN, NIT, CXM, TET	2	2
E.coli	TZP, CAZ, CTX, ATM, PEF, OFX, CIP, AMX, GEN, NIT, COT, CXM, AUG, TET	11	11
		7	7
Klebsiella spp	TZP, CTX, CIP, AMX, GEN, NIT, COT, CXM, AUG, TET		
		1	1
Acinetobacter spp	TZP. CTX, IMP, AMX, GEN, NIT, COT, CXM, AUG, TET		
		2	0
Enterobacter spp	AMX, CXM, AUG, NIT, TET		

TABLE 4: PLASMID SCREENING RESULTS OF ISOLATES

Isolates	Source	Number with Plasmid	Plasmid Sizes (kb)
E .coli (1)	Urine	1	4.4
E. coli (2)	Urine	1	3.0,3.6, 4.4
E. coli (3)	Urine	1	4.3
E. coli (4)	Urine	1	4.6
E. coli (5)	Urine	1	4.5
E. coli (6)	Urine	1	4.8
E. coli (7)	Urine	1	4.6
E. coli (8)	Urine	1	4.6
E. coli (9)	Urine	1	4.9
E. coli (10)	Cervical swab	1	4.7
E. coli (11)	Cervical swab	1	4.6
Citrobacter spp (1)	Urine	1	4.4
Citrobacter spp (2)	Urine	1	4.6
K. pneumoniae (1)	Urine	1	4.5
K. pneumoniae (2)	Urine	1	4.4
K. pneumoniae (3)	Urine	1	4.7
K. pneumoniae (4)	Urine	1	4.7
K. planticola (1)	Urine	1	4.1, 4.7
K. planticola (2)	Swab	1	4.4
K ozaenae (1)	Urine	1	4.6
P. aeruginosa (1)	Urine	1	4.6
P. aeruginosa (2)	Urine	1	4.6
P. aeruginosa (3)	Urine	1	4.6
P. aeruginosa (4)	Swab	1	4.6
Acinetobacter spp (1)	Urine	1	4.6

Discussion

Chemotherapy and radiotherapy methods of treatment adopted for patients with carcinoma of the cervix and breast have been implicated as an agent of immunosupression. Hence, it's been known to contribute to infections in patient with an underlying debilitating effect of cancerous growth. (Rice *et.al*.,1990) With the emergence and increase in bacterial resistance, surveillance of the prevalent pathogen and their resistance pattern is of utmost importance to reduce the mortality rate due to bacterial infections and also improve the quality of life of affected patient. (Figuera *et.al*.,2006)

Reports of ESBL producing strains have been appearing for about a decade among outpatients and in patients in this environment (Aibinu *et.al*., 2003) but no data exists on ESBL bacteria isolates from cancer patients in this environment. Therefore, it is noteworthy that this study isolated 61 gram negative pathogens and out of these 32.8% were found to be ESBL producers while 23% showed AmpC enzyme.

This result records so far the highest number of gram negative species to be recovered from cancer patients compared to previous studies on isolates from this environment that studied anaerobes and gram positive organisms. (Rotimi *et.al*., 1984.,Oduyebo *et.al*.,2001)

Of the 61 isolates recovered from urine, and swabs of these patients, 49 (80.3%) were from urine. *Klebsiella* species had the highest occurrence in urine among these cancer patients which is in agreement with Podschunn and Ulmann(1998)that reported *Klebsiella* species as an opportunistic pathogen, which primarily attack immunocompromised individuals . On the other hand, *Proteus mirabilis* was the most frequently isolated organism from wound swabs of these cervical and breast cancer patients. This was followed by *Enterobacter* spp (E. *aerogenes* and *E. cloacae*); *Pseudomonas aeruginosa* and *Escherichia coli*. All these organisms have been implicated in wound infections (Goosens, H. 2005). *Klebsiella planticola* was the only species of *Klebsiella* isolated from wound swabs in this study. This is in agreement with the report of Podschunn and Ullmann(1998)which reported *K. planticola* to have a high frequency of recovery from clinical samples of wound. This findings highlights the organisms most commonly implicated in wound swabs of cervical and breast cancer and the organisms most commonly implicated in infections among cancer patients in this environment.

Multi-drug resistance was found among the 9 groups of organisms isolated. The best coverage against these organisms was obtained with imipenem(100%), except for *Pseudomonas aeruginosa* and *Acinetobacter* species which showed resistance to the carbapenem with 33% and 50% resistance respectively.

High resistance to amoxicillin clavulanic acid, a beta-lactam beta- lactamase inhibitor was observed among the isolates and all other beta-lactam agents. The third generation cephalosporin were effective against *S. maltophilia, Serratia* spp with over 75% sensitive, multi-drug resistance occurred in E. *coli, Pseudomonas aeruginosa, Acinetobacter* spp, *Serratia liquefaciens* with complete resistance to over 7 antibiotics.

Most of the ESBL isolates were multi-resistant but susceptibility to imipenem and amikacin (>60%) was high. However, imipenem is not easily available in Nigeria because of its high cost. Resistance to the quinolones (ofloxacin, ciprofloxacin, pefloxacin) was detected in most of the ESBL and AMPC producers (>50%). This further limits the choice of effective antibiotics among these patients.

Emergence of these resistance and production of ESBLS and AmpC is of concern among these patients. Plasmid profiles showed that all the strains were diverse in nature with respect to transmission of antibiotic resistance except for *P.aeruginosa* isolates which had all strains harbouring only one plasmid of same molecular weight. It was also observed that *Enterobacter cloacae* showing AmpC did not harbour plasmid suggesting that the resistance may be chromosomally borne.

This emergence of ESBLs and stable derepressed mutants that hyperproduced chromosomal beta-lactamases have the potential to diminish the activity of all extended spectrum cephalosporins (Goosens.,2005) and these important pathogens are currently on the rise in critically ill group of patient (Patterson and Bonomo2005).

It is of concern in this study that proliferation of beta-lactamase resistance among strains may have been due to misuse of antibiotics, proliferation of multiply resistant clones, transfer of resistance-carrying plasmids and inability to detect emerging phenotypes in developing countries as stated by Croft *et.al.*, 2007.

Conclusion

This study has been able to show an emergence of different strains of multi-resistant bacteria producing beta-lactamases among clinical isolates of cancer patients. Many of these multiresistant species harboured plasmids which may encode genes for antibiotic resistance or virulence factors and may predispose to high morbidity and mortality of the disease. The resistance has paralleled the introduction, administration misuse and overuse of broad spectrum of antibiotics. All physicians should be obligated to prescribe antimicrobial agents more deliberately. Also, there is need for antibiotic surveillance in this population of patients to ensure judicious use of antibiotics.

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Land utilization farming with reference to Uttarkashi, the Hilly District of Uttarakhand

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ABSTRACT

Traditional knowledge system has been a key to the survival of the hill society, be it in cropping, forestry or health. It has not only ensured continuous livelihood of farm households but also ecological sustainability. Farming in the hills is highly interdependent with forestry and animal husbandry. The present study deals with the major environmental problem related to deforestation in Uttarkashi district of Uttarakhand, their remedial measures, socioeconomic status and the links of forestry, animal husbandry and agents of change**.** [Academia Arena, 2009;1(5):35-40]. ISSN 1553-992X.

Key Words: Uttarkashi, Development Strategy, Traditional system

INTRODUCTION

Large-scale indiscriminate cutting of trees, uncontrolled overgrazing overexploitation of communities, unscientific exploitation of natural resources reflects their effect on vegetation and environment. At present there is hardly 46 million hectare area with reasonable forest cover but according to national forest policy, there should be at least 110 million hectare area under forest. The national target is to reclaim annually 3-5 million hectare of waste land and to plant trees and grasses on vacant government land, community land, marginal agricultural land and the Agro forestry will be vital for bridging the gap between demand and availability of various forms of wood. Traditional Agroforestry system and fixed farming are well established in the Ganga and yamuna valley, planting and harvesting of trees for wood products, fruit, fodder, leaves etc since ancient time, the type of agroforestry system found in a particular area is determined to same extent by agro-ecological and socio-economic factors if these agro forestry system are modified properly play an important role in reclamation of waste land and soil conservation.

Rearing of livestock is an integral part of the economy of the people of the district, due to over-grazing, desirable nutritive grasses and medicinally important species have been depleted considerably, during past times the grazing incidence has decreased due to bringing more and more area under agriculture, horticulture and closing of existing grazing areas by state forest department as a measure of soil conservation and also under different afforestation programmes. High density of human and livestock population over exploitation of community, unscientific exploitation of natural resources, reflect their effect on the vegetation and indirectly on environment in various ways like soil erosion, global warming, irregular rain fall extinction of various species these are caused mainly by cleaning forest for agriculture, horticulture, illicit lopping and cutting of forest vegetation for fuel, food, fodder, charcoal, removal of litter from forest floor for manures, grazing and commercial exploitation of important forests species. The study describes how environmental legislation has slowly taken away the traditional livelihoods of vast numbers of people. Wood carvers, whose handworkers be seen in the traditional houses, have disappeared over years, nomadic sheeps and goats herders are slowly dying and agriculture is Back-breaking work that does not yield enough for subsistence.

MATERIALS AND METHOD

The present study was conducted in the Uttarkashi district of Uttarakhand which is basically divisible as Ganga and Yamuna Vallies located between 31º 02´ north latitude and 78º 44´ to 78º 43.4´ east longitude of western Himalaya covering about an area of 8016 square km. Uttarkashi is the northmost district of the

Uttarakhand bordering Himachal pradesh to Northwest, Chamoli district on eastern side, Dehradun district on western side, Tibbet on northern side and Tehri district on southern side. The district bear unique cultural, heritage, significant forest and water resources. The detailed information about the study materials was collected with the co-operation of Statistical department, forestry department, and horticulture department. The information regarding the problem is based on following parameters-

1 Population and its growth rate
2 Live stock population
3 Forest composition and its growth stock
4 Land use statistics
5 Distribution of land holdings by size classes
6 Area and yield of principal crops
7 Area and production of fruits
8 Area and production of vegetables

RESULTS AND DISCUSSION

The total population of Uttarkashi district during year 2001 is 294179 in the comparison of Uttarakhand population (8479562). The growth rate of the population is high as 22.72 beside this the population density of this hilly district is lowest (37) out of the 13 districts of Uttarakhand, large part of the population is in rural areas (Table- 1). The sheep and goats are migratory taken for grazing to alpine pastures during summer and lower hills during winter while the cow and buffaloes grazed in an areas near the villages, free grazing are practiced for these livestock. From 1998 onward the live stock population increased from 394466 to 438086, which is the maximum value of livestock in Uttarakhand (Table 2). Milk availability in the district is low and the milk societies require capital to develop infrastructure and markets. There is also no fodder department. Cattle bought from outside are less adaptable to the cold weather of Uttarkashi and thus cross-breeding is needed within the district, but vaccine is aconstraint. Since Uttarkashi is rich in livestock, wool-rearing is a viable option. The total forest area of the district is 88.86%. On the basis composition the forest of the region are broadly classified as coniferous forest and broad leaved forest including undisturbed forest, *Pinus roxburghii, Cedrus deodara, Pinus wallichiana, Picea smithiana, Abies pindrow* are important conifers while Oak (*Quercus leucotrichophora, Quercus semicarpifolia, Quercus floribunda)* are important broad leaved species with a number of other temperate and tropical hardwoods growing in this region. *Quercus leucotrichophora* has maximum area 33724.04 (ha) while *Pinus roxburghii* have least area of 1284.06 (ha) (Table 3). All land, which is used wholly or partly for agricultural production, are operated as one technical unit by one person alone or with others without regard to the title, legal form, size or location. The Barren and unculturable wasteland is 4.65%, current fallow and other fallow land is 0.57% (Table 4). The area under agriculture is about 3.97% of the total land area, due to large agricultural population and limited arable area the size of land at present is about 23.23%, about 86.21% of the farmer are small and marginal owing about 49.40% of the land holdings area. The number of holdings bigger than 10 hectare area are negligible (Table 5).

The important fruits are *Pyrus mallus,Pyrus communis, Pyrus persica, Prunnus persica, Juglans regia, citrus spp.* among fruits in the region the *Pyrus malus* occupies larger area of about 6928 ha and lowest 170 ha for *Prunnus armeniaca* (Table6) The important vegetables are *Pisum sativum, Lysopersicum esculetum, Raphinus sativus, Allium cepa, Brassica oleracea, Abelmoschos esculentus, Solenum tuberosum*

The production of the *Lysopersicum esculetum,* is highest (4012M tonnes) following *Pisum sativum* (3770 M tones), among all vegetables in all blocks the total area and production of the vegetables of the district are 4668.5 ha and 87434.7 M tones respectively (Table7). Total area and production of cereals are 40589 ha and 53599 M tones respectively while total food grain area and production are 46811 ha 59032 M tones respectively (Table8).

The extension of cultivation to this area will be expensive, since it requires extensive work for soil and water conservation, irrigation and reclamation. On the basis of diagnostic survey and appraisal of existing traditional farming system for satisfying farmer needs which are ecologically and economically feasible, the following aspects should need immediate care and attention

1- Preservation of genetic resources of the local species mostly exploited by the farmers

2- Identification of multipurpose woody species

3- Identifying crop associations which can be fitted in to different intensities of shed

4- Plantation of fuel wood and fodder species

5- Qualitative and quantitative interaction between plants and soil in different type of associates

6- Awareness among the rural people through trainings, workshops and seminars

7- Involvement and encouragement of rural women in awareness programmes by organizing site and need specific training, workshops and seminars.

RESULTS AND DISCUSSION

Table 1- Population and its growth rate during year 2001

Site	Male population	Female population	Total population	Rural population	Urban population	Sex ratio	Population density	Growth rate
Uttarakhand	4316401	8479562	6309317	2170245	2170245	963	159	19.20
Uttarkashi	151599	142580	294179	271255	22924	941	37	22.72

Table2- Live stock population

Year	Cow	Buffalo	Sheep	Goat	Total
1993	210632	38280	89329	95613	433854
1998	199263	38594	72367	84242	394466
2003	202535	38690	101268	95593	438086

Table3- Forest composition and growing stock

Species	**Area (ha)**
Quercus leucotrichophora	33724.04
Quercus semicarpifolia	24308.30
Quercus dilatata	14471.75
Pinus roxburghii	1284.06
Cedrus deodara	3346.54
Abies pindrow	1619.06
Picea smithiana	3288.94

Table 4- Land use statistics

Characteristics of Uttarkashi	Area (Ha)	Percentage of total land area
Total area	812415	100
Forest	721661	88.83
Agriculture land/Cultivable land	2278	0.29
Current fallow land	1539	0.16
Other fallow land	3099	0.38
Land put to non-agricultural uses	5381	0.65
Culturable waste land	40694	5.00
Barren and uncultivable waste land	37763	4.65

Table 5- Distribution of land holdings by size classes

Size class (ha)	Number of land Holdings	Percentage (%)	Area (ha)	Percentage (%)	Average size of Holdings (ha)
Less than 0.5	20182	52.41	3212	9.42	0.16
0.5- 1.0	6346	16.48	4132	12.12	0.65
Marginal farmer	26528	68.88	7344	21.54	0.28
1-2	6670	17.32	9500	27.86	1.42
Small and marginal farmer	33198	86.20	16844	49.40	0.50
2-4	4282	11.12	11673	34.24	2.73
4-10	1014	2.63	5326	15.61	5.25
10 and above	21	0.05	257	0.75	12.24
Total	**38515**	**100.00**	**34100**	**100.00**	**23.23**

Table 6- Fruit production during year 2006-07

Sl. No	Name of Block	*Pyrus malus*		*Pyrus communis*		*Prunnus persica*		*Pyrus persica*		*Prunnus armeniaca*	
		Area (ha)	Production (M tonnes)	Area (ha)	Production (M tonnes)	Area (ha)	Production (M tonnes)	Area (ha)	Production (M tonnes)	Area (ha)	Production (M tonnes)
1	**Bhatwari**	277	4941	225	1647	30	188	115	660	20	205.00
2	**Dunda**	235	1955	159	1179	32	175	120	670	18	180.00
3	**Chinyalisaur**	235	1534	169	1161	21	200	125	667	15	145.00
4	**Naugaon**	2380	20314	290	2588	60	194	135	750	25	233.00
5	**Purola**	709	3416	250	1217	13	205	120	650	20	214.00
6	**Mori**	3092	10312	270	1904	14	164	67	490	24	92.00
	Total-	**6928**	**42472**	**1363**	**9696**	**170**	**1126**	**682**	**3887**	**122.00**	**1069.00**

Sl. No	Name of Block	*Juglans regia*		*Citrus species*		*Mangifera indica*		Other Fruits		Total	
		Area (ha)	Production (M tonnes)	Area (ha)	Production (M tonnes)	Area (ha)	Production (M tonnes)	Area (ha)	Production (M tonnes)	Area (ha)	Production (M tonnes)
1	Bhatwari	182	151	47	153	2	8	200	320	1098	8273
2	Dunda	184	126	62	200	37	65	180	310	1027	4860
3	Chinyalisaur	210	142	42	150	25	55	220	315	1062	4369
4	Naugaon	288	202	28	125	87	290	290	332	3583	25028
5	Purola	164	132	16	62	25	-	185	303	1497	6199
6	Mori	252	113	10	63	18	-	168	280	3915	13418
	Total	**1280**	**866**	**205**	**753**	**194**	**418**	**1243**	**1860**	**12187**	**62147**

Table 7- Vegetable production during year 2006-07

Sl. No	Name of Block	*Pisum sativum*		*Brassica oleracea*		*Solanum melongosa*		*Allium cepa*	
		Area (ha)	Production (M tonnes)	Area (ha)	Production (M tonnes)	Area (ha)	Production (M tonnes)	Area (Ha)	Production (M tonnes)
1	Bhatwari	44	210	17.37	248.55	3.50	20.60	0.50	12.00
2	Dunda	65	550	35.68	640.45	7.50	210.40	18.10	375.00
3	Chinyalisaur	27	240	8.40	117	8.50	10.50	10.50	150.50
4	Naugaon	260	1600	10.75	228	3.50	40.50	40.40	800.50
5	Purola	155	1250	5.00	50	0.50	7.50	1.50	18.50
6	Mori	55	130	8.80	142	1.50	27.50	1.00	15.50
	Total	**596**	**3770**	**86.00**	**1177.45**	**25.00**	**296.4**	**72.00**	**1360.00**

Sl. No	Name of Block	*Capsicum annum*		*Lycopersicum esculentus*		Other vegetables		*Solenum tuberosum*		Total	
		Area (Ha)	Production (M tonnes)	Area (Ha)	Production (M tonnes)	Area (ha)	Production (M tonnes)	Area (ha)	Production (M tonnes)	Area (Ha)	Production (M tonnes)
1	Bhatwari	0.50	35.00	35.00	95.80	523.6	5769.1	298.35	7045.60	922.82	13336.65
2	Dunda	2.50	60.00	60.00	305.20	229.9	4210.6	150.65	3528.40	569.33	9780.05
3	Chinyalisaur	4.75	10.50	10.50	105.60	109.2	2195.5	160.65	3725.80	339.55	6555.4
4	Naugaon	4.25	125.50	125.50	3005.40	678.25	15975.99	550.35	15205.20	1673	36981.6
5	Purola	1.00	70.00	70.00	450.00	28.8	354.5	370.00	8745.00	631.8	107744.5
6	Mori	1.00	8.00	8.00	50.00	66.7	789.16	400.00	9045.00	532	10006.5
	Total-	**14.00**	**309.00**	**309.00**	**4012.00**	**1636.5**	**29214.84**	**1930.00**	**47295.00**	**4668.5**	**87434.7**

Table8- Area and Production of principal agriculture crops

Abbreviations: ha= Hectare, (M tonnes)= Metric tones

Sl.No.	Name of the crops	Area (ha)	Production (M tonnes)
1	*Oryza sativa*	9884	16476
2	*Triticum aesitum*	15643	18393
3	*Zea mays*	5982	7969
4	*Hordeum vulgare*	175	203
5	*Glycine max*	48	37
6	*Macrotyloma uniflorum*	604	438
7	*Eleusine coracana*	5640	7308
8	*Echinochloa frumentacea*	2613	2775
	Total cereal	**40589**	**53599**
1	*Cicer arietinam*	**4**	**2**
2	*Lens cullinaris*	**40**	**100**
3	*Phaseolus mungo*	**593**	**213**
4	*Cajanus cajan*	**180**	**90**
5	*Pisum sativum*	**342**	**212**
6	*Phaseolus vulgaris*	**2195**	**2469**
7	Other pulses	**2868**	**2347**
	Total food grains	**46811**	59032

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The Use Of Predictive Modeling In Shelf Life Determination Of Paints

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Abstract: The spoilage of six water-based paints was monitored during storage at room temperature (30 ± 2^0C) for 10 months at two weeks intervals. The bacterial population ranged from $1.0 \times 10^1 - 4.7 \times 10^5$ cfu/ml, while the fungal population ranged from $1.0 \times 10^1 - 5.5 \times 10^3$ cfu/ml over the study period. The spoilt paint sample served as the control with bacterial population count of 3.4×10^{10} cfu/ml and fungal population count of 3.2×10^5 cfu/ml. The bacterial strains isolated from the fresh paint samples were identified as *Bacillus polymyxa*, *Bacillus brevis*, *Bacillus laterosporus*, *Proteus mirabilis*, *Escherichia coli*, *Lactobacillus gasseri* and *Lactobacillus brevis* based on standard cultural and biochemical techniques and isolates' phenotypic profiles using the analytical profile index (API 20 E and ID 32 E test systems. The fungal isolates were identified as *Aspergillus niger*, *A. flavus* and *Penicillium citrinum*. The microbial growth data from the fresh paint samples and the spoilt sample were fitted into a predictive model to estimate the shelf life of paints as 27, 22, 30, 36, 22 and 23 months respectively. [Academia Arena, 2009;1(5):41-46]. ISSN 1553-992X.

Key words: Predictive modeling, paints, shelf life

INTRODUCTION

Paints are uniformly dispersed mixtures having a viscosity ranging from a thin liquid to a semi-solid paste, consisting of a pigment (the substance that provide colour) suspended in a liquid vehicle such as oil or water. They solidify when exposed to air (Briggs, 1980). The effects of microbiological spoilage of paints such as viscosity loss, gassing, malodour, discolouration and visible surface growth can lead to a reduction in shelf life and significant economic loss to the paint industry (Gillatt, 1992; Adeleye and Adeleye, 1999). The contamination occurs during production and poses greater problems when they are not detected until the paint reaches the end user, since there is no shelf life indication on the paints. This occurs because the shelf life is not known. Therefore, the estimation and indication of shelf life is a major challenge facing the paint industry. The paucity of information on shelf life has also led to the indiscriminate use of lead to improve durability and shelf life. A common practice of manufacturers in industries is to utilize various short cuts, e.g. bracket tables (Porterfield and Capone, 1984) and the Q-Rule (Connors *et al.*, 1973) to estimate and project shelf life. These techniques share the advantage that decisions may be made by analyzing only a few stressed samples. However, they also have some limitations since they are based on assumptions about the product components and are valid only in so far as these assumptions are accurate. Any method adopted for determination of the validity of paint stability and shelf life should be based on analytical precision, the use of appropriate controls within the experimental design, the assumptions embodied in a mathematical model, and the measured characteristics of product components. Over the past few decades, other methods such as microbial stability techniques (Anderson and Scott, 1991) and sensory evaluation (Trees *et al.*, 2000) have been used to determine the shelf lives of other products, however, these also have their limitations. Microbial stability testing assessment techniques require that the test period should be long enough to allow significant product degradation under recommended storage conditions. Secondly, the testing protocol does not permit one to distinguish percent degradation from inter assay variation. Although, data collected at an appropriate frequency is such that a trend analysis may discern instability from day-to-day imprecision. The reliability of data interpretation needs to be improved by including in each assay, a single lot of reference materials with established stability characteristics. This may help to minimize the impact of systemic drift and inter assay imprecision. Sensory techniques involve the use of trained laboratory panel of judges to evaluate the appearance of degradation typical of the product by use of a 5-point structured category scale. Each evaluation contains a marked reference sample that is obtained from a fresh production batch. A score of 2 on the category scale

indicates 'just detectable' deterioration in sensory qualities compared to that of the marked reference which is a fresh product. A score of 3 indicates 'clearly detectable but not acceptable' deterioration, and a score of 5 indicates that the judge considers the sample unacceptable. Samples are usually evaluated twice, and means of scores are calculated over replicates for each sample (Trees *et al.*, 2000). This method is subjective and less accurate and not suitable for paints and paint products as they are not foods for human consumption.

An alternative to direct product testing is predictive microbiology, the modeling of microbial populations, which has become an active area of research. Unfortunately, there has been no record to date where predictive modeling has been applied to determine the shelf life of paints. Predictive models are mathematical equations which can use the information from a large microbiological database to predict inactivation or growth of microorganisms under defined conditions (Trees *et al.*, 2000). Predictive models offer considerable prospects for use in shelf life determination of microbiological based products. Predictive microbiology has proven its value for a useful model-based description of microbial growth ever since its development (McDonald and Sun, 1999; McMkeen and Ross, 2002). Data used in building a model are usually acquired from laboratory experiments. The problem of unrestricted use of lead in paint production to improve the shelf life has been traced to the fact that the shelf life of paints has been ignored by manufacturers. The importance of adhering to this strict manufacturing ethics cannot be over emphasized, especially in a warm and humid environment where deterioration is facilitated. Furthermore, the ingestion or inhalation of lead-based paints has been implicated in plumbism and learning disabilities (Rabin, 1989; Banks *et al*., 1997; Landrigan, 2000; Lanphear *et al*., 2000; Dietrich *et al*., 2001; Lewendon *et al*., 2001; Mathee *et al*., 2007). Thus, the use of predictive modeling in estimating the shelf life of paints, which is a critical step in evaluating new formulations is the aim of the present study.

MATERIALS AND METHODS

Isolation Techniques

Freshly made paint samples (DK1 – DK6) in 4 liter plastic containers were monitored for microbial growth for a period of 10 months at 2 weeks intervals. Aliquots (0.1ml) from both low (10^{-2}, 10^{-4}) and high (10^{-6}, 10^{-8}) ten -fold serial dilutions of paint samples were plated by pour plate technique on Nutrient agar, Mac Conkey agar and Potato dextrose agar plates in three replicates and incubated aerobically at room temperature (33 ± 3^0C) for 2 -5 days. Spoilt paint samples were also analyzed as described for the fresh paints. The developed colonies were counted, purified by subculturing and identified by the API 20E and ID 32E test systems.

Model Development

The growth data obtained were fitted into a suitable model (Dawes, 1969) to predict the time when the paint samples would reach absolute spoilage level (3.4×10^{10} cfu/ml). The time it took to reach this microbial population level (i.e N_t) was taken as the shelf life of the fresh samples. To estimate the shelf life time of freshly produced paint samples, the model was used as given below:

$$\frac{\text{Log}_{10} N_t - \text{Log}_{10} N_o}{\text{Log}_{10} 2} = \frac{t}{T}$$

Where N_t = highest cell count as colony forming units (i.e. total heterotrophic microorganisms) at the end of log. Phase; N_o = Initial cell count as colony forming units (total heterotrophic microorganisms) immediately after production; T = mean generation time of (total heterotrophic microorganisms) during log. phase; t = duration (months) taken for the population to increase exponentially from N_o to N_t.

RESULTS AND DISCUSSION

The microbial population count of the fresh paint samples immediately after production were observed to be approximately 1.0×10^1 cfu/ml for both the total bacterial count and total fungal count. In contrast, the spoilt paint samples (PSA- PSE) had total bacterial count of 3.4×10^{10}, total coliform count of 2.9×10^7 and total fungal count of 3.2×10^5 cfu/ml (Table 1). A summary of the mean changes in the microbial population density of fresh paint samples monitored at 2 weeks intervals is given in Fig. 1. Microbial population counts have been used by many investigators to establish deterioration of paints (Gillatt, 1992; Adeleye and Adeleye, 1999; Da Silva, 2003). In this study, the results show that there was a

time interval which elapsed before the initial population density N_o began to increase in number. This time interval known as the lag phase (L) varied from 4 – 5 months in the paint samples tested. This probably may be the effect of biocides incorporated during production. The predominant bacteria isolated from the fresh paint samples included *Bacillus polymyxa* (OB-1), *Bacillus brevis* (OB-2), *Bacillus laterosporus* (OB-3), *Proteus mirabilis* (OB-4), *Escherichia coli* (OB-5), *Lactobacillus gasseri* (OB-7) and *Lactobacillus brevis* (OB-8). The fungal isolates included *Aspergillus niger* (OB-9), *A. flavus* (OB-10) and *Penicillium citrinum* (OB-11). Other workers have also reported the occurrence of *Bacillus, Pseudomonas, Enterobacter, Proteus, Aerobacter, Escherichia, Micrococcus* etc. in paints and painted walls (Jakabowski et al., 19883; Ogbulie, 2004; Saad, 1992). In addition, *Pseudomonas aeruginosa* (OB-6) was regularly isolated only in the spoilt paint samples. This is most likely possible because the Pseudomonads can degrade an exceptionally wide variety of organic molecules. Thus, they are very important in the mineralization process. This finding also reflects the observation of Dey (2004) who reported that Pseudomonads are the most commonly encountered group, comprising at least 75% of isolates from spoilt paint samples. Three different fungal species were isolated from both fresh and spoilt paint samples. Two of the three fungal species isolated belonged to the genus *Aspergillus* while the third fungus was *Penicillium citrinum. Aspergillus* species have been observed in fresh paints (Adeleye and Adeleye, 1999). *Aspergillus* has been reported as one of the most abundant fungi isolated from biodeteriorated paint films in Egypt (Saad, 1992) and Japan (Inoue and Koyano, 1991). When the data obtained from the microbial population count were fitted into the model (Dawes, 1969), the estimated average shelf life was 26 months. Despite active research on predictive modeling over the last few decades, several studies that have been published (Fu *et al*., 1991; Fu and Labuza, 1993; Ross, 1996; Koutsoumanis, 2001; Koutsoumanis and Nychas, 2001; Ross and McMkeen, 2003) show that the emphasis of predictive microbiology has been on perishable and processed foods. It is noteworthy therefore, that predictive models have been used in the present study to determine and predict the shelf life of paints based on microbial growth kinetics.

Table 1. Microbial population densities in spoilt paint samples

Paint sample	Total bacterial counts (x 10^{10} cfu/ml)	Total coliform counts (x 10^{7} cfu/ml)	Total fungal counts (x 10^{5} cfu/ml)	Fungal isolates	Bacterial isolates
PSA	2.9	1.1	2.5	OB-9	OB-2, OB-3, OB-4, OB-6, OB-7
PSB	3.4	1.1	3.2	OB-9, OB-11	OB-1 OB-6, OB-7, OB-8
PSC	3.0	1.0	2.8	OB-10, OB-11	OB-3, OB-4, OB-6, OB-7
PSD	2.5	2.9	2.5	OB-10	OB-2, OB-4, OB-6
PSE	3.1	1.1	2.2	OB-11	OB-1, OB-5, OB-6

Values presented are means of triplicate samples.

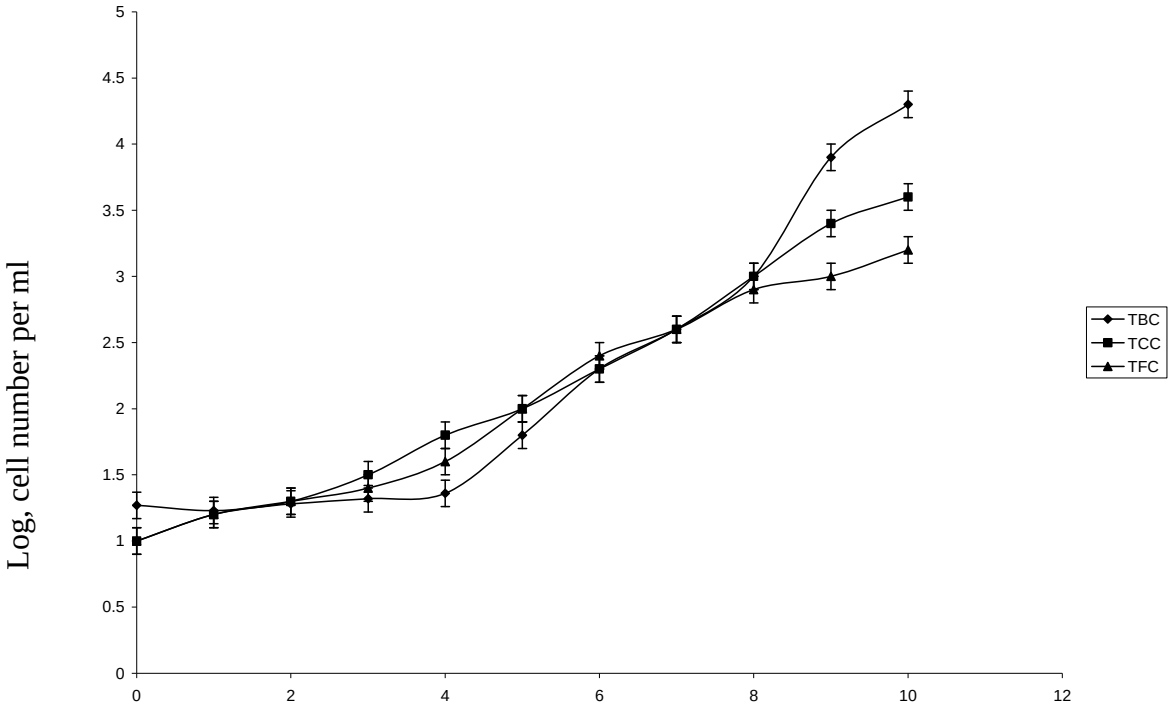

Fig. 1. Mean changes in microbial population density in fresh paint samples DK1-DK6. TBC, total bacterial count; TCC, total coliform count; TFC, total fungal count. Data represent the averages of triplicate determinations.

CONCLUSION

The results of the extensive analysis of freshly made paint samples monitored over a period of 10 months, showed the characterization and documentation of the microorganisms associated with spoilage of water based paints made in Nigeria. Based on the results obtained in this work, it is clear that the increasing levels of deterioration which resulted from contaminated raw materials, factory processing units and packaging materials all have significant impact on the microbial population count and hence aesthetic qualities of water-based paints. These have also contributed to the gradual reduction of the shelf life of paint to 2 years.

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现今发达国家的后资本主义社会将走向何处？

====再论‘社会生产主要动力形态的改变导致生产关系和社会经济形态的质变’====

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内容摘要：发达国家在前资本主义社会的后期，社会生产力发展到顶峰后，在 21 世纪初开始进入后资本主义社会—信息社会。**由于后资本主义社会充满许多难以克服的危机，社会经济的发展将受这些危机的限制而无法持续平稳的发展**，有时还会因危机而停顿倒退，因为这些危机是由其‘自由资本主义’的本质所决定的。本文的目的在于分析发达国家的后资本主义社会里的各种矛盾和危机，其主要的危机是能源危机和道德危机。只有解决了能源危机，社会经济才能在有更加强大的生产动力的推动下持續发展。只有解决了道德危机，才能建设成一个更加公平，更少危机的和谐社会。在克服道德危机的长期过程中，后资本主义社会必然地会逐渐地部分地增加社会主义的成分。所以，后资本主义社会的社会经济的发展就会成为一个‘有限制的资本主义’和‘社会主义成分’相互矛盾，相互制约，相互平衡的长期的历史发展过程。当社会主义成分发展到超过资本主义成分成为主导地位时，后资本主义社会就会转入社会主义社会。[Academia Arena, 2009;1(5):47-66]. ISSN 1553-992X.

关键词：社会生产力的主要动力形态； 前资本主义社会；后资本主义社会；社会主义社会；城乡工农和地区三大差别的消失；两种不同类型的国家：发达国家和发展中国家；三种经济：实体经济，软体经济，虚拟经济；后资本主义社会的四种危机：能源危机，金融经济危机，道德危机，战争危机；

前言：为什么要将资本主义的发展历史过程分为‘前资本主义社会’和‘后资本主义社会’两个历史阶段？因为资本主义的前后这2个阶段有不同的社会主要生产动力形态，所以，也就有不相同的社会生产关系，和不同的社会的基本矛盾和不同的危机。

作者以前在《对人类社会发展和生产关系发生质变的新观念》一文中(请查看：http://www.sciencepub.net/academia/0103)已经阐明：**只有社会生产主要动力形态的改变才能导致生产关系和社会经济形态的质变，**其它如科学技术的进步，经济和政治结构改进等虽能在某种程度上促进社会的发展，但都不能使生产关系发生质变。

概括的说，**当今世界分为 2 种不同类型国家和两类社会: 第一类型的国家是发达国家**,这些国家都由工业社会进入了后工业社会，或者说由前资本主义社会走向后资本主义社会，即信息社会，[1].如美国,法国,日本,北欧各国等. 这些国家已在全国范围内实现了机械化和电气化。**而且基本上在全国范围内消除了城乡，工农，和地区三大差别**。这就为在全国范围内实行广泛的民主和较独立有效的法治奠定了经济基础。**第二类型是除了发达国家之外的**

所有发展中国家或曰落后国家. 这些国家无一例外地正由农业社会走向工业社会，即走向前资本主义社会. 这些国家为了摆脱贫困,即脱贫致富以实现国家的富强,都正在加快其工业化和现代化的进程.然而**最主要最根本最困难的任务是实现全国的农业的工业化**，以便将来也能够消除消除工农，城乡，地区 3 大差别后，由前资本主义社会转向后资本主义社会。也许有人会问，现在全世界都已在发展信息产业知识经济，发展中国家难道不可以直接进入信息社会以达到后资本主义社会，而绕过（跳过）前资本主义社会吗？答曰：“不可能”。**因为一个没有经历过一个经济高达发达的前资本主义社会，而基本上消除了工农，城乡，地区 3 大差别国家和社会，是一个生产力低下的社会，是一个发展极不平衡的畸形社会。**只有在消除了这些不平衡之后，社会经济才能较继续向前发展，这就是说，**前资本主义社会是每个国家必须经历的一个历史阶段。**

I. 人类社会发展过程中各种社会的主要特征的比较：

作者在前文中 [1]指出：到现在为止，**人类社会发展的共同规律是都会有顺序地经历 5 种不同的社会发展的历史阶段，**因为无论是经济政治社会和文化都是由低级向高级的发展，而这种发展都是由社会生产的主要动力形态决定的。现就将各个社会的主要特征比较如下。

人们接着会问。在发达国家的前资本主义社会基本上消除了三大差别: 即地区差别,工农差别和城乡差别之后,社会生产的主要动力形态是如何转变以改变社会的生产关系的呢？**发达国家在 21 世纪初开始进入后资本主义社会，即知识经济和信息社会**，以半导体为主的多样化微型化精密化的动力装置使各种各样的工作系统和器具更加智能化和高度自动化,

表 一： 人类 5 种社会经济形态不同特性的比较

	原始社会	奴隶社会	封建专制社会	前资本主义社会	后资本主义社会
主要生产动力	个人劳力	奴隶人力	牲畜附加人力	# 蒸汽内燃发电电动 4 机	# + 各种频率微型半导体
主要生产关系	公社内个人平等	奴隶主和奴隶	地主和贫雇农	资本家和工人阶级	管理阶层和员工
主要经济	无,自己找食	畜牧业	农业	工业	服务业+信息经济
时代特征	石器时代	铜器时代	铁器时代	机电器时代	半导体时代
政治制度	公社一体	奴隶主 统治	封建专制王朝	资产阶级政府	垄断集团操控的民主法治
社会经济危机	天灾，猛兽	奴隶主的压迫，战争, 奴隶暴乱	王朝腐败,战争, 灾荒和农民 暴乱	周期性经济危机 争夺市场殖民地战争	金融经济危机, 道德危机 战 争 危 机
生产动力危机	无	缺少奴隶引发战争	争夺农民和土地	少有能源危机	能源资源危机,环境危机

这满足信息社会和智慧经济时代社会和人们对工作和生活日益增长的诸多新要求，提高了社会的劳动生产率，缩短了人们的劳动生产时间和时空的距离。使人们能更加轻松地生产

劳动和方便愉快地生活。个人的工作和生活更加独立自由自主，单纯的重体力劳动工作已不多见，雇员与老板之间的雇佣关系更加松散自由化，更少强制性压迫性。而社会财富大量的增加，更推动了金融经济的大发展。人们从生到死都受到基本的社会安全和福利的保障。**但是要想过更美好舒适的物质和精神生活，即使中产阶级也必须终生辛勤的工作劳动和奋斗。**然而，**在发达国家的后资本主义社会，虽然工农业的总产值已居全国 GDP 的少部分，但是，实体经济的动力和动力装置仍然是煤炭石油天然气和蒸汽机内燃机发电机电动机。**而由于煤炭石油天然气等即将耗尽而引起的能源危机将极大地限制后资本主义社会经济的发展。

II。‘前资本主义社会’与‘后资本主义社会’的关系和区别

总起来说，在各个发达国家的前资本主义社会，由于蒸气机, 内燃机,发电机和电动机作为强大的社会生产的主要动力的普遍发展和运用，世界上煤石油天然气的几乎可以无限制的供应，加上自由市场经济几乎无限制的扩张，虽然经历过 20 世纪 30 年代的经济大萧条和许多经济危机，也经过 2 次世界大战，但是这些发达国家的国家工业化和实体经济的发展始终是快速而强有力的。**特别是 2 次大战后各发达国家 50 年的快速大发展，最后使得发达国家将“自由资本主义经济”发展到了顶峰，其表现形式就是各国全社会基本上消除了三大差别**（即地区差别,工农差别和城乡差别），**这也表明各国的实体经济也发展到了顶峰，**而在新世纪初开始进入后资本主义社会。后资本主义社会是在前资本主义社会的社会经济的基础之上发展转变而来，并且找到和成功地运用了多种多样的半导体作为微型动力，**使发达国家开始进入知识经济和智慧经济的新时代，这就是后资本主义社会。**但是后资本主义社会没有前资本主义社会那么幸运，它遇到了一系列难以解决和克服的社会经济问题和危机。**这其实是前资本主义社会的自由资本主义发展到顶峰后，即实体经济也发展到了饱和后必然会衰落的结果**。因为在当今的后资本主义社会，在煤炭石油天然气等自然能源即将耗尽的今天，比蒸气机, 内燃机,发电机和电动机更加强大的动力装置尚未出现之前，这些国家经济的发展只能靠那些微型动力装置所装备的知识经济和智慧经济这类的软体经济来推动。但是，**这类软体经济除了使人们的生活得更加轻松愉快之外，即对生活只能起锦上添花的作用之外，不能满足人们对物质生活更多的需求。**加之，发达国家的资本家为了降低成本和节约资源以追求高额利润，往往将可转移的实体经济都转移外迁到发展中国家，使发达国家的经济失去了坚实的物质基础。至于所谓的“金融经济”，这其实是虚拟经济，它在毫无限制和监督下运行必然自由泛滥，必然会产生为一大堆泡沫。再加上为争夺能源而引起的战争，这就是后资本主义社会的经济不可能像前资本主义社会后期那

样的强劲高速发展，而必然下滑的深层原因。从 2008 年下半年起，由于美国次贷危机引发的金融经济危机大海啸拖累所有发达国家和全世界的经济落进大衰退的深渊，同时也暴露出以美国为首的发达国家的经济脆弱和泡沫的本质。**以掠夺他国他人财富为目的虚拟经济（金融经济）最后会以害己而告终**。美国经济的衰落必然导致其霸权的衰落，这对建立一种国际间公平合理的国际正常关系是大有裨益的。**这或许将促使人类社会未来的进步能够建立在比较公平竞争的机制下优胜劣汰**。

发达国家由于智慧经济的快速发展，使人们的工作和生活日益轻松愉快，这就使得人与人之间的关系更加个性化独立化和自由化，同时，由于社会分工的更加专业和细致，个人的工作和生活的需要却更加依赖于社会和他人的供给服务合作和帮助。因此，就要求个人与社会和他人的联系（非亲身接触）要更加频繁和紧密，这就会造成个人与社会和集团之间的频繁的利益冲突。于是，**人与人之间的就完全变成了利益关系，人都变成为经济动物，而丧失了许多能由于亲自接触而产生的感情，**而感情是人类快乐和幸福的源泉。

III 后资本主义社会的基本矛盾：

前资本主义社会的各个发达国家虽然在全社会基本上消除了三大差别（即地区差别,工农差别和城乡差别），**但存留下了也许长期或者永远难以消除的脑力劳动和体力劳动的差别。 这种差别的长期存在就主要表现为管理者与被管理者之间的基本矛盾**。其表现形式有：【1】。企业内部管理阶层与员工之间的矛盾。因为在后资本主义社会里，大企业的资金几乎都是由股票集资而成。大股东一般都占据董事会的重要位置。而经理和管理阶层往往雇佣专业人员，他们的利益是与股东资本家和雇员的利益相冲突的，他们赚钱和分红的多少与企业的盈亏并不完全一致，即使企业亏损或倒闭，他们还可以照样拿高薪走人甚至毫发无损。反而股东资本家与员工的利益较有更多的一致。【2】。金融经济管理阶层和投资者的矛盾，因为这些高管和管理阶层并不一定是大股东，公司的兴衰与他们没有直接的利益联系。这种矛盾往往表现为管理阶层对平民投资者财富的肆意掠夺，而带有空手套白狼的欺诈性质。这与前资本主义社会（特别是在资本主义社会的中前期）内资本家对工人的剥削有本质的区别，那时资本家或亲自管理或找代理人直接管理企业，企业的盈亏直接关系到资本家本身的利益。【3】。政府雇员或工作人员与民众之间的矛盾。每个国家的政府都有一大批的公务人员，后资本主义社会的发达国家也不例外。这是一个庞大的群体。他们都有一些共同通病。他们大约占各国人口总数的(10~25)%.它们的工资虽然不很高，但收入稳定，福利好，不易失业。他们的通病是不求上进(因为要上进想赚大钱的

人不会久留此地)，懒散，抱团，官僚主义，爱滥用权利，总想把大众口袋里的钱掏給政府，政府的钱多了，他们的钱也就可能水涨船高。当然还有少数人以权谋利，贪污受贿的。而那些被民众选举出来的头头为了自己以后的选票和前途，往往还要拉拢这一大帮人。所以就形成政府与广大民众的利益冲突。【4】。其它的矛盾还有贫富差别，种族差别，以及宗教文化差异等等。这些差别所形成的矛盾激化时，往往会造成社会的局部冲突和动乱。【5】。中小企业主与其职工的矛盾.这种矛盾一般并不大，二者之间多是自由自愿合作，合则来，不合则去的性质。一般难以发展到引起社会冲突。【6】。从全世界来讲，还有发达国家与发展中国家间发展的不平衡的矛盾。这种不平衡表现为：一方面发展中国能为发达国家提供廉价的劳动力市场和资源。但另一方面，还有不同的宗教信仰种族文化等矛盾和冲突。并且还有由于贫富悬殊，发达国家对发展中国家掠夺资源和转嫁危机而产生怨恨冲突恐怖袭击等。这些复杂的矛盾和冲突可能造成国家间的战争。【7】。发达国家之间直接为争夺他国的能源资源或为转嫁金融经济危机而产生的矛盾。

这些矛盾的复杂的相互作用的可以导致严重的社会经济危机或者战争，从而阻滞社会经济的发展。

IV. 发达国家的后资本主义社会的能源危机和资源危机，环境危机

概括的说，后资本主义社会存在着 4 大危机：能源危机，金融经济危机，道德危机和战争危机。这 4 大危机是后资本主义社会的自然条件和社会经济条件中所固有的，是躲不开和甩不掉的。后资本主义社会只有在克服这 4 大危机中，首先是能源危机中推动社会经济的发展。**解决能源危机是解决一切危机和社会经济继续向前发展的前提。**

下面先谈能源危机和资源危机，环境危机。

能源向来是保障经济发展的推动力。由于天然能源不可再生而且非均衡地分布世界各地，导致各个经济大国都需要透过能源外交或者战争来谋取大量天然资源，以保护其经济和政治利益。一些拥有丰富能源资源的国家，甚至将能源资源作为战略武器，以获取国家的额外利益。前资本主义社会与后资本主义社会的国际环环境的主要区别在于：【1】。**前资本主义社会生产力的发展是没有遇到什么阻力或者瓶颈的**,因为前资本主义社会是在世界上少数国家产生和发展的。在其发展过程中，世界上绝对多数国家和地区几乎都是未开垦的处女地。虽然资本主义为瓜分市场和殖民地在 20 世纪发动了 2 次世界大战，并出现过周期性的经济危机。但是在蒸气机, 内燃机,发电机和电动机 4 种强大动力的推动下，社会生产力和生产率是快速地向前发展的，这种生产力的发展在世界充足的能源供应下，是没有遇到什么阻力或者瓶颈的。【2】。但是**在后资本主义社会**，世界的煤炭石油天然

气等的储量约供全世界 50 年的消耗。世界经济已经全球化，世界已成为世界村。各种微型动力装置所组成的信息智能器具除了缩短人们的时空距离和使人们工作生活更方便愉快外，无法满足人们日益增长的对生活所需的物质资料的巨大需求和欲望。**由于没有新的巨大动力装置和与之配套的新能源。社会和人们的物质生活的巨大需求并不容易得到满足。**这就使争夺能源资源成为国际间冲突和战争的根源。虽然，各国正在积极研发可再生能源。如太阳能源的利用，风能的利用，生物燃料的利用，甚至将来氢氧发动机的成功使用等都只可能替代一部份石油天然气，但不能从根本上解决对强大动力能源的巨大需求。只有像可控制的核聚变(包括可控制的冷聚变)的成功使用也许能最终满足社会人们物质生产对能源的需求。但其成功运用尚远无头绪。【3】。现在，人类工业和生产中所需的合金元素和稀有元素都是随着太阳系的诞生从宇宙中带来的，人类尚无法人工制造。随着人类需求的增加，这些自然资源在无补赏的逐渐减少。因此，争夺自然资源也成为国际间冲突的原因之一。【4】。任何工业生产都会不同程度地破坏环境和对环境造成污染。在破坏之后要恢复到原生态几乎是不可能的。现在全球的温室效应，海平面上升，暴风暴雨洪水干旱频繁。臭氧层的大空间被破坏使人类暴晒在高能辐射下。工业和化工所排放废气重金属对水源河流大气和土地的污染，原子裂变反应堆的放射性污染，动植物种类的急剧减少等等，造成了生态的不平衡和动植物物种的大量灭绝，而使人类的生活居住环境持续恶化。【5】。地球人口总数的增加，全球工业化程度的增加，造成了能源资源的日益短缺，环境污染和生态的不平衡。现在各个国家个人对淡水需求量大大的增加，未来争夺淡水将可能成为国际争端之一。**而所有这些问题的最终解决一方面要取决于人类最后是否有能力完全能够利用如可控制热(冷)核聚变的无限能源，以便可以为人类提供所需的更加丰富的生活物质资料。而更为重要的是人类本身应该控制和抑制自己的物质欲望和消费欲望。而这是全社会每个人的道德观和价值观的问题.**

V. 发达国家后资本主义社会的金融经济危机：

在发达国家的后资本主义社会，存在着三种经济：实体经济，软体经济和虚拟经济。**#1。实体经济：**即第一（农业）第二产业（工业）。例如食物，房屋，汽车，飞机，石油，电冰箱，药品等。由于实体经济中高技术量现在几近饱和，劳动量大，利润较低。发达国家往往将利润低的产品的生产转移到发展中国家以降低成本，获取更高的利润。这其中多为实体经济。**#2。软体经济：**即所谓的第三（服务业）和第四（信息业）产业。例如电脑，手机，媒体业，服务业如健身美容等。当然其中的许多硬件也属于实体经济。这类

产业往往含有许多高新技术，许多产品和服务业的利润会很高，其总产值已经成为发达国家经济中 GDP 中的主要部分。**#3。虚拟经济**：即银行，股票，保险业等金融经济。也可以称之为第五产业吧。**发达国家的虚拟经济现在愈来愈膨胀和发达，危机爆发前，美国30%的利润来自金融业**。因为这些国家的平民百姓都有多余资金用于投资，都想以钱赚钱，获取暴利。但这是一个不生产任何产品，而只靠吸收投资和分配资金以及倒买倒卖货币而可以获取暴利的高端行业。这又是一个极其重要的产业。如果把整个世界经济看成一个人体的话，金融经济就是整个经济的心脏和血管。当银行不能给各个企业提供足够的金钱流通时，社会的经济活动就由于“缺血”而死机了。于是，一场金融危机就演变成了经济危机。

【1】。由于现在发达国家的后资本主义社会的主体经济仍然是‘自由资本主义经济’，资本的存在就是为了追求最高利润。**各国政府在垄断集团的背后操控下，高倡“自由资本主义”和“自由市场经济”，提倡无限制的财富积累。**实际上是放纵金融大鳄和垄断集团无限制地巧取豪夺，无限制地掠夺本国平民和外国的财富。这就必然会导致一次次地国内外金融经济危机。而且，发达国家仗着其财大气粗的金融霸权优势，再加上（美元或欧元）货币本位制成为国际储备货币的优势，可以滥印钞票，这使得发达国家可以肆意的扩大消费和超额消费以掠夺外国的财产，转嫁自己的金融经济危机，这就可能造成国际间的冲突甚至战争。**虽然发达国家有较独立的法制和较普遍的民主制度，但是这些法制并不是完全建立在公平的原则上的，所以无法阻止垄断集团和财团走向垄断资本主义和肆意掠夺社会财富，并导致一次又一次的全国甚至全世界金融经济危机。**

【2】。由于后资本主义社会总财富的增加，贫民和平民的基本生活都有较完整的社会福利保障。几乎人人都有或多或少的剩余金钱可以用于投资但是大多数民众的物质生活并不富裕，他们还需为丰富自己的物质生活而辛勤劳动工作和奋斗。他们眼看少数大款的挥霍无度和一掷千金，这种反差和心态的不平衡几乎使整个社会充满贪欲欺诈。**人人都想多赚钱，都想不用劳动而用投资来以钱赚钱。这就使得后资本主义社会的发达国家的金融经济成为全国经济中最活跃又最充满欺诈和最容易成为泡沫的经济**。

【3】。<u>而有关国计民生的实体经济由于高度机械化，自动化和利润低而降为全国经济的次要成分。资本和人力都从制造业转向知识经济和服务业。</u>因为实体经济比较难以弄虚作假，需要实干苦干，而且利润不大，所以那些想发横才的人不乐意从事于实体经济。**在发达国家，那些高智慧的人都一窝蜂的去学金融经济，去搞股票投资，坑蒙拐骗。而少有人愿意从事于工程师教师医生技工等的实干工作**。一方面，法律和监督无法毫无漏洞地每时

每刻都能监管他们的经营。另一方面，这些金融经济高管们都是为赚大钱而来，道德人格水平原本就低，而贪婪欲望的烈火在其相互攀比下愈烧愈旺。他们只要用些心机在键盘上敲敲打打，就能打出花啦啦的一大堆钞票，何乐而不为。因此，借贷炒股和投资的杠杆越长越长，泡沫经济一天一天地膨胀，待到泡沫破灭之日，就是金融经济危机到来之时。这就是这次空前的金融经济危机产生的根源。

【4】。虽然各国正在用尽全力化解危机，但由于美欧主导下的过度虚拟经济积累甚重，无论如何也不可能籍一次行动而全部消肿。可以断言，**在 21 世纪，过度的虚拟经济将不时(每隔五到十年)会给世界人们带来或大或小的麻烦。**因此，**只要有融资股票炒买炒卖等虚拟经济存在，就会有泡沫，就会造成危机，就会产生劫贫济富，就需要对虚拟经济眼严格调控监管，并在泡沫开始出现时给以预警。**

调控监管虚拟经济的有效办法是对在虚拟经济中获取暴利的公司和个人征收高额附加税建立全国性的反泡沫基金，以便在金融经济泡沫破灭时予以某些可能的必要补救。同时使其利润不比制造业的利润高的太多。

也许完全根除金融经济领域内的欺诈和泡沫似乎不太可能，但是减少欺诈和减小泡沫应该仍然是可能的。最主要的问题是要破除“自由市场经济”的“不受任何监管的绝对自由化”的信条，使金融经济市场不能绝对自由化，不能完全放任自流，必须平时有严格的常规的监管法律和条例。**其监管法律和条例的原则应该是金融经济领域的利润不能超过实体经济的利润太大太多。**对其高利润所得应该征收高额所得税。**同时对金融经济领域的富豪和高管们的薪金，红利，和奖金也应该有所规范限制。**

【5】这次空前的**金融经济危机在发达国家会持续多长时间的关键在于是否较快地形成新的经济增长点，**有新的科技产品，新的市场。否则，很可能会引来一个长达十年八年的经济衰退。虽然美国现在有科学技术优势，但是，在短期内能够开发出有广大市场和能吸收广大劳动力的新经济，这种可能性并不大。从长远来看，也许能够领着世界走出危机的多半可能仍然是美国。但是,未来的**新科技产业一定会融资，也就一定会造成经济泡沫和危机:** 关键问题是：今后新的科技革命只有发生在实体经济领域，比如可控制热(冷)核聚变，汽车业，飞机业等，才能造成广大的就业人群，才能供给社会的长期需要. 因此,才能持续增长。而象半导体、计算机、网络通讯等高科技的新产业, 在开始时, 由于其巨大的超额利润就已经形成了巨大的经济泡沫. 因为这些新技术产品所需的劳动量小，易于大量快速地生产，市场很容易就达到饱和。一旦市场饱和，价值即迅速降低而使泡沫破灭以形成危机。再也

无法推动经济的长期发展。未来以新科技所形成的新产业, 或者称之为新的经济增长点, 都有可能步网络通讯等高科技的后尘, 在市场饱和后形成泡沫破灭的危机.

【6】。这次空前的**金融经济危机在发达国家会持续多长时间的另一个关键** 是是否能够较快地调整经济结构。即适当的减少虚拟经济和增强实体经济，调整它们之间的总体比例，调整它们的利润率。使国家的整体经济能较均衡的发展。

但是只要存在投资股票银行等庞大的虚拟经济，就会有投机欺诈和巧取豪夺，就会有泡沫，就会最后形成周期性的金融经济危机，只不过每次危机的大小危害程度不同而已。

VI. 发达国家的后资本主义社会的道德危机：

【1】。人类欲望是人类的主要精神特征即所谓“人性”.欲望是人的精神动力,它刺激每个人为自己的生存发展,**为**享受快乐和幸福而行动. 正是为享受和快乐的欲望决定了个人的生活目标.。欲望本身是中性的，无善恶之分。为揭露宇宙和自然界的秘密,为了探求科学真理,总是刺激着许多学者终生为发明和运用新科技而奋斗,其中,**新动力(能源)和动力装置的发明和利用为推动人类社会经济形态和生产关系的质变起了决定性的作用。**.,从而有效地推动了人类社会的前进.这就是人类“善”的欲望膨胀的结果。但为满足自己个人的欲望，达到自己的目的而不择手段，坑蒙拐骗，损人利己，危害社会，这就是人性的“恶性”欲望膨胀。**如果社会上许多个人，公司和社会上充满这种“恶性”欲望，相互攀比成风，就形成了社会的道德危机。而发达国家的后资本主义社会由于鼓吹无限制地“自由市场经济”和鼓励“个人财富无限制地积累”，提倡绝对的‘个人自由’和极端的‘个人主义’，必然导致形成一个充满欺诈和道德危机的社会。**

【2】。发达国家的后资本主义社会虽然对平民有较完整的基本福利和社会安全的保障体系，但是它仍然是一个高度发达的自由资本主义社会。不受控制的自由市场经济和个人自由的生活方式必然导致贫富极大地悬殊。一方面是垄断集团的富人(如华尔街的精英)巧取豪夺，掠夺他人和社会的财富，他们有不受限制地累积个人财富的权利，过着骄奢淫逸的生活。另一方面，平民需要专业特长，勤奋好学，辛勤工作，终身奋斗，才能维持一般的中产阶级平民生活。一遇到失业和经济危机，日子就更加难过。**这种极大的贫富反差是产生道德危机的另外一个重要原因。在一个贫富极大悬殊的国家里，有几个人不会‘见钱眼开’和‘见钱眼红’的呢。富者巧取豪夺，贫者都想不劳而获。都不愿意从事艰苦的实际工作劳动，金融股**

票成为全国性的大赌场，金融经济泡沫和危机就成为必不可免的灾难。【3】。据《华尔街日报》报道，华尔街某些高级管理人员一个星期的收入都比奥巴马总统的年薪高。华尔街高管的奢华生活，令人咋舌。AIG 高管詹姆斯·哈斯有一座两层白色别墅。别墅为古典风格，高大门廊与海湾式窗户尽显豪华。住宅外是高尔夫球场，可以远眺长岛湾风景。豪宅坐落在独立的街道终端，有专业保安全天守卫。而就在他的住所不远，就有因无力还贷而被银行强行没收的房子，让人不禁感叹“天堂和地狱”只隔咫尺。

高盛公司全球董事长兼 CEO 劳尔德·贝兰克梵 2007 年因为拿了 6850 万美元而创了投资银行的薪水纪录。2003 年到 2007 年，贝兰克梵一共拿了 2.1 亿美元的薪水。他拥有价值 2600 万美元的别墅让其他人“望尘莫及”。

前美国纳斯达克股票市场公司董事会主席，大骗子麦道夫生活也相当“豪华”，仅四所豪宅就价值约 2200 万美元。在棕榈滩的一处住宅价值 1100 万美元， 这座豪宅占地巨大，有 5 个卧室、7 个浴室和室外游泳池。在华尔街，高管拥有私人游艇和专门码头是常事，更是炫富的必备道具。

2008 年，在金融风暴银行面临倒闭下，华尔街员工分红的总额是 5430 亿美元。这就是美国文化。这些都是造成美国金融经济问题的根本原因，那就是不顾一切、疯狂地追逐短期利润。**高风险有什麽好怕的？这些银行的决策者全都是无所畏惧，因为顶了天就是拿钱走人（grab the money and run），没什麽大不了.**[3]

美国《金融时报》报道说，在那些千万身家的华尔街高管中，已酝酿了一种半歇斯底里的情绪。一些银行家指责，政府对奖金征收重税是“我一生所见最反美国的事情”。一名主管坚称，新措施将“使美国退回石器时代”。有人认为，自金属工具发明以来，金融精英有能力累积巨额财富而使数百万人失去职位，这正是人类进步的主要特点。这就是富人的道德观。超级薪资使得决策者无所畏惧，加上同行之间的竞争，这就造成银行业高槓杆的运作模式，使泡沫越吹越大。当泡沫破灭时，就形成巨大的金融经济危机。

再来看看民众的愤怒。这种愤怒也是非常合理的。金融机构倒下，竟然要民众埋单，而且这些高管还坚持自己的生活标准不受影响，这让人不能接受。

【4】。有一种观点认为：人们对物质享受的欲望容易达到“饱和”，而精神享受就难以“饱和”。我觉得这种观点是不正确的。那些富豪们既然把物质享受当成一种欲望，它就会上瘾，一上瘾就会层层升级，喜新厌旧，互相攀比，追求新的刺激而无止境。**中国古**

语：“欲豁难填”就是这个意思。所以**老子说：“罪莫大于可欲，祸莫大于不知足，咎莫大于欲得。”看看上面华尔街的富豪们，有谁是已经满足了的呢**？也许少数人到他们临死之前躺在床上会有少许的满足。总之，人们的欲望是其精神面貌道德观和价值观的问题，整个社会的媒体文化学校教育家庭教育应该从小就培养人们要有正确的道德观和价值观。

美国金融界的文化生的是重病，金融界人士已经没有羞耻之心。他们居然把经营别人的钱（譬如退休基金）毫无羞愧地以各种名目放进自己的口袋、把政府（纳税人）为他们善后的钱毫无羞愧地放进自己的口袋。这些人如此腐败不能扭转美国的金融颓势。[3]

绝大部份的人和所有的美国人都不希望美国的银行倒闭，影响太大了。今天大家都在赌政府会否干预。美国政府怎麼干预呢？就是大量借钱给这些银行不让它们倒闭。但是钱从那里来呢？向国外借钱能解决的机会是零，**因为由金融衍生产品所造成的黑洞估计高达 50 兆到 60 兆，足以拖垮全世界**。美国能借到的钱属于杯水车薪。唯一的、最可行的、也最容易的解决方桉就是印钞票，这是只有美国拥有的特权。[3]

【5】。但丁：“道德常常能填补智慧的缺陷，而智慧却永远也填补不了道德的缺陷”。其实，但丁这种历史早期的提法是不符合当今的现实的。这次美国的空前的金融经济大危机的产生也许是互联网和知识经济帮了大忙。也就是说，**智慧所引导出来的欺诈和坑蒙拐骗会使人们的道德更加堕落。**还是中国 2500 年前的哲学家**老子对人性看得更加透彻**。他说：**“智慧出，有大伪”**。

其次，贫民的懒惰和个人的纵欲所造成的广泛的个人犯罪是社会道德危机的另一个重要原因。 实际上，次贷危机也好，美国贸易赤字也好，说穿了，就是美国人消费得太多，生产得太少，形成了缺口。这个缺口怎么补？一是抢，二是骗。

富人的骄奢和贫民的懒惰成为阻滞社会经济发展的两极。这都是提倡无限制的个人自由所造成的“个人欲望恶性膨胀”的结果。这就是后资本主义社会的道德危机产生的根源。

【6】。这次金融经济危机体现了美国社会从上到下的全面腐朽。现在美国老百姓群情激愤，都说这次危机是华尔街那帮混蛋和小布什政府的错。但是我们平心而论，美国老百姓又怎么样？你活干得这么少，压根就没那份钱，你凭什么住大房子？[3] 整个社会不是靠大力提倡和鼓励人们用道德规范个人的行为。整个媒体为了追求利润整天所炫耀的是是非不分的个人英雄主义暴力和性。而靠浩繁的法律去惩戒犯罪的后果，既增加了巨大的社会成本，只能惩罚小盗而对大盗无所作为。这次美国震撼世界的金融经济危机唯一一个人受到了惩罚的人就是：麦道夫（Medoff）。也达不到人们提升道德水平的效果。

VII. 后资本主义社会中的超级大国的霸权和战争危机

由于在**发达国家**的后资本主义社会存在能源资源危机，金融经济危机，特别是道德危机，而且它们又**是一个生活水平高,消费高,和福利高的 3 高国家.** 为了维持这 3 高，特别是垄断集团及其高管为了获取最高的利润，它们一方面将许多薄利的实体经济迁移到发展中国家，另一方面，**无节制地发展虚拟经济—金融经济**，以便操控和掠夺他国和本国平民。为了操控和掠夺他国，就得建立霸权。**霸权是靠强大的武力，金融，和能源 3 大支柱支持的。**美国金融资本家支撑美元的全球货币地位， 军火商保证美国军事优势，强大的武力就不怕外国来逼债. 石油商保证能源供给。 三者支撑起美国在全球的霸主垄断地位。**只要美元是主宰性的世界货币，美国就什麽都不怕。**现在实际上没有哪一个国家或者集团的势力想要或有能力控制掠夺或者打败美国，但是美国为了金融军火能源垄断集团及其高管为了获取最高的利润，**每个美国总统一上台就对别国发动战争。这种长期炫耀武力的结果是造成国家财政的巨大亏空，也是引起这次金融经济危机爆发的重大原因。**

为了要使发展中国家顺从地接受霸权和对其财富能源的掠夺，美欧国家需要话语权和炫耀其虚伪的价值观。美国是“软性生产”大国，媒体业发达，这样它就可以通过舆论**炫耀其虚伪的价值观，同时用各种办法收买发展中国家的社会精英，使其顺从地接受霸权和掠夺。于丹：**“西方垄断了理论与政治评判的话语权，他们采用偷梁换柱的办法，将人们对普世性价值的追求，变成对西方资本主义政治制度的追求。他们的公式是：普世性价值等于西方资本主义价值，西方资本主义的政治、经济模式是普世性的模式。不仅如此，资本主义制度开始对自身进行重新包装，把自己与平等、自由、民主、公平、繁荣等一切美好的东西联系起来，并把自己的制度标签改为“自由民主制度”。这样一来，资本主义不仅把自己的制度本质深深掩藏起来，而且传统的资本主义与社会主义的对立，就俨然变成了“自由民主制度”与“非自由民主制度”的对立。西方一下子抢占了政治评判和道德评判的制高点，一切不符合西方政治指标的制度都要面临政治合法性与道德的双重批判。”

美国鼓吹的「全球化」（Globalization）是西方国家的另一个强盗论述.「全球化」基本上就是西方发达国家在优势经济、财力和科技的情况下堂而皇之入侵开发中国家市场的一种手段。星巴克咖啡、麦当劳汉堡、沃尔玛零售店. . . . 在「全球化」的旗帜下进入全世界，不但抢佔别国的市场，也破坏了当地文化。[3] **美欧发达国家就是用‘资本自由化’和‘金融全球化’的虚伪的口号敲开发展中国家的金融大门，然后用其雄厚的金融势力对其它国家的财富冠冕堂皇地大肆掠夺和转嫁其金融经济危机的。因为有强大的武力作后盾，被掠夺者只能忍气吞声。**

一旦国家变穷，西方政治制度的缺点全部冒出来了. 这次美国发生的百年一遇的大金融经济危机是其道德危机，战争危机（多年的伊拉克和阿富汗战争）西方政治制度的缺点等等全面爆发的综合体现。

“人类社会的进步应该是在公平竞争的机制下优胜劣汰。” [5]现在美欧发达国家的社会经济，科学技术，文化教育等各个方面都已经走到世界所有国家的前面，都占有绝对的优势，不害怕与别的国家的公平竞争。那么，为什么还要用霸权和武力侵略和掠夺别的国家呢？这完全是这些国家的垄断集团及其高管为了获取最高的利润的恶性欲望无限制地膨胀的结果。他们同时也是疯狂掠夺本国平民财富的罪魁祸首。广大受害的平民大众一定会从今后的一次又一次的金融经济危机中认清垄断集团的邪恶本质。这次 G20 元首在伦敦聚会时，游行民众打出**“吊死银行家”**牌子就是明证。

VIII. 结论：美欧发达国家的后资本主义社会将走向何处？

【1】。 阻碍美欧发达国家的后资本主义社会继续发展的主要因素：前面已经谈到，美欧发达国家的前资本主义的后期是自由资本主义发展的顶峰。**到了新世纪初，由于实体经济增长的放缓和知识经济的出现和迅速发展，加上金融经济的大扩张，**美欧发达国家开始进入后资本主义社会。但是后资本主义社会是充满上述 4 大危机的社会，所以也是自由资本主义开始下滑的社会。因此，要使后资本主义社会继续向上向前发展，就必须：**第一。最好能先解决能源危机（硬件），第二。逐渐解决道德危机（软件）。美欧现今社会，只有狠抓这两头，尽快解决这两种危机，社会经济才能继续向前发展**。否则，社会经济的发展就只能江河日下。

【2】。首先，**必须完满而彻底的解决能源危机。有了充足的能源就有了一切**。这是后资本主义社会的生产力要继续高速发展的必要条件和前提。因为全球的煤炭石油天然气将在约 50 年内耗尽，如果没有足够强大而充足的新能源及其动力装置，就不可能生产出全社会所需的丰富的生活物质资料，工业和农业生产和各种软体经济中硬件的生产将无法进行。即使各种软体经济包括知识智能经济的大大发展也满足不了人们对基本生活物质资料的需要。因此，**后资本主义社会的社会经济要继续发展的根本问题仍然是动力问题。**像核（裂变）能发电，再生能源，太阳能技术、水能风能发电，生物燃料技术、太阳热能等都只能作为补充的或者附加的能源使用，暂时缓解一下对能源的需求，**而不能成为社会生产力的主要动力。也许未来只有类似可控的冷（热）核聚变所产生的无限的能量才能替代即将耗尽的煤炭石油天然气。**如果发达国家不能在全球煤炭石油天然气耗尽完以前解决新巨

大能源和其动力装置问题，那么，为争夺剩余的自然能源而引起的国际间的冲突或战争将难以避免，**长期无法解决能源危机的后果将会导致人类社会退回到《牛马耕田的铁器时代 + 智能经济时代》**。人类社会就将进入一个得了软骨病的时代。

【3】。要逐渐的基本上解决道德危机。#1。以社会平等公正合理的法制有效地限制对财富和权力的垄断是解决社会道德危机的必要条件。实际上，**从 2008 年下半年起在美国产生的空前的金融经济大危机主要是资本主义社会的道德危机所造成的**，是美国式“自由资本主义”“成功”（实为破产）的信条——“不受限制地累积个人财富的权利”的必然结果。现在，这些华尔街精英深信的原则已受到了严峻挑战而破产。世界上没有不受限制的东西，也不可能永久存在不受限制的权利。**美国总统布什在北大演讲**，有一段非常精辟的哲理名言：“人类千万年的历史，最为珍贵的不是令人眩目的科技，不是浩瀚的大师们的经典著作，不是政客们天花乱坠的演讲，而是**实现了对统治者的驯服，实现了把他们关在笼子里的梦想**。因为只有驯服了他们，把他们关起来，才不会害人。我现在就是站在笼子里向你们讲话。”现在来看，**害人的不只是‘权贵’，还有‘富豪’**。谁是美欧社会的最高统治者？是总统吗？不是，是总统背后的垄断财团—金融军火石油垄断财团及其代理人。**布什的权力恐怕更多的是被关在这些垄断财团包括钱尼的笼子里，更多的是受他们限制，而不是受平民大众的限制。既然总统的权力能够被限制而被关在笼子里。那么，那些垄断集团及其高管“不受限制地累积个人财富（其实是不受限制地掠夺别人的财富）的权利”为什么不能被关在笼子里呢？**一个美国总统的年薪一年就只有$40 万，那些最杰出的科学家一辈子得一次诺贝尔奖才约$100 万。那些华尔街的高管们凭什么一年拿走$数千万甚至上亿？他们并不是全部用自己的资本在赚钱，而只是套用管理投资者的资金巧取豪夺而已。**他们的分红应该按照自己的投资股份的多少与其他的投资者一样平等，他们的奖金也应该与公司的其他员工奖金的比例相等**。这种允许大亨们无限制地掠夺平民的‘没有良心的’“自由资本主义”制度是造成这次空前的金融经济大危机的罪魁祸首。这种不平等不公正制度不改革行吗？制度是根据人们的共识的价值观建立起来的，**在这发达国家的民主社会里，制度的问题就是价值观的问题**。由此可见，**解决道德危机的关键在于长期地不停地公正地打击和惩罚那些贪得无厌的富豪对社会财富的掠夺，并把他们和当权者一起关进笼子里**，减少贫富的悬殊差距，使社会的财富分配更加公平合理。**#2。社会愈向前发展，人们的物质生活资料愈丰富，它们就会有更多的时间，精力和金钱从事精神文化生活。就愈加需要人们有更加高尚的道德观价值观与之相适应。#3。社会给人们提供的物**

质生活资料与丰富，愈要求人们节约来之不易的能源和资源。这就是说，解决道德危机就需要社会绝大多数人要有一个正确的思想方式，行为方式和生活方式。因此，这是需要一个长期的历史过程才能完成的。

中国的前首富现在狱中的牟其中感慨道，“中国人学不会做一个好富人的本领。”“做好一个穷人，有骨气就行了，而做好一个富人，则需要巨大的智慧和仁慈的灵魂。”[6] 其实，**全世界几乎绝对多数富人都是同样地贪婪成性的。**中国 2500 年前的孔子早就要求“富而无骄”和“富而好礼”。然而，即使在全社会的有效监管和道德水平提高的情况下，大概也不可能使 100%的富人达到“无骄”而“好礼”。

由此可见，在现今的美欧社会，**只有经过全社会长期反复的努力斗争解决了道德危机，才能较彻底的解决今后的金融经济危机和由霸权而引起的国际间的战争危机**。但是，社会大多数人的道德观和价值观的转变不是在短期内能够完成的，而是在随着霸权的逐渐衰落和金融经济危机的不断冲击下，使人们从长期的痛苦的教训中才能逐渐得以转变。

【4】。在后资本主义社会，能源危机与道德危机二者之中，如果只解决了一个，社会仍然只能长期地滞留在后资本主义社会。#1.因为如果只解决了能源危机，虽然社会的总财富大大的增加了，人们的物质生活水平也大大的提高了，但是社会的贫富仍然悬殊，富人的贪婪和对社会平民财富的掠夺仍然会造成周期性的金融经济危机，也会造成与别国的战争。贫民的懒惰也是阻滞社会经济发展的一个重要的因素。**#2.**同样，如果只解决了道德危机，而没有解决能源危机，这种社会只能越过越穷，給人们能够提供的物质生活资料会越来越少，何谈社会经济的继续发展。**所以，只有能源危机和道德危机二者全都解决了之后，后资本主义社会才能长期平稳地向前发展，经过发展后，才有可能最后进入更加公平合理的社会主义社会。**

【5】。 发达国家不能依靠掠夺发展中国家以图促进自己社会经济的快速发展，发达国家必须真实地帮助发展中国家的社会经济一起发展。现在所谓“全球化”只是发达国家掠夺发展中国家的欺骗口号，而不是帮助发展中国家加速发展的用意。“这种新型殖民主义简单讲就是把过去以实际占领国土而后掠夺资源为目标的老式殖民主义变换成建立以在美国主导下的全球国际资本金融生产秩序来不断摄取全球各种资源的新型经济掠夺方式。在新的全球化浪潮中,CEO 们代替了旧日的总督们,各种条约代替了加农炮(当然这些条约本身是有强大军事力量为后盾的),所以美国在强调它的利益时,强调的是用它手中的″秩序″来产生利益---保证自己做老大的秩序”[3]美欧发达国家在经过这次百年一遇的大金融经济危机之后，只有逐渐改变其损人利己的极端个人主义的道德观和价值观，向着利人利己互助合

作的道德观和价值观转变，**使全世界都处于和平互利的发展环境时，发达国家本身社会经济今后才能继续向前发展**。否则，由于种族文化信仰移民以及资源等导致的冲突或战争，除了有利于垄断集团之外，同样会阻滞发达国家社会经济的发展。

【6】。**老子：“罪莫大于可欲，祸莫大于不知足，咎莫大于欲得。故知足之足常足矣。”“天之道，损有余而补不足。人之道则不然，损不足以奉有余。”**这些掷地有声的警世恒言正是医治现在美欧发达国家道德危机的良方。人只是“天”（自然界）之中的有限时间内的有限存在物，违反天道的人道最终会受到大自然的不断惩罚后，而回归天道。

“人之道，损不足以奉有余”. 因为迄今为止的人类社会，还都是对社会财富分配不公的社会制度。财富分配权还不能由社会的大多数人所决定。现在发达国家的财富分配权力被该国垄断集团在背后操控，而总是采取“损不足以奉有余”的劫贫济富政策，是造成金融经济危机，战争危机和最后导致国力衰落的根源。所以，归根结底,这要取决于未来人类是否能在完全彻底地认识自己控制自己，最终能够限制自己的“恶性欲望”的膨胀，接受教训改变自己的观念和行为。而回归“**损有余而补不足**”的天道。必须懂得：‘**一个劫贫济富的社会是不可能长治久安的。**’ 总而言之，**后资本主义社会所有危机产生的总根源是社会制度问题，**‘自由资本主义’制度与其它任何制度一样，不能不受制约而无限制地发展，特别是在后资本主义社会由于社会财富的巨量增加，金融经济已经发展到非常庞大的情况下，无约束的‘自由资本主义’只能逐步的部分的向更加公正的社会主义转变。

【7】既然现在发达国家的后资本主义社会是一个充满危机的社会，是一个难以继续发展上升的社会。这次空前的金融经济危机爆发就是上面所述 4 大危机叠加在一起相互作用的结果。由上面的分析就可以看出，**在美欧发达国家长期解决能源危机和道德危机的过程中，顺理成章地就只能在后资本主义社会里逐渐增加更多的社会主义成分，以逐步地向一个更平等更公平型的（即贫富差距缩小型的，更好的维护社会和大多数人的利益的）社会转变，向一个节约型的，环保型的，不损人利己型的社会转变，也就是将‘无限制的’“自由资本主义”必然会逐渐的部分的转向‘更公平的’社会主义，使“自由资本主义”成为‘有限制的’成分。这就是说，后资本主义社会会是一个‘有限制的’ “自由资本主义”和“社会主义”某些成分长期共存相互竞争相互制约以促进后资本主义社会继续向前发展的社会。**“拉斯穆森报导 9 日公布一项最新民调显示，现在美国只有 53％的人认为资本主义优于社会主义，20％的人表示更喜欢社会主义经济制度，这些令人吃惊的数字说明，当这个‘自由国家’正在与数十年罕见的经济衰退拚搏时，人们的不满情绪日趋严

重。”[7]“ 拉斯穆森报导上月的民调发现，三分之二的美国人认为，大政府和大企业经常勾结起来，损害消费者和投资者的利益。”[7]

【8】。作者所理解的社会主义社会：现在发达国家的后资本主义社会由于“自由资本主义”还占绝对的优势。其社会生产率的水平和社会的道德水平都还不够高，还不足以消除社会中贫富的尖锐对立，脑力劳动和体力劳动的尖锐对立，管理阶层与被管理阶层的尖锐对立，以及种族和文化等等的矛盾，这些矛盾的发展和激化，导致前述的 4 大危机。虽然，现在在发达国家实行了不同程度的社会福利和社会保障，**但这些只能说是含有社会主义的因素，因为其出发点还不是建立在人人完全平等和社会财富的公正分配的基础之上的。**所以不足以消除 4 大危机。因此，只有后资本主义社会在发展过程中消除了 4 大危机之后，**也就是其社会主义成分逐渐增多和自由资本主义相应地减少之后，即到达到一定的成熟阶段之后，后资本主义社会即转入社会主义社会。在这个社会里，其社会主义成分大概至少增多到和自由资本主义成分相等或者有所超过而开始占主导地位。但是“自由资本主义”不会消失，它的总量还会增加，因为它仍然能为发展生产力作贡献，只是它的“恶性膨胀”会受到有效的限制而不会危害社会和大众而已。**

这个社会主义社会的主要社会政治经济结构和特征大致如下：第一。个人私营经济，集体（股份制）经济 ，国有经济 3 者和其相互混合体会长期共存相互竞争和相互制约地发展。“研究发现，在多数情况下，‘在服务业和在竞争条件下生产的商品中’ 私营企业优于公营。在提供公共服务行业中（如公路，市政污水处理，国防）公营企业优于私营。在垄断行业中（如电力，铁路）公营和私营差不多。”[5] **第二。**“自由市场” 这支‘看不见的手’将与宏观调控和有效管理这只‘看得见的手’相互制衡。” 使自由市场经济受到适当的限制。**第三。**民主和法制：公正的法制应该使社会的财富得以公平合理地分配。一方面，要用民主和法制缓和调解和解决社会中的各种矛盾和利益冲突。另一方面，要有效地反对对“财富的垄断”和对“权力的垄断”。有效地限制富豪们对财富无限制地掠夺和对市场的操纵垄断，公平合理的规范他们的一切收入。**第四。**建立正确的道德观价值观。**要使绝大多数人培养出爱人爱物的正确的价值观和人生观—“己所不欲，勿施于人”；“爱人无损人”；“爱物无损物”。**鼓励和奖励人们建立有利于环境，社会和集体的生活习惯和生活方式。提高人们的文化素养，辨别真，善，美与假，恶，丑，使人们的心灵减少污染。**也要用适当的道德和法规抑制平民大众过度消费的欲望和任性懒惰的习性。**

总结论：究竟社会主义社会是什么样呢？如何达到社会主义社会呢？

本文通过上面的论证可对社会主义的概括理解是：发达国家后资本主义社会在解决能源危机后，在解决道德危机的过程中，继续向前发展的结果，当社会主义的经济成分（总资产）逐渐发展到超过资本主义经济成分（总资产）时，后资本主义社会才可能转变为社会主义社会。并开启人类社会的一个新的社会主义社会的历史阶段。.在这样一个社会里，一方面由于有极强大的生产动力（解决了能源危机），能为全社会每个成员提供其所需的足够丰富的物质生活资料。又有公正的法制和健全的民主保证社会财富的公平合理的分配，并且有效地将富豪和当权者一起关进笼子里。同时，每个成员还应有较高的文化素养和较正确的道德观和价值观（解决了道德危机）。这样，他们中的绝大多数人就不会因为缺少了金钱和所需的生活物质资料而失去尊严和委屈自己，成为金钱的奴隶。同时，当富人们不能单纯用金钱能买到可以满足自己“恶性欲望”的东西时，金钱的作用也大大的降低了，比如当爱和性不能只有用金钱可以买卖时，人们就会自然地降低掠夺别人和社会财富的邪恶欲望。又比如从前为了争夺王位可以杀的血流成河。现在有为王位打仗的吗？这样的社会才真正有了人人平等和社会公正的经济和道德的基础和法治的保障。但是即使人类社会未来能够普遍地进入更加公平和美好的社会主义社会，那个社会也会存在许多重大问题和矛盾：比如，管理者和被管理者的矛盾；节约资源和保护环境；个人犯罪；贫者懒惰；社会经济发展迟缓；道德问题；自然灾难；科技灾难；经济发展不平衡等等。

上面作者对社会主义的理解是不同于所有前人的，包括不同于马克思斯大林和毛泽东式的社会主义。这提高了社会主义的物质和精神的层次和实现社会主义的难度。**也就是说，社会主义只能从发达的后资本主义社会中生长出来，只能从后资本主义社会的后期转变而来。而所有发展中国家不可能直接进入社会主义社会，但可以在消除工农城乡和地区3大差别的同时增加一些社会主义的因素，比如各种社会福利保障等。**

请参看对比下面何新先生最近对新社会主义的研究和论断。何新：“新社会主义应包含科学的计划经济，包含对两极分化的遏制，包含对那批为富不仁者、趁改革中制度的败坏而掠取国家资源暴富者和冷血剥削者的再剥夺。也应包含恩格斯和列宁论述的人民民主理想和社会主义新民主政治制度的设计！”“我建议你们有信仰有良知的年轻学者研究新社会主义。什么是社会主义？简单说就是：公共资源的社会公有和共享，社会产品的公平分配，有长程科学计划的经济生产和消费，公民生老病死的社会安全保障。要让国家政治道路和未来政策设计回归于“科学的”新社会主义！要知道，这也正是来自亿万人民心声中的呼唤，是 1840 年以来千百万先烈前赴后继牺牲奋斗的呼唤，是 1921 年以来中国共产党立党的本来宗旨；而且，**这也是从佛陀、耶稣和中国圣贤周公孔孟以来一切有良知的人类**

圣哲寻求导向历史正义的终极呼唤！“[4]如按照何新先生的上述理解，似乎现在任何一个国家的首脑和中央政府只要有足够的科学头脑和智慧，不折不扣地实行上面的政策和规划，就可以达到“科学的”新社会主义社会了。又比如，现在的中国，只要能够将现在尚未做到的上述中“对两极分化的遏制”“社会产品的公平分配”“ 公民生老病死的社会安全保障”努力补充做到，甚至连工农，城乡，地区 3 大差别都用不着消除就可以达到社会主义社会了。更有甚者，从前的斯大林式和毛泽东式社会主义只要将“公民生老病死的社会安全保障”这一条多加完善，就成为合格的新社会主义了。不知我是否误解了何新先生。我似乎觉得何新先生忽略的恰恰是常识；**社会主义社会只能建立在高生产力和高道德观的基础上。贫穷不是社会主义。这些常识往往比理论更重要，更接近真理**。

====全文完====

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Where Will The Post-capitalist Society of The Current Developed Countries Go?

====Re-expositions to "the qualitative change of production relations would only be decided by the change of the social main productive force"====

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Abstract: In the later period of the pre-capitalist society of developed countries, its social productive forces had developed to the acme of the free capitalist. At the beginning of 21 century, The developed countries started into the post-capitalist society, i.e. information society and an era of the intelligent economy. Due to full of many crises hard to be overcame, the social-economical developments in developed counties will hardly get to continuous progression, because those crises are just decided by the nature of 'free capitalist'. In the process of overcoming those crises, the post-capitalist society of the current developed countries will only gradually and inevitably increase in more socialist components. Thus, it will finally lead to transform the post-capitalist society into a more fair and reasonable socialist-society. [Academia Arena, 2009;1(5):47-66]. ISSN 1553-992X.

Key words: the social main productive force; pre-capitalist society; post-capitalist society; socialist society; the disappearance of three great differences between farmers and workers, between countries and cities and between districts; developed countries and developing countries; four crises: energy, financial and economical, moral, and war;

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新中国与“文化大革命”

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摘要：这篇文章是作者不间断地思考了几十年的一个问题，即 1949 年建立的“新中国”的社会结构及其深刻矛盾——“共产党的一党专政”与“毛泽东的个人独裁”以 及在这种矛盾作用下的社会走向。作者用来剖析历史的话语源自马克思主义理论，他对中国共产革命后建立的“新中国”之社会性质、“共产党的一党专政”与“毛 泽东的个人独裁”之区别所作的剖析，其深刻性丝毫不比饱学西方理论者逊色。这篇文章的价值就在于此：它表明，多年来许多人未能充分认识“新中国”社会的本 质，不是缘于理论的困窘，而是缘于思想的贫乏。（ http://www.tecn.cn ）。作者与他的“右派”同学无疑都是当时最有才华的青年，但多年残酷的政治风雨使他们备受摧残，大多数人都未能从那种炼狱里生还，而谭天荣顽强的生命力不仅使 他能够扛住所有加于他的苦难，还能持续深入地思考。本刊编辑部刊发此文，既因为文章本身的深刻思考，还缘于这篇历时 38 年才完成的文章代表了生活于毛泽东 时代下一群特立独行的思想者经历了炼狱之痛的思想历程。
（ http://www.tecn.cn ）. [Academia Arena, 2009;1(5):67-76]. ISSN 1553-992X.

原编者按：只要研究中国 1957 年的“反右”历史，对谭天荣这个名字就不会陌生，因为他是当年北京大学的“第一号”学生“右派”，他与他的那一代同学如林昭等人的命运，已经化为那个时代的一个符号。（ http://www.tecn.cn ）

1968 年我曾作一次尝试，根据我所理解的历史唯物主义的观点描述从新中国成立起到那时为止的历史进程，并把“史无前例”的文化大革命描述为这一进程的必然结果。
（ http://www.tecn.cn ）

对于许多人来说，现在讨论涉及毛泽东的历史问题并不是为了理解，而是为了安慰他们自己的“社会主义良心”。对于这些人，我在这里对新中国历史的描述只能激 起狂怒。但是，由于这段历史影响的不仅仅是 1949 年以后的几十年，还将影响今后中国的社会发展进程，基于此，超越意识形态限制讨论毛泽东身影笼罩下的新 中国历史就成为不可回避的历史任务。
（ http://www.tecn.cn ）

一、新中国历史的初始条件

新中国的历史是在特定的社会历史的初始条件下，按照世界历史的共同规律展开的。为了描述这一段历史，首先要考察它的初始条件。（ http://www.tecn.cn ）

新中国成立时的社会历史状况有两个基本特征：

第一，在多年战乱（8 年抗战、3 年内战）之后，中国的城市和乡村都遭到空前洗劫，而中国共产党却在战火中锻炼了自己，变得极为强大和灵活。新中国成立时， 共产党成了执政党，有如一盘散沙的民众和中国共产党这两个机体彼此相遇并且在相互作用中迅速确定了自己的位置。自古以来，国家与社会之间的矛盾一直在中国 占着重要的地位。上述初始条件使得这一矛盾对于新中国更加突出。（ http://www.tecn.cn ）

第二，正如 1949 年 3 月毛泽东在“中共七届二中全会”上的报告所说，当时中国只有大约 10%左右的现代性工业经济，此外的大约 90%左右是分散的个体的 农业经济和手工业经济，这与古代没有多大区别。这就是新中国的历史的初始条件：一些多少现代化了的工业小岛散布在仍然停留在古代的个体经济的汪洋大海之 中。（ http://www.tecn.cn ）

在这样的历史条件和经济基础上，新中国将走向何方呢？

因为大工厂几乎都在城市，毛泽东这里说的现代性的工业经济可等同于“城市经济”，而古代的经济则等同于“乡村经济”。如果把当时的乡村隔离起来，即假定占 10%的城市经济根本不

存在，那么在这个古代的经济基础上，将长出一个古代的上层建筑；反过来，如果把城市隔离起来，即假定占 90%的乡村经济不存在，那 么，这些经过民主革命的现代城市，根据当年的特定的社会历史条件，在代表现代性的城市经济的政党领导下将会建成一个社会主义的现代社会。当中国社会进一步 发展时，停留在古代的乡村要求建立一个与古代的经济基础相适应的古代的上层建筑；而现代化了的城市则要求建设社会主义。这就是新中国的社会的基本矛盾，这 是古今中外无处不在的城乡矛盾的一种特殊形式，新中国的历史就在这一矛盾的基础上展开。
(http://www.tecn.cn)

毛泽东自 1949 年以后成为全中国人民的领袖，他既是城市居民的领袖，也是乡村居民的领袖。作为城市居民的领袖，他的历史使命是按照马克思的蓝图，在中国 建成社会主义；作为乡村居民的领袖，他的历史使命却是在中国建成一个古代的东方专制帝国——一个新世纪的“秦始皇”和一个“在暴君统治下人人平等”的庶民 社会。既然中国的城市与乡村处在相互作用之中，这两种相互排斥的历史使命不免相互渗透。于是，新中国的社会的基本矛盾就反映在伟人毛泽东身上，表现为他的 “思想状况”的矛盾：既是马克思主义者，又是暴君。当毛泽东说他自己是“马克思加秦始皇”时，或许他自己也没有察觉其中有如此深刻的含义。 (http://www.tecn.cn)

二、小农的王朝

因为新中国成立时已经有了现 代化的城市，从仍然停留在古代的乡村经济基础的土壤上自然长出来的国家形式，就不同于古代的东方专制帝国。它将是一种什么样的国家形式呢？在世界历史中曾 经有过两个先例，一个是 20 世纪俄国的斯大林主义的国家形式，另一个是 19 世纪法国的拿破仑主义的国家形式。它们的共同特征是，在铲除旧社会的不平等之 后，国家（表现为一个“暴君”）通过机关和军队直接对社会进行统治。 (http://www.tecn.cn)

斯大林主义的社会政治特征现在被统称为“个人崇拜”。迄今为止，为什么十月革命后的俄国会产生个人崇拜，仍是 20 世纪历史最大的不解之谜。至于拿破仑主 义，马克思的《路易·波拿巴政变记》（下面简称《政变记》）一文刚好对它作过详尽的考察。在法国历史上，拿破仑主义国家即波拿巴王朝。马克思在该文中指 出：“波拿巴代表一个阶级，而且是代表法国社会中人数最多的一个阶级——小农。正如波旁家族曾是大地产的王朝，奥尔良家族曾是金钱的王朝一样，波拿巴家族 乃是农民的王朝，即法国人民群众的王朝。” (http://www.tecn.cn)

当然，马克思在这里所考察的是 19 世纪中叶的法国，乡村的政治影响毕竟不如城市。代表乡村社会关系的“第二帝国”之所以能够建立，乃是由于城市的各敌对阶 级暂时达到了势均力敌，刚好让“第二个波拿巴”钻了空子。但在新中国，乡村经济本来就占绝对优势，再加上土地改革使乡村居民一度变成了“耕者有其田”的小 农，激活了他们的政治热情，乡村的政治影响一开始就大大超过城市。由此可以断言，新中国即将建立的“小农的王朝”将比 19 世纪的法兰西“第二帝国”更接近 于古代的东方专制帝国。 (http://www.tecn.cn)

那么，“小农的王朝”究竟是什么样的王朝呢？在《政变记》一文中马克思写道：“小块土地所有制，按其本性说来，是全能的和无数的官僚藉以立足的适当基地。 它造成全国范围内所有一切关系和个人齐一的水平。因此，它也就使得有可能从一个最高的中心对同样的群众在一切方面发生同等的作用。它消灭着人民群众和国家 权力之间的贵族中间阶梯。所以它就引起这一国家权力及其直属机关的各方面的直接干涉。”这里，马克思指出小农的王朝是全能的和无数的官僚藉以立足的适当基 地。在新中国，共产党的干部们在这一基地上很快就转化成为自我服务的大官小吏，从而使中国共产党从一个革命政党转化成为一个排他性的利益集团——权力贵 族。同时，马克思又指出：小农的经济地位使得他们不能以自己的名义来保护自己的阶级利益；他们不能代表自己，他们的代表一定要同时是他们的主宰，是高高站 在他们上面的权威，是不受限制的政府权力，这种权力保护他们不受其他阶级侵犯，并从上面赐给他们雨水和阳光。这里，马克思指出小农的王朝要求有一个权力无 限的最高主宰。在新中国，这一要求通过各种途径把中南海的主人——“伟大领袖”毛泽东——实际上推上了皇帝的宝座。虽然，和袁世凯不同，他没有龙袍，也不 需要龙袍。 (http://www.tecn.cn)

下文考察小农的王朝的这两个要求在新中国实现的过程。

三、新中国的干部与群众

新中国建国以后，中国共产党 的政策与政府构架基本上模仿苏联，而那时的“第一个社会主义国家”还被认为是“社会主义的人间天堂”。因此，当中国共产党在中国发动土地改革、改造私营工 商业时，人们（包括许多共产党人在内）理所当然地认为，它是在按照马克思的蓝图建立一个没有阶级、没有剥削的新社会。然而，“十月革命一声炮响，给中国送 来了马克思主义”，但马克思的科学社会主义借以实现的物质基础——现代的生产力和生产关系——却并未随着这一声炮响送过来。考虑到这点，就不必惊讶共产党 政策的实际社会效果远远偏离了“建立一个没有阶级、没有剥削的新社会”这一目标。（ http://www.tecn.cn ）

新中国通过土改消灭了地主阶级，又通过社会主义改造消灭了资产阶级。但是，即使不考虑当时的社会结构，仅从物质生产的角度出发也能得出这样的结论，即阶级 和阶级斗争不会因此而消失。要在新中国建成社会主义，就得发展现代工业，就得有社会分工，应用科学技术，由此而需要各种不同才能的人才，就会形成多种多样 的社会关系；作为这一切的必然结果，就会形成阶级分化和阶级斗争。然而，要认识新中国的阶级斗争，我们必须还原当时的历史。
（ http://www.tecn.cn ）

按照官方的说法，在土改中被没收了土地、在土改复查中被没收了所有浮财的地主，仍然还是地主；不仅如此，他们的子女、子女的子女，世世代代仍是“地主阶级 出身”，受到和地主一样的政治待遇。而事实上，“土改”之后地主和农民的经济地位已经没有什么区别，这两类人的区别仅在于历史。至于地主子女和农民子女的 区别则仅在于血统。在世界历史上，“阶级”是按经济情况划分的，只有“种姓”才按血统划分。因此，土改之后“地主”这一称谓不再是指一个阶级，而是指一个 种姓了。而新中国自 1949 年以后的所谓“阶级斗争”，实际上乃是一种特殊形式的“种姓迫害”。这种冒称“阶级斗争”的种姓迫害，一直掩盖着真正的阶级压 迫与剥削。另一方面，这种荒谬的种姓迫害，还使得阶级斗争学说在中国名声狼藉。中国共产党人用自己的实践极大地败坏了马克思主义的声誉。（ http://www.tecn.cn ）

然而，在这一时期，真正的阶级压迫与剥削本身也是隐蔽的。首先，在完成“三大改造”之后，从小商店的店员到大厂矿的经理，从小学教师到大学教授，从火车司 机到交通部长，都是国家的“干部”，即官僚和职员。在发达的资产阶级国家，官僚只是统治阶级的工具，并未单独构成一个阶级。但对于像中国这样农民占优势的 国家，情况怎样呢？（ http://www.tecn.cn ）

马克思在《政变记》中曾这样论述上世纪的法国官僚：在君主专制时代，在第一次革命时期，在拿破仑统治时期，官僚是为资产阶级的阶级统治进行准备的手段；在 复辟时期，在路易·菲力浦统治时期，官僚是统治阶级的工具。但在上述所有时期，官僚都力求达到了个人专制。到了“第二共和国”时期，由于城市中相互对立的 各个阶级一时间势均力敌，乡村的社会关系暂时占了优势，官僚们的这一目的终于实现了，他们本人成了统治者。（ http://www.tecn.cn ）

由此可见，官僚本人成为统治者乃是乡村的社会关系的特征。在农民占优势的国家，乡村的社会关系一直处于优势，因此官僚本身一直就是统治者。在这里，官僚与 农民乃是乡村社会关系的两个方面，既与资产阶级相对立，也与无产阶级相对立。在这种意义下，“第二个波拿巴”和他的同僚乃是当时法国农民的代表。但是，第 二帝国的“一大群富贵豪华的官僚”作为农民的代表者，并不是农民领袖或农民在议会中的代表，他们组成一个“和社会各真实阶级并列的人为等级”。（ http://www.tecn.cn ）

中国共产党的干部大多出身于农民，在建国之前，他们在乡村过着军事共产主义的生活。“进城”之后，由于地位的改变，由于乡村的政治影响，他们很快形成“一 大群富贵豪华的官僚”，但是似乎不能说他们组成了一个“和社会各真实阶级并列的人为等级”。这是因为，在法兰西“第二帝国”，除了官僚这个“人为等级”之 外，还有一个由社会各真实阶级构成的公民社会。但是在新中国，原有社会中最有活力的部分已经被干部等级制度所吞并。除了“干部”，社会上就只剩下市民和农 民了，而这些居民则被称为“群众”。针对这种情况，可以说新中国的基本阶级结构就是“干部”与“群众”的两极对立，其中的一极是“富贵豪华的官僚”，即共 产党的“高级干部”，另一极则是极端贫困与无权的广大的农民群众，而工人、知识分子、市民、一般干部（特别是农村的基层干部）就成了两极对立的中间阶层， 这种社会结构使得国家与社会之间的矛盾，呈现出最纯粹、最极端的形式。（ http://www.tecn.cn ）

四、新中国的农民与工人

人们说，1949 年的革命是 “新民主主义革命”，即无产阶级领导的资产阶级民主革命。在世界历史上，资产阶级民主革命的任务原是摆脱封建桎梏、铲除封建不平等、建立资产阶级法治社会。而 1949 年革命的结果却与此背道而驰：它建立的干部等级制度把旧社会的剥削者与劳动者之间的不平等以新的形式固定下来，让大批干部有旧社会剥削者的 收益而没有旧社会剥削者的劳累与风险；它建立的“阶级成份”制度把印度那种按血统定尊卑贵贱的种姓制度移植过来，将出身于地主、富农、“反革命”、“坏份 子”以及后来的“右派”等强行划为“不可接触的贱民”。这一切正是资产阶级民主革命所要铲除的封建不平等。然而，更致命的封建不平等还是由户口管理制度维 持的城市居民与乡村居民之间的不平等。这种不平等正是新中国的阶级压迫与剥削的基本特征。 (http://www.tecn.cn)

阶级压迫与剥削总对应于一定的剩余价值形式。如果说，佃农的剩余价值形式是“地租”，那么，自耕农的剩余价值形式就是“赋税”。新中国的农民也交农业税， 但那并不是主要的剩余价值形式；对于他们，主要的剩余价值形式是“征购”。1953 年底，国家开始实行“统购统销”，农民必须把“余粮”按照国家规定的价 格卖给国家。显然，只有统购的价格比市场价格低时，统购才是必要的。那么，对于小农来说，农产品的市场价格又是由什么来决定呢？ (http://www.tecn.cn)

马克思在《资本论》中曾说：小农集小地主、小资本家和农业工人于一身，作为小地主，没有地租他也得种地，作为小资本家，没有利润他也得种地，只要他能付给 自己作为农业工人的工资。换句话说，只要他还能活命，他就会去种地。因此，“他们的剩余劳动的一部份白白地送给了社会，它既不参与生产价格的调节，也不参 与一般价值的形成”。这就是说，即使农民按市场价格出售粮食，他们也就刚刚能活命。现在强迫农民按更低的价格出售，试问把农民置于何地？在新中国，人们已 经接受了一种特殊的语言。例如，吃面包喝牛奶的洋人“处于水深火热之中”，而吃糠咽菜长大的中国乡村孩子则“生活在蜜罐里”。早在 1953 年，乡村居民就 已经进入“蜜罐”了。接着就是“农业合作化运动”，农民在这次运动中失去了土地、耕牛和农具，得到了一副锁链。对此，农民虽然不满，还得敲锣打鼓表示欢 迎。 (http://www.tecn.cn)

乡村的变化引起了城市相应的变化：与粮食的荒谬低价对应的是工业品的荒谬高价。这种荒谬的价格不仅导致种种荒谬的社会现象，还导致一种荒谬的理论：“一个 工人一年创造一亿人民币的价值，而一个农民一年只创造几百万的价值。”马克思的不肖子孙竟然忘记了劳动时间决定商品价值这一经济学的基本原理。荒谬的价格 使得城市居民的生活水平远远高于乡村居民，为了防止由此而引起的劳动力的流动，就实行了“户口管理制度”。这一制度赋予城市居民种种特权，让城市居民天生 高贵而乡村居民天生低贱。 (http://www.tecn.cn)

城乡差距使得“下放农村”成为一种政治惩罚手段。仅是面临“下放农村”的万丈深渊，就足以使每一个城市居民成为“党的驯服工具”。新政权利用工人阶级对享 受特权的感恩和对失去特权的恐惧，把它收编成自己的“近卫军“，在历次运动中用来恫吓、压制和攻击知识分子和其他各种不够“驯服”的人。新中国的御用工人 阶级被动地写下了国际工人运动史上最可耻的一页。 (http://www.tecn.cn)

五、群众运动

世界历史证明，即使有某种不 平等也可以建立法制。在古罗马帝国，虽然有自由民和奴隶之间的不平等，罗马法还是保障了自由民内部的平等。在南北战争前的美国各蓄奴州，虽然有白人和黑人 之间的不平等，当时的美国宪法还是保障了白人内部的平等。那么，能不能想象在新中国荒谬的种姓制度和户口管理制度下，把某些人划为“人民”而把另一些人划 为“敌人”，再制定某种保障“人民内部”的平等的法制呢？不可能！ (http://www.tecn.cn)

1949 年的革命原是国际共产主义运动的一个组成部分，而根据当年的特定的社会历史条件，它建立的却只能是一个小农的王朝。这个王朝只可能是一个“人治” 的古代国家，而不可能是一个法制的现代国家。此外，新中国还有一个特别的因素——中国共产党对“群众运动”的偏爱——

更使得任何法制成为镜中花、水中月。（ http://www.tecn.cn ）

中国共产党是靠群众运动打下的天下，自然对群众运动情有独钟。它依靠“人民公社运动”来“改变生产关系”，在现实生活中再现了堪与安徒生《皇帝的新衣》媲 美的童话；它依靠“大跃进运动”来“发展生产力”，在世界历史的舞台上演出了与果戈里的《钦差大臣》迥然异趣的滑稽剧。然而，中国共产党最得心应手的还是 靠群众运动来铲除异己。这种群众运动的典型程序是揭发、批斗、处理三步曲：（ http://www.tecn.cn ）

第一步，先动员群众相互检举揭发，其内容往往是私下谈话和私人信件。私下谈话无据可查，真假难分。运动的领导人为了动员群众，把运动搞得轰轰烈烈，自然“ 宁可信其有，不可信其无。”私人信件虽然白纸黑字，但怎么解释却可随心所欲。（ http://www.tecn.cn ）

第二步是“批斗”，在这一阶段，一部份群众被指定来“批斗”运动的对象。对这一部份群众来说，重要的是“体会领导意图”，至于有没有事实依据倒并不重要。 不必担心有人会辩解，被批斗的人唯一的权利是不分皂白地“承认”。也不必担心有人会提出异议，因为谁提出异议谁就会立刻成为运动的对象。对于运动的领导来 说，不论批斗怎样离谱，支持批斗就是保护群众和积极分子的“热情和正义感”，稍加劝阻就会使人产生批斗过火的“错误印象”。因此，领导对于“群众的批斗” 只会火上加油。至于领导从“群众的批斗”得出结论的艺术，恐怕连唐代酷吏来俊臣的《罗织经》也要黯然失色。（ http://www.tecn.cn ）

最后一步是处理，轻则降职降薪，重则被开除公职成为“人民的敌人”，或者被判刑、劳改、枪毙，因此而空出的职位，则理所当然地由这次运动的积极分子来占 据。或许，不用多久，事实证明某一积极分子的检举不过是私人报复，某一积极分子的揭发不过是张冠李戴。但是，那又怎么样？运动已经结束，这位积极分子已经 升了官，难道再降下来？尽管他说的不是事实，他的立场还是正确的，还是“站在党和人民一边”的。再说，运动的对象有一定比例，这位积极分子的检举揭发，至 少在凑足名额、完成运动的指标这一点上立了大功。（ http://www.tecn.cn ）

群众运动一个接一个，“人民的敌人”的队伍逐步扩大。与此同时，靠运动起家的人的队伍也逐步扩大，逐步形成一个特殊的阶层。尽管不少这次运动的积极分子在 下一次运动中又成了运动的对象，但总的来说，这个阶层的人数逐渐增多，权力日益膨胀。不言而喻，这个阶层的共同的道德准则是卖友求荣。而这一准则自然被他 们奉为社会主义的最高道德准则。于是，中国民间的传统道德、知识分子的气节以及共产党标榜的实事求是作风，都成了“反社会主义”的。至于民主与法制，自然 更是“社会主义的死敌”了。如果说，“大炼钢铁”运动剃光了无数山头，给自然环境所造成的破坏，几十年也不能恢复，那么，这种卖友求荣的“道德准则”对群 众心理的摧残，给中华民族所留下的精神上的创伤，恐怕几百年也难以痊愈。（ http://www.tecn.cn ）

六、新中国历史进程的基本特征

上述几方面构成了新中国奇特 的阶级压迫和剥削体制。中国式种姓制度、户口管理制度和群众运动是它的三大支柱。中国式种姓制度使得人们得以用“阶级种姓”迫害冒充阶级斗争，掩盖了真实 的阶级压迫和剥削；户口管理制度保障一部分劳动者对另一部分劳动者的经济掠夺，从而掩藏了不劳动者对劳动者的经济掠夺；群众运动则使人民群众经常处在一种 自相残杀的状态，并把一切反抗扼杀在萌芽中。正是在这一体制的形成过程中，共产党转化成为新兴的权力贵族，伟大领袖毛泽东入主中南海成了没有皇帝名号的皇 帝。（ http://www.tecn.cn ）

权力贵族和皇帝，这是 1949 年革命的种子在中国乡村社会关系的土壤中长出的一对并蒂莲。它们的生命力都来自共产党，权力贵族本身就是共产党的统治基础， 而皇帝则拥有共产党的武装力量。它们有各自的社会基础，权力贵族维护着城市居民的种种特权，而皇帝则得到乡村居民的道义上的支持。然而，不论这一对并蒂莲 怎样相互依偎、相互缠绕，它们却天生是对头。新兴的权力贵族要求确立稳定的贵族——平民两极社会，这意味着摆脱“凌驾于党和国家之上”的任何个人与机构， 这一要求被表述为“确立新民主主义的社会秩序”；而新登基的天子则要求建立一个正式的“皇帝—臣民”的两极社会，这意味着在新社会的机体上割去“伟大领袖 ”与“人民群众”之间的“贵族中间阶梯”——共产党，而这就是“在无产阶级专政的条件下继续革命”、“限制资产阶级法权”和“消灭三大差别”等“毛泽东思 想”的真正含义。于是，新中国的城乡矛盾在当时就表现为毛泽东与共产党之间的对抗。（ http://www.tecn.cn ）

乍一听来，这一论点简直是“天方夜谭”。谁不知道毛泽东是共产党的领袖，共产党的党史就是“毛泽东领导中国人民从胜利走向胜利”的历史。共产党和它的领袖 即使有矛盾，那也只能是“人民内部矛盾”，正确思想与错误思想的矛盾，这里怎么会有什么对抗呢？不能否认，的确是毛泽东和共产党领导中国人民建立了新中 国。但是，彼一时也，此一时也。当年打江山的时候，毛泽东与共产党是等同的概念；但现在是坐江山的时候，毛泽东必须铲除共产党。即使对新中国的社会历史一 无所知，只要翻一翻中国的编年史也能知道这一点。汉高祖为什么要杀功臣？因为打江山的时候需要人才，而坐江山的时候却只需要奴才。不幸的是，韩信与彭越等 人为刘邦打下天下之后，仍然还是人才。刘邦不得不铲除他们。既然刘邦一定要铲除韩信与彭越，毛泽东又怎能不铲除彭德怀与刘少奇？ （ http://www.tecn.cn ）

人们自然会提出疑问：“怎么可以把新中国和汉王朝相比呢？这是两种完全不同历史时期的两种完全不同性质的国家政权。”是的，新中国成立时距汉王朝已两千多 年，可谓久矣。但是我们不要忘记，直到 1949 年，中国还有 90％的经济生活停留在古代，也就是停留在汉代；再说，毛泽东与刘邦都是借助于农民革命建立起 自己的王朝。因此，我们实在不必惊讶新中国和汉王朝之间具有某些相似的社会历史特征。江山坐稳以后，皇帝杀功臣正是这样的特征。当然，新中国与汉王朝还是 有所不同，汉王朝的开国皇帝要对付的是一个个为他打天下的功臣，而新中国的开国皇帝要对付的却是一个他自己领导的，缔造了新中国的政党。如果说，刘邦不得 不一个个地铲除和他一起打天下的功臣，那么，毛泽东就得铲除共产党了！自古以来，在天子的视野里，除了三宫六院、粉黛三千，就只有宰相、群臣和百姓，哪能 容得下什么党？ （ http://www.tecn.cn ）

诚然，天子也要靠宰相和群臣来治理百姓，但宰相和群臣虽可享受荣华富贵，却不能有自己的意志，他们的职能只能是“听差”。不幸的是，共产党却远不是一群听 差。它天生就是一个组织严密、纲领完整的共同体，并在长期的对敌斗争中成长壮大；另一方面，权力贵族并不排斥一位“伟大的领袖”，只要他维护权力贵族的权 益，这样的贵族领袖相当于“立宪君主”。同样不幸的是，代表中国乡村社会关系的毛泽东也远不是一位立宪君主，数亿农民要求他成为高高在上、不受任何限制的 “秦始皇”。这种社会历史条件规定了毛泽东与共产党之间的关系只能是腥风血雨的对抗，正是这一对抗奠定了新中国不断动荡的历史的基调。 （ http://www.tecn.cn ）

如果我们抬头看看北方，事情就更加清楚了。苏联历史上的种种令人困惑的事件，特别是令人谈虎色变的“大清洗”，如果不是斯大林与布尔什维克党的对抗的表 现，又能是什么呢？斯大林与布尔什维克党的对抗，正是苏联历史进程的基本特征。同样，毛泽东与中国共产党之间的对抗，则是新中国历史进程的基本特征。 （ http://www.tecn.cn ）

七、“一党专政”和“个人独裁”

人们根据列宁关于群众、阶 级、政党和领袖的命题得出结论：中国共产党是无产阶级的政党，因此，在它执政的新中国，统治阶级是无产阶级；它的领袖毛泽东自然是无产阶级的革命导师。那 么，怎见得中国共产党是无产阶级的政党呢？不是因为它的党员出身于无产阶级，也不是因为它的支持者是无产阶级（它的党员和支持者绝大部分是农民），而是因 为它的指导思想是无产阶级的先进学说——马克思主义。这一结论一直被看作天经地义，但得出这个结论的整个推理却是因果倒置的。 （ http://www.tecn.cn ）

中国共产党代表什么人的利益不决定于它所标榜的指导思想，而决定于它所处的实际地位。诚然，中国共产党的指导思想是从苏联引进的列宁—斯大林版本的马克思 主义，再经过毛泽东的“创造性的发展”，与本来意义下的马克思主义已经大相径庭，实在称不上是“无产阶级的先进学说”。尽管如此，由于中国共产党是在土地 革命和抗日战争中成长的，在 1949 年以前，它仍不失为一个革命政党。执政后的中国共产党转化成为权力贵族，不是由于它的指导思想的改变而是由于它的经济 地位的改变；不是由于它缺乏先进理论或缺乏共产主义信念，而是由于“理论”和“信念”斗不过“利益”。因此，当人们根据“指导思想”来确定一个政党所代表 的阶级时，他们其实错误地应用了列宁关于“群众、阶级、政党和领袖”的命题。 （ http://www.tecn.cn ）

当然，列宁的这个命题本身也有问题。马克思在《政变记》中曾这样描写那次政变的结局：“法国逃脱整个阶级的专制，好像只是为了服从于一个人的专制。”不必 深入这句话的内容就能看出，马克思在这里把“整个阶级的专制”和“一个人的专制”区别开来。而按照列宁关于“群

众、阶级、政党和领袖”的命题，这种区别是 不存在的，“整个阶级”是由某一政党来代表的，而该政党则是由一个领袖来领导的，因此整个阶级的专制就是这个领袖的专制，从而也就是“一个人”的专制；反 之，一个人的专制也就是整个阶级的专制。列宁的这一命题明显地与马克思的观点相矛盾。（ http://www.tecn.cn ）

应用列宁的这个命题，人们可以把资产阶级专政和无产阶级专政区别开来，却无法理解世界历史中更具体的内容。例如，人们很难把以希特勒为元首的德国纳粹政权 和以罗斯福为总统的美国代议制政权区别开来，因为希特勒和罗斯福都是本国的资产阶级政党的领袖，在本国实现资产阶级专政。进一步，按照这一命题人们还可以 断言，欧美各国人民几个世纪的斗争差不多一无所获，最多只不过从一种资产阶级专政变成了另一种资产阶级专政。只有 1917 年俄国的那个“震撼世界的十天” 才发生了翻天覆地的变化，推翻了资产阶级专政，建立了无产阶级专政。
（ http://www.tecn.cn ）

上面只是随手拈来的几个例子。我们越是深入地考察问题的细节，列宁关于“群众、阶级、政党和领袖”的命题就越是显得抽象而空洞。一般地说，列宁的这一命题 与其说是一种理论，倒不如说是更夫的老生常谈：“一切猫都是灰色的。”不幸的是，列宁的许多“理论”都是这种抽象而空洞的老生常谈。更不幸的是，正是这些 老生常谈被人们奉为“列宁主义的核心”，奉为“试金石”、“分水岭”等等。对于这些老生常谈，我们不能苛求列宁。列宁是一个大忙人，他有太多的事情要作， 实在没有时间来仔细阅读马克思和恩格斯的经典著作，更没有时间来仔细研究世界历史。至于列宁的老生常谈特别受到青睐，倒也不难理解，老生常谈毕竟是人们特 别是懒人最容易理解的。但是我们却不能否认，以这些“核心”、“试金石”和“分水岭”之类为基本内容的所谓“列宁主义”，从学术的角度来看只是一个垂死的 宗派，它与日新月异的现代社会科学越离越远，还总是不断地被当代的世界历史所嘲弄。（ http://www.tecn.cn ）

然而，列宁关于“群众、阶级、政党和领袖”的命题所导致的最致命的混乱，还是对“一党专政”和“个人独裁”两个概念的混淆。若按照列宁的命题推理，一党专 政只能通过该党的领袖来实现，从而就只能是这位领袖的个人独裁。这样就把一党专政和个人独裁等同起来了。这种概念混淆在实践中经常出现。例如，人们曾谴责 国民党的统治是“国民党的一党专政”，又谴责它是“蒋介石的个人独裁”，似乎没有人感到这是两种不同的谴责。除了理论上的失误以外，特殊的历史条件也促成 了这种概念混淆。“蒋介石的个人独裁”和“国民党的一党专政”虽然不是一回事，但它们之间的矛盾并不突出。不幸的是，对于新中国，“共产党的一党专政”与 “毛泽东的个人独裁”却表现为两种迥然不同的统治形式，它们之间的对立乃是理解新中国历史的关键。前者是对权力贵族的统治的一种不确切的表达方式，后者则 是皇帝统治的一种比较一般化的称呼。谁要是混淆了这两个概念，他就完全不能理解新中国的历史。（ http://www.tecn.cn ）

八、“引蛇出洞”？

1956 年 2 月，苏共召开了 “二十大”，赫鲁晓夫作了“关于个人崇拜及其后果”的报告。这一事件在中国产生了各种效果，其中之一是权力贵族的统治从此被称为“集体领导”，而皇帝的统治则从此被称为“个人崇拜”。同年 9 月，中国共产党召开了“八大”。由于当时中苏矛盾尚未充分展开，在苏共对中共的传统影响下，“八大”作出了“坚持集体 领导、反对个人崇拜”的决议。新兴的权力贵族与新登基的“皇帝”的蜜月结束了，这两种力量开始了第一次较量，结果是权力贵族获得了胜利，但只是暂短的胜 利。接踵而来的是 1957 的“整风”与“反右”，在“整风运动”中毛泽东一直在号召“给党提意见”，号召“大鸣大放”，并反复承诺，“言者无罪、闻者足戒 ”。从 6 月 8 日《人民日报》发表社论起，毛泽东又突然翻脸，发起了“反击右派分子的猖狂进攻”的运动。这一历史进程是不是象毛泽东自己说的是个“阳谋” 呢？
（ http://www.tecn.cn ）

如果把 1957 年春夏之交北京大学里的大字报与 9 年后同一时期在同一大学里的大字报作一比较，我们会得到一定的启发。1957 年北京大学从 5 月 19 日开始 的大字报运动在毛泽东“反击右派分子的猖狂进攻”时遭到镇压。1966 年 5 月 25 日（又是一个多事的五月），北京大学又一次出现了大字报，不久就有工作组 的进驻。工作组的部署是：“当牛鬼蛇神纷纷出笼开始攻击我们的时候，不要急于反击。要告诉左派要硬着头皮顶住，领导上要善于掌握火候。等到牛鬼蛇神大部分

暴露了，就要及时组织反击。”这才是真正的“引蛇出洞”，但它并不是毛泽东的主意。毛泽东明确表态：反对“工作组镇压学生”。（ http://www.tecn.cn ）

另一方面，在 1957 年，学生们向共产党提的意见虽然相对温和，但他们理所当然地把毛泽东当作共产党的代表。与此相反，1966 年的校园英雄聂元梓、蒯大 富却在自己的旗帜上写着：“高举毛泽东思想的伟大红旗，横扫一切牛鬼蛇神。”对于工作组来说，牛鬼蛇神是蒯大富们；而对于蒯大富们来说，牛鬼蛇神却是工作 组，也就是以刘少奇、邓小平为代表的共产党。
（ http://www.tecn.cn ）

总之，1957 年的学生运动既给共产党提意见，也给毛泽东提意见，毛泽东坚决反对；1966 年的学生运动拥护毛泽东，反对共产党，毛泽东坚决支持。由此可 以看出，毛泽东唯一关心的是，你拥护还是反对他个人，但他并不关心你拥护还是反对共产党。一般地说，他对于自己在“关于正确处理人民内部矛盾”一文中提出 的 6 条标准中的任何一条都并不真正关心。
（ http://www.tecn.cn ）

那么，毛泽东 1957 年发起“整风运动”的初衷，是不是因为已经预见到有人会反对他自己，从而安排“引蛇出洞”呢？“反右运动”实际上是反知识分子。 1955 年的“反胡风运动”已经把知识分子整得服服贴贴；在发动“整风运动”时，毛泽东没有必要对他们使出“引蛇出洞”的绝招。倒是 1956 年中共“八大 ”所通过的关于“提倡集体领导、反对个人崇拜”的决议使毛泽东如临大敌，但共产党怎么说也不是“洞里的蛇”。因此，关于毛泽东在“整风”时再三号召“鸣放 ”的初衷，“引蛇出洞”之说更象是事后编出来的答案。（ http://www.tecn.cn ）

考虑到当时皇帝、权力贵族和知识分子三方面的相互关系，对这一问题顺理成章的答案是，为“八大”的决议而龙颜大怒的“天子”想借助于知识分子和其他平民来 整垮权力贵族，以后改变方向则是由于看到时机尚未成熟。由于种种原因，这一在 1957 年就已经小试牛刀的计划推迟了 9 年才付诸实现。（ http://www.tecn.cn ）

九、“无产阶级专政”的下一个目标

在黑色的 1957 年，“大鸣 大放”把国家与社会之间的矛盾（即人民政府与人民的矛盾）推向前沿，权力贵族和“皇帝”联手，把 55 万“右派分子”送上了社会主义的祭坛，“反右运动”大获全胜。但是权力贵族也为这一胜利付出了代价。（ http://www.tecn.cn ）

象历次运动一样，反右运动的理论前提是：共产党是无产阶级的政党，它的统治是“无产阶级专政”，因此它要翦除的异己自然是“资产阶级”。“反右运动”的对 象是知识分子，因此知识分子自然成了资产阶级。既然如此，知识分子在“鸣放”时响应号召给党提的意见自然都是要求“资本主义复辟”了。教授治校——“资本 主义复辟”，同人办报——“资本主义复辟”，内行人领导科技——“资本主义复辟”，甚至一个中学校长要求对本校教师的业务能力评定有发言权，也是要求“资 本主义复辟”。所有这些要求其实都是资产阶级民主主义的要求，而且也都是人们在“国民党反动派”和“独夫民贼蒋介石”统治下或多或少已经争得的民主自由。 但这些都与“无产阶级专政”不相容，都是“资本主义复辟”的要求。这样一来，中国知识分子终于领教了“无产阶级专政”的真正含义：这个专政所捍卫的社会主 义的“人间天堂”原来是一个久违了的古代王国，这个王国在自己的旗帜上写着，“普天之下，莫非王土；率土之滨，莫非王臣”。正是在“反右运动”中，共产党 第一次（虽然只是在私下）打出了“谁打天下、谁坐天下”的政治旗帜。其潜台词是：“新中国乃是我共产党的私家王朝，谁敢说半个不字！”这样，人们终于明白，1949 年建立的新中国也不过是改朝换代而已。不幸的是，经过这次付出了昂贵代价的改朝换代，人们在近百年来的现代化运动中曾经挣得的少许民主自由竟 丧失殆尽。
（ http://www.tecn.cn ）

为什么会这样呢？新中国乃是一个小农的王朝。作为新中国的执政者，中国共产党已经建立的上层建筑乃是一个新世纪的古代帝国。但是，我们不要忘记，新中国毕 竟还有城市。在 1949 年，中国共产党曾下决心在新中国建成现代化的经济基础。到了 1957 年，它已经基本上在新中国确立了小农王朝的上层建筑；但它不得 不为了生存而建立现代化的军事工业，从而不得不一般地建立现代化的经济基础，因此它仍然没有改变在城市实现“工业化”这一方针。糟糕的是，中国的上层建筑 的现代化已经有几十年的历史；更糟糕的是，新建立的现代化的经济基础难免经常地、

每日每时地长出现代化的上层建筑。而上层建筑的现代化是小农的王朝绝对不 允许的。因此中国共产党除了不遗余力地清除过去的上层建筑的残余之外，还不得不在建立现代化的经济基础的同时把上层建筑的现代化扼杀在萌芽状态。换言之， 它不得不保护原因并在结果出现的地方把结果消灭掉。这就是新中国的“无产阶级专政”的任务。相应地，任何使上层建筑现代化的意向就是“资本主义复辟”了。 这种用语在语义学上是不是恰当或许还有待进一步探讨，但坚决反对上层建筑的现代化却无疑是中国共产党在这一阶段必须肩负的历史使命。 (http://www.tecn.cn)

中国共产党的领袖们未必都十分明确自己的历史使命，但他们从切身的体会完全能意识到反对上层建筑的现代化的“无产阶级专政”乃是自身的特权地位与物质利益 的保障，因此他们团结一致地反击“右派分子”的“资本主义复辟”。他们只是没有意识到，中国共产党作为权力贵族的存在，其本身与“皇帝”之间也有不可调和 的矛盾。从表面上看，“反右运动”的结局既是皇帝的胜利，也是权力贵族的胜利，实质上这一结局却更有利于“皇帝”，“反右运动”反的是知识分子，而知识分 子乃是城市所代表的现代社会不可缺少的组成部份。因此“反右运动”的胜利实质上是乡村的古代社会关系对城市的现代社会关系的胜利。诚然，权力贵族在它和知 识分子的对立中代表已经建成的小农王朝来对抗上层建筑现代化的要求，从而代表乡村的古代社会关系。但是，在它和“皇帝”的对立中，却是以新时代的一党专政 来对抗传统的个人独裁，这时权力贵族的地位倒了过来，它自己代表城市的现代社会关系，而其对立面“皇帝”则代表着乡村的古代社会关系。既然“无产阶级专政 ”的任务是维护乡村的古代社会关系，那么权力贵族的存在和它对新中国的统治又怎能不是“资本主义复辟”呢？因此，仅仅凭借历史的惯性，权力贵族也必然成为“无产阶级专政”的下一个目标。尽管陶醉于“反右运动”胜利的权力贵族一无所知，灭顶之灾却在一步步临近。 (http://www.tecn.cn)

此后，随着毛泽东对国际共产主义运动领袖地位的渴望日强，中国有了“总路线”、“大跃进”和“人民公社”这“三面红旗”。其结果众所周知：毛泽东没有当上 “国际共运的旗手”，“持续三年的大跃进”却变成了“连续三年的自然灾害”。伟大领袖对于自己这一“丰功伟绩”的第一个反应是，清洗以彭德怀为代表的一批 共产党的精英（他们还依稀记得当年革命的目的是“穷人翻身”）。不管是否自愿，权力贵族自己也参与了这一次清洗。这次清洗使得全国继续滑向“大跃进”的深 渊，其后果是饿死了 3 千万中国人。空前的灾难导致民怨沸腾，权力贵族与“皇帝”同样失去民心，但首当其冲的还是“皇帝”。在 1962 年 1 月召开的“七千人 大会”上，形势竟然迫使“一贯正确”的“天子”作了自我批评，权力贵族对皇帝又一次取得了胜利。不幸的是，这次短暂的胜利却使得毛泽东与共产党（以刘少 奇、邓小平为代表）之间的对抗公开化了。毛泽东终于下决心实现铲除中国共产党的宿愿。 (http://www.tecn.cn)

当然，中国共产党的统治是历史形成的，铲除它得有一个过程。在苏联，斯大林借助于宫廷政变，借助于秘密警察，通过“肃反”、清洗和暗杀，逐步铲除了列宁的 布尔什维克党，当上了“新沙皇”。新中国则以另一种方式完成了这一历史转折，根据中国的特点，毛泽东再次诉诸群众运动，于是“伟大领袖”发动了“史无前例 的文化大革命”。最初的“红卫兵运动”“扫四旧”，“斗牛鬼蛇神”，似乎漫无目标。只有当运动发展到“踢开党委闹革命”和“军队支左”时，才显出其自身的 本来面目：这是乡村起来反抗城市，这是武装力量起来压倒组织力量，这是“皇帝”起来铲除权力贵族。运动造成了普遍的毁灭：生命和财产，文化和科技，道德和 人伦。(http://www.tecn.cn).

（作者为青岛大学物理系教授。1968 年 10 月初稿；1980 年 11 月重写；2005 年 8 月修改完稿。）

New China and "Great Cultural Revolution"

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Abstract: This article is to describe New China and "Great Cultural Revolution". (http://www.tecn.cn). [Academia Arena, 2009;1(5):67-76]. ISSN 1553-992X.

学习谭天荣的一点心得

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谭天荣何许人也？值得你去学习？而且还写什么心得！

他是一个鲜有人关注的年逾古稀的大学退休物理学教授，即使在他辛勤耕耘了 50 年的物理学界也无人理睬他。因为他总是不合时宜地与国际大师和泰斗们‘作对’，他甚至敢‘蔑视’量子力学，他‘异想天开’地要把天书般的现代物理学拉回到普通人也能明白的经典物理学的‘老路’上。
[Academia Arena, 2009;1(5):77-78]. ISSN 1553-992X.

在这个马克思早已不吃香的年代，他却依然是一个马克思主义学说的坚定信仰者和鼓吹者。在这个学术界把科研作为圈钱游戏的迪斯尼乐园里，他却躲在一角痴心不改地捕捉那些与赚钱和成名毫无关系的，已经成为金科玉律的现代物理学的毛病。这就怪不得没人理他了。

不过，在 30 年前的某一段时间里他却名噪一时——伟大领袖毛主席亲自赏了他一套‘右派’的顶戴花翎。从那时起，这个顶子陪着这位尚未毕业的北大才子渡过了 22 年的炼狱般的生活。

我没见过谭天荣教授，我‘认识’他是从读他的文章开始。

几十年来我也读了不少书，也见识了很多大人物的文章，但从来没有像读谭老师的文章这么令人耳目一新。可以这么说，任何一个理工科出身的，对科学有着好奇心的人，看了他的作品必有振聋发聩之感觉。

他的经历毫无疑问称得上苦难，用‘曾经沧海难为水’都不足以形容，但更使我们受益的是他的科学思想，特别是他对待科学的态度以及治学精神。

他的文字朴实优美，毫无做作感——远远超过当今很多中文系教授的文字水平。请看（林昭骨灰下葬仪式上的讲话片断。林昭，北大学生右派，在监狱中被凌辱致死。）：

“同学们：今天，我们从四面八方，被正义和良知召唤到这里来参加林昭骨灰下葬仪式。林昭是我们朝夕相处的同学，更是我们的英雄、我们的良心、勇气和骄傲。……。

今天，随着骨灰的下葬，林昭漂泊的灵魂终于找到了一块栖息之地。作为生者，我们的神圣职责，就是拒绝遗忘。

……。而今天，在你离开人世 36 年以后，每一个有良知的人都从心里佩服你。你是女中丈夫，你是巾帼英雄。你是剑，你是火焰。你是新时代的秋瑾，你是体制外的张志新。

不！你就是林昭，你是无与伦比的林昭。”

他有常人不及的独立思考和怀疑精神，不论是在物理学还是在政治观点上从不随风倒。

“记得有一次，我和一位同学争论一个问题，他说他的观 点是从一本名著上看到的，从而有恃无恐地问我：‘人家是权威，我信他的还是信你的！’我不做声，心想：‘物理学又不是宗教，有什么信不信的。就算这位权威 是对的，你接受的也是他要你那样理解的东西，而不是你自己所理解的东西。’原来我周围的同学与我的学习态度有一个根本的区别：我相信的只是自己的“理解 ”，而人家却优先考虑“权威”的意见。”（谭天荣《我的回忆与思考》）

他对科学的痴迷程度现在恐怕无人能比了。在受到非人折磨的日日夜夜里还是对科学那么的神往，我辈万分汗颜！

“按理说，禁止我们这些“教养分子”自学完全没有必 要：第一，我们每天从事超负荷的、以折磨人为主要目的的劳动，还有开不完的斗争会、批判会、帮助会、学习会、生活检讨会，……谁还有精力自学？第二，我们 这些人原来是“天之骄子”的大学生，一下沦为“阶下囚”，前途渺茫，度日如年，谁还有心思自学？第三，自学在这里是不受欢迎的，管教干部虎视眈眈，‘积极分子’无孔不入，谁还有胆量自学？

然而，人毕竟是各式各样的，偏偏有人每天在十几个小时 的劳动之余，还有那么一点点精力；偏偏有人虽然跌入深渊，却依旧心向天空，希望之星还没有完全熄灭；偏偏有人虽然经过七斗八斗，成了惊弓之鸟，但在自学这 件事上，却仍敢冒天下之大不韪，明知山有虎，偏向虎山行，在各种不利条件下，抓紧每一分钟自学。”（谭天荣《我的回忆与思考》）

也许有人要问，谭天荣到底搞出了啥高明的东西？

说出来你可能有点失望。

他已经并且正在进一步地证明： “微观世界并没有新的物理学规律。宏观与微观这两个世界其实遵循同一个规律，微观世界的规律也是直观的、‘因果’的和‘决定论’的，一言以蔽之，是‘经典’的。”

其中一个典型的例子是他根据经典物理学的原理，导出了电子的波粒二象性、量子性与不确定性。

他对量子力学进行了独到的诠释。

他对‘文革’产生的原因给出了令人信服的理由。

他论证了马克思的思想依然是揭示社会发展规律的武器。

……

毫无疑问，这一切都与赚钱挨不上边儿，甚至连申请科研经费都成问题。但我却认为，在一定程度上，谭天荣教授的工作给了我们一个新的世界观。

我们现在自主创新的东西很少，愚以为，作为每一个科研工作者个人缺乏谭天荣教授独立思考，勤奋，耐心与严谨的作风与学风是重要原因之一。

最后，以谭天荣教授关于物理学未来的陈述作为本文的结尾。

“永远结束依靠不同凡响的想象力、依靠‘匪夷所思’的新颖观念为物理学披荆斩棘开辟道路的历史，重新回到依靠勤奋、耐心和严谨来发展物理学的传统道路上来。”

(Recommended by Zhang Dongsheng, zhangds12@hotmail.com)

谈地产的价值

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摘要：本文的中心是：当前美国房地产市场危机的根本原因，是房地产价格过高，远远高过了其本身的价值。[Academia Arena, 2009;1(5):79-80]. ISSN 1553-992X.

关键词：美国；房地产；市场危机；价格；价值

当前美国房市危机的直接表现是一些还款能力低的人还不起所贷的购房款，好像房市危机的原因及其本质就是那些穷的不该拥有住房的人们自不量力购买了房产。其实，很多人付不起房贷，不是不应该拥有住房，而是房产的价格高出了这些人的支付能力。价格首先应该由其价值决定。现在在美国，比如东西两海岸，很多地方的房产，一套达到了一百万甚至两百万美元。这些房产的价值真值这麼多吗？不值。

首先，土地本身没有商品价值。土地哪里来的？是宇宙天体经过亿万年的演化形成地球时自然形成的，不是人类创造的财富，不包含商品意义上的社会必要劳动时间，从商品学角度讲，就如同空气与海水。土地之所以可以买卖，具有商品价格，是买卖是该土地的占有者通过其占有权向买者强行收取的。在美国，很多土地占有者的占有权是其爷爷的爷爷的爷爷们残忍的杀死了原住民以后抢夺来的。另外的很多人，比如新移民，他们对这些土地的占有权是用自己劳动赚来的钱买来的，但是，大家必须清楚，这些土地卖者的卖者的卖者们，最终还是几百年前残忍杀死原住民杀人越货抢来的，这些新移民归根结底还是从销赃者手中买来赃物。

第二，现在我们看地产的使用价值。比如，在纽约旧金山，一栋房产 100 万美元。如果按照 6% 的银行利息，这 100 万美元每年的银行利息就要 6 万美元（省略驴打滚）。就在纽约旧金山，大量的人全部时间工作，全年总收入还不到 6 万美元，所以，这一栋房产的使用价值就要值一个人全部的工作收入吗？纽约旧金山的一般人一年的工作所得还不够有一栋房产来居住睡觉的使用价值吗？再比如，按纽约旧金山的粮价，1 磅上好的大米值 1 美元，一栋房产的价格相当于 100 万磅的大米。按每人每天吃一磅大米，这一栋房产的使用价值，就相当于 100 个人吃 30 年？当然不是。从使用价值上讲，100 个人用 300 年的粮食前来换取一栋房屋的居住，，使用价值相同吗？一台很好的计算机，也就 500 美元，100 万美元能买 2000 台好电脑。现在还是有一些人没有计算机。一家人有别墅住与 2000 个人有计算机用，那个使用价值高呢？所以，现在的房产状况，根本就是价格远超过了使用价值。当然，房地产价低会影响开发商的积极性。但也不能为了开发商的利益而让地产偏离其价值偏的太离谱。

对于当前肆虐美国的房市危机，有众多的分析与对应措施，甚至有一种说法是将房市危机金融危机归罪与克林顿所谓“要让平民都拥有自己的房子”的提法。克林顿提出的“要让平民都拥有自己的房子”，也就是“住者有其房”，这本身错了吗？这本身是没有错的。衣食住行是人之基本。穿者有其衣、吃者有其食、住者有其房、行者有其鞋，再着，睡者有其床、写者有其笔、用电脑者有其机，等等，都是天经地义的，只要能买的起。克林顿的问题不是提出住者有其房，而是不该让人们通过借贷来实现住者有其房，而应该限制房市漫天要价。

即使如上所述，为了尊重现实，为了社会的稳定吧，人们承认现在这些脏品继承者或买脏者对地产的占有权，人们不去过于认真计算房地产的实际使用价值，但是在现有地产占有者转让地产占有权时，至少不能漫天要价。至少不能在地产市场的价格向本来面目滑动时，由政府拿出全社会的巨款税款 7000 亿、 8000 亿甚至上万亿来保持房地产本来就不合理的高价。

对于大多数的普通人来讲，房子是用来居住的。现在的错误是误导人们把房产当作投资，本末倒置。而且，房地产价格过高还会实质性的增加社会成本，限制社会发展。

由于美国对外用兵等已造成人权信誉危机及最近的金融经济危机等困境，房价这个社会成本更要重视，以避免政治与经济衰退。中国则更要引以为戒，不要推行有损经济发展的高房价政策。

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Restate Value

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Abstract: This article describes the value of restate. The reason of the restate crisis is that the price is toohigh, which is much higher than that it really is.
[Academia Arena, 2009;1(5):79-80]. ISSN 1553-992X.

Keywords: America; restate, value, price, crisis

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Extremely Rare and Endemic Beautiful Taxon Palm: *Trachycarpus takil* Becc.

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Abstract: This article offers a short describes on the Extremely Rare and Endemic Beautiful Taxon Palm, *Trachycarpus takil* Becc. [Academia Arena, 2009;1(5):81-82]. ISSN 1553-992X.

Kumaun Himalaya offers a unique platform for nurturing several endemic taxa and therefore is a type locality of these taxa. *Trachycarpus takil* Becc. is one of them, which is extremely rare in occurrence in wild state and has a specific habitat preference. *Trachycarpus takil* Becc. belonging to the family Arecaceae (Palmae) which is a rare and endemic taxon of this Kumaun Himalaya having a very small population in wild state. However, by far no serious attempt towards its conservation has been undertaken. This species has been cultivated around Nainital and Ranikhet in Kumaun Himalaya by Britishers and explore the causes responsible for their being rare and threatened in the wild state. *Trachycarpus takil* Becc. is a cold temperate species for Palm family and grows in dense humid temperate forest between 2000-2700m altitude usually in association with *Alnus nepalensis, Quercus leucotricophera, Q. floribunda, Ilex dipyrena, Rhododendron arboreum, Lyonia ovalifolia, Betula ulnoides, Cupressus torulosa, Abies pindrow, Persea duthiei* etc. It usually prefers north and northwestern aspects in hilly slope on moist humus rich soil having localized natural population. The wild adults population of this palm species appears to be extremely rare and highly threatened. Four adults tree have been recorded from near Bhatkot, two from Munsiari proper and less then a dozen from Kalamuni-Betulidhar near Munsiari, two from Thalkedar near Pithoragrah town. In India, this species is available under cultivation in U.P. Sate Horticulture Garden, at Florence, Italy and has been introduced along with Caucasus coast of the Black sea reason of erstwhile USSR and along West Coast highway of Mexico. It is a medium sized tree, 8-10m tall, trunks clothed with tightly clasping netword of coarse fibers, leaves large, 1-2cm long, persistent, old on withering, but not faling off, reflexed irregularly divided upto the middle, glucose beneath, petiole slender, 1-1.2m long, subtrigonous, flower glomerulate, minute, hyaline, fruits reniform, brownish black, flowers from April to May and fruits from September to October. It is a very handsome and elegant tree.

Trachycarpus is a genus of eight species of palms native to Asia, from the Himalaya east to eastern China. They are fan palms (Arecaceae tribe Corypheae), with the leaves with a bare petiole terminating in a rounded fan of numerous leaflets. The leaf bases produce persistent fibers that often give the trunk a characteristic hairy appearance. All species are dioecious, with male and female flowers produced on separate plants although female plants will sometimes produce male flowers, allowing occasional self-pollination.

The most common species in cultivation is *Trachycarpus fortunei* (Chusan Palm or Windmill Palm), a temperate palm which is, in cultivated range, probably the northernmost palm species in the world, having been successfully grown in such cool and damp but relatively mild locales such as Scotland, southwestern Norway, extreme southwestern Utah ,coastal New Jersey and the panhandle of Alaska . It is frequent in gardens in the United Kingdom and Ireland, along the Atlantic coast of France and northern Spain, in southern and coastal Poland, in southern Switzerland and northern Italy, and in the Pacific Northwest of North America. The dwarf form known as "*Trachycarpus wagnerianus*" is unknown in the wild, and is considered to be a synonym of *T. fortunei* (Kew palms checklist). It resembles that species closely, differing mainly in its smaller and much stiffer leaves. Hybrids between them are reportedly intermediate in size and fully fertile. *Trachycarpus takil* (the Kumaon Palm) is similar to *T. fortunei*; it is probably slightly less tolerant of cold. Other species less common in cultivation are *T. geminisectus, T. princeps, T. latisectus, T. martianus, T. nanus and T. oreophilus. T. martianus* and *T. latisectus* do not tolerate cold as well as *T. fortunei, T. takil* or *T. wagnerianus. T. geminisectus, T. princeps* and *T. oreophilus* are still too rare and small in cultivation to assess their full potential.

The trunk fibres produced by the leaf sheaths of *Trachycarpus fortunei* are harvested in China and elsewhere to make coarse but very strong rope, brooms and brushes. This use gives rise to the old alternative name "Hemp-palm". The fibrous leaf sheaths are also frequently used to clothe stems of artificial palms. This genus is very popular among palm enthusiasts for its ability to withstand cold,

especially in the form of damp, cool summer weather with relatively mild winter weather. These palms often tolerate snow in their native habitats and are the hardiest trunking palms. Often palm is used as beautiful ornamental plant. *Trachycarpus* species are used as food plants by the larvae of some Lepidoptera species including *Paysandisia archon* (recorded on *T. fortunei*).

The species has become critically rare and highly vulnerable due to ruthless deforestation causing fragmentation of natural habitat. For the conservation measure, Prof. Y.P.S. Pangtey, F.N.A.Sc. in his recently concluded project produced 5000 seedlings of temperate palm and these were distributed throughout the Uttarakhand to make an effort for its survival.

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Think Again : About the Time Interval

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ABSTRACT

The same place twice at different time of events, respectively, in different frame of reference in different time intervals observer. Relative to the incident site in the frame of reference movement observer, receives signals twice larger than the time interval is always associated event . This formula is called the famous clock inflation , usually expressed as $\Delta t' = \Delta t / \sqrt{1-\beta^2}$. The authors ponder earnestly and strict proof, time interval is not confined to inflation , it also exists shrinks . [Academia Arena,2009;1(5):83-88].ISSN 1553-992X.

Key words: transmission time , time interval , interval dilation , interval contraction

1. INTRODUCTION

About inflation this concept, clock , and is not time clock running faster or slower, also not run in real time slows down , but by the spread of light signals caused by different reference frame the same signal timing, receiving . Namely, the time interval is changed . For example: imagine a signal transmitters on the moon , every 10 minutes to launch a signal to the earth , existing two spacecraft in the earth and the moon between 10 million kilometers to/SEC movement (this hypothesis of this speed, only for theoretical explanation). A ship is flying to the earth, and another vessel flying to the moon , shuttle and earth is identical to the mechanical properties of the clock (or recorder) . Ask: the two spacecraft and earth measured signal period for each ?

The earth to receive signals interval is the moon signals emitted from cycle, $\tau = 10$ minutes.

The shuttle S_1 flies to the earth $\tau_1' \approx \tau + \frac{V}{c-V}\tau \approx 10 + 10 \times 10/(30-10) \approx 15$ minutes.

The spacecraft S_2 flying to the moon $\tau_2' \approx \tau - \frac{V}{1+V}\tau \approx 10 - 10 \times 10/(30+10) \approx 7.5$ minutes.

The records from their respective reference frame data display, the reference frame S_1 time interval expansion , reference frame S_2 time interval contraction . According to the clock inflation formula, we are:

$\Delta t' = \Delta t / \sqrt{1-(\frac{V}{C})^2} = 10 \Big/ \sqrt{1-(\frac{10}{30})^2} \approx 10.6$ minutes . What's the difference among τ_1', τ_2'

and $\Delta t'$? Therefore, make a concrete analysis.

2. EXPANSION AND CONTRACTION OF THE TIME INTERVAL

The same place twice at different time of events, respectively, the time difference between the two events, called time interval. Reference frame away from light exercise, receive twice larger than the time interval event occurs. Similarly, reference frame movement toward the direction of event occurred, time interval happen contraction. Therefore, the expansion or contraction time interval is spread by light signals in the process of a kind of effect.

2.1 Time Interval Inflation

As figure 1 and 2 shows, When along the X-axis movement systems S' and stillness reference frame S completely coincidence moments, from the light-source point P shining a pulse. Set in point P, O and O' points at the three time clock timing starts, time this concept has been Newtonian in Philosophic Naturalis Principle Mathematical in, time clock is used for measuring "real" time of a kind of instrument (timing is used to measure time clock of an instrument.). The second flash launch is in the first time interval $\boldsymbol{\tau}$, along the X-axial movement speed reference frame S' for V. The origin of the reference frame S' in the X- axis at different times with the "special" nature of space location: A, B, M, N …….

Point E: Is in the X-axis space point P on the corresponding coordinates.

Point A: Inertia reference frame S' coincides with static system S completely moments, point P launch first flash.

Point B: In the reference frame S' observer to receive first flash signals in space.

Point M: The second flash light emission in time interval $\boldsymbol{\tau}$, the spatial position of reference frame S'. Authors assume that "special" spatial point have a stationary coordinate system S_k, and they kept relatively quiescent state: coordinate system S_k, point P and reference frame S. The space location in reference frame S_k point P for $(x-V\tau, y_0, z_0)$, instant space-time as $(x-Vt, y_0, z_0, \tau)$.

Point N: To receive the second signal time reference frame S' in space. Assume the second flash light spherical spread to the reference frame S_k origin M time for t_m (the light signal transmission time). $t_m \neq \tau$.

According to the Pythagorean theorem, we obtain spherical equation in the reference frame S:

$$(x-Vt)^2 + {y_0}^2 + {z_0}^2 = (ct_m)^2 \quad , \tag{1}$$

Move along the X-axis reference frame S', spherical surface continued to spread in, the ball on the pursuit of diffusion in face of reference frame S' observer. At this moment, in reference frame S' to read the clock is t_n, instant space-time as $(x - V\tau - Vt_n, \ y', \ z', \ \tau + t_n)$. Figure 1 in analysis, obviously.

$$[(x-V\tau) - Vt_n]^2 + y'^2 + z'^2 = (ct_n)^2 \quad , \tag{2}$$

The x'-shaft and X-axle load, reference frame S' along the X-axis movement, around the X- axis rotation does not. That is, $y' /\!/ y$, $z' /\!/ z$. $y'=y$, $z'=z$, $x'=x-vt'$. Will formula (1) and (2) joint solution formula we have :

$$t_n = \frac{\sqrt{(1-\beta^2)t_m^2 + \beta^2(x-V\tau)^2/c^2} - \beta(x-V\tau)/c}{1-\beta^2} \quad .$$

(3)

From point P to N, t_n say flash signal transmission (or light spherical diffusion) time value . When the movement reference frame S' and stillness systems S coincides moments, first flash point P, two reference frame observer and start the timer . Reference frame S' in each "special" space stations of clocks is respectively: read the numerical T_A, T_B, T_M, T_N.... . According to the Yang Fa-cheng papers: Think of the Relationship Between Time and Space Again , that is :

$$T_B = \frac{\sqrt{(1-\beta^2)t_a^2 + \beta^2 x^2/c^2} - \beta x/c}{1-\beta^2} \quad .$$

So are:

$$T_A=0, \qquad T_B = \frac{\sqrt{(1-\beta^2)t_a^2 + \beta^2 x^2/c^2} - \beta x/c}{1-\beta^2} \quad , \qquad T_M = \tau \quad \text{and} \quad T_N = \tau + t_n \quad .$$

In figure 2, reference frame S' observer to receive the flash signals twice, is the time interval value τ'.

$$\tau' = T_N - T_B = \tau + t_n - T_B$$

$$= \tau + \frac{\sqrt{(1-\beta^2)\ t_m^2 + \beta(x-V\tau)^2/c^2} - \beta(x-V\tau)/c}{1-\beta^2}$$

$$- \frac{\sqrt{(1-\beta^2)t_a^2 + \beta^2 x^2/c^2} - \beta x/c}{1-\beta^2} \quad .$$

(4)

This formula is used for measuring precision of expression .

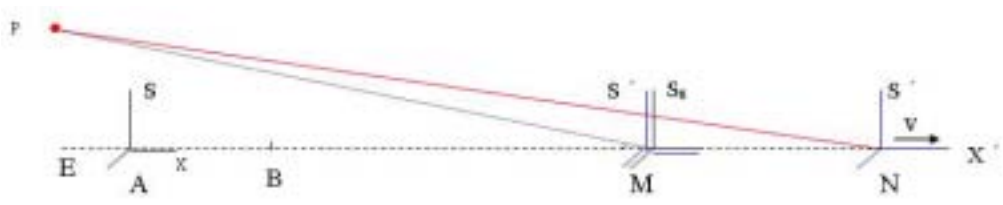

Fig.1 Point P: is fixed in the reference frame S in any position. The reference frame S' reached A position movement, light source point P emission first flash. It reached M position movement, the light-source point P emission second flash.

Fig.2 Sports reference frame S' to receive first flash at point B, It receives the second flash signals in point N.

Humans always trying to seek the simple method to approximate an objective reality. Therefore, the approximate calculation method for use under the simplified formula (4). In this paper, in the first flash after launching , time interval is long enough to occur in the second flash. Have the following conditions:

$\overline{AM} = V\tau,$ $\overline{EM} = |x - V\tau|$ (because the time interval τ is long enough),

$\sqrt{y^2 + z^2}/c \cdot t_m = \sin x \to 0,$ $V\tau >> |x|,$ namely

$EM = |x - V\tau| \approx V\tau,$ $PM = c\,t_m \approx |x - V\tau| \approx V\tau.$

$t_m \approx V\tau/c,$ $t_a = (po/c) \to 0,$ $(x/c) \to 0.$

By above knowable series conditions $T_B \approx 0,$

Thus: $\tau' = T_N - T_B$

$$\approx \tau + \frac{\sqrt{(1-\beta^2)V^2\tau^2/c^2 + \beta^2V^2\tau^2/c^2} + \beta V\tau/c}{1-\beta^2} - 0$$

$$\approx \tau + \frac{\pm V\tau/c + V^2\tau/c^2}{1 - V^2/c^2} \quad .$$

(5)

In the formula (5), we have taken:

$$\tau' \approx \tau + \frac{V(c+V)\tau}{c^2 - V^2} \approx \tau + \frac{V}{c-V}\tau \quad .$$

(6)

This formula is called time interval inflation.

Along the X-axial movement speed reference frame S' for V, and speed $V(0 < V < C)$.

If $V \geq C$, then Eq.(1) and (2) all do not hold water.

2.2 Under Special Circumstances Time Interval Inflation

As Fig.4 shown, the clock inflation formula $\Delta t' = \Delta t / \sqrt{1 - V^2 / c^2}$, its essence is refers to the "special" situations, different locations of the two events occur at the same time. In the movement of the inertial system S' in large measure time intervals than static reference frame S of the time interval. Flash diffusion time for t_1, from point P to A. Flash diffusion time for t_2, from point Q to A. According to formula

$$t = t_0 \Big/ \sqrt{1 - (\frac{V}{C})^2}, \quad \text{We have} \quad t_m = t_1 \Big/ \sqrt{1 - (\frac{V}{C})^2} \quad \text{and} \quad t_n = t_2 \Big/ \sqrt{1 - (\frac{V}{C})^2}.$$ So are:

$$\Delta t' = t_n - t_m = (t_2 - t_1) \Big/ \sqrt{1 - (\frac{V}{C})^2} = \Delta t \Big/ \sqrt{1 - (\frac{V}{C})^2}.$$

Is the signal propagation delay effect [1,2].

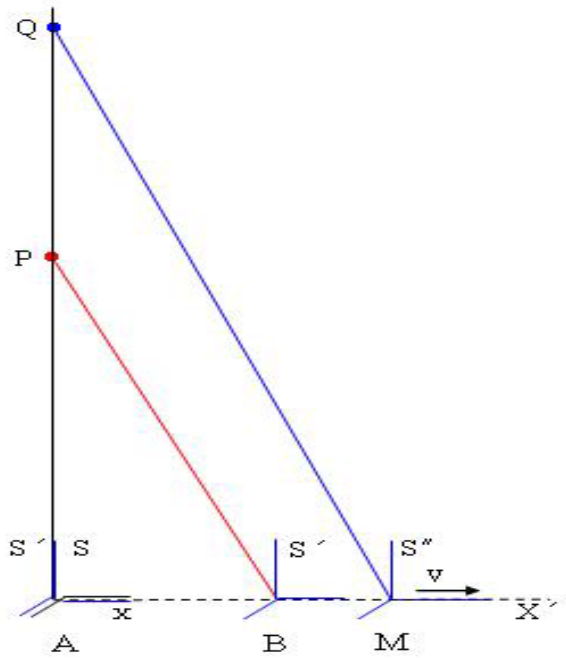

Fig.3 In the y -axis different location of two point light-source, two point light flash pulses fired at the same time. In the reference frame S, received two flash time interval is Δt. In the reference frame S', received two flash time interval is $\Delta t'$.

2.3 Time Interval Contraction Expression

In front of the reference frame S' is discussed from light exercise. If the reference frame S' is toward the light exercise, the speed of reference frame should take negative $(-V)$, we obtain :

$$\tau_2' = \tau + \frac{-(cV - V^2)}{c^2 - V^2}\tau \approx \tau - \frac{V}{c+V} \cdot \tau \quad .$$

(7)

This formula is called time interval contraction . It is suitable for low speed frame of reference , also suit superluminal motion inertia system .

3. CONCLUSION

The same place twice at different time of events, respectively, in different reference frame in different time intervals . Reference frame movement away from the incident site, time interval inflation . Reference frame movement toward the direction of event occurred , time interval happen contraction .

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4/15/2009

An Investigation for Cellulase Activity of a Novel Antibiotic producing *Streptomyces* sp. Isolate H-1 from Egyptian Mangrove Sediment

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Abstract: The aim of the current study was to investigate the cellulolytic activity of a previously isolated and identified isolate from mangrove sediment from Hurgada natural protectorates in Egypt as mention below. The Actinomycete isolate, *Streptomyces* sp.H-1, was known to produce aromatic antibiotic, possess broad spectrum of antibacterial activity, very similar to the antibiotic Tubermycin- -A. The results of the current study show that this isolate also has a very powerful cellulase enzyme system capable of degrading natural cellulosic biomass residues, such as crystalline cellulose derived from cotton seed linters, both *In-vivo* and *In-vitro*. In the meanwhile, the antibiotic production also was reserved. Study of enzyme production optimization revealed that its best production was under shaking incubation (200 rpm) for seven days at pH 7, 35 ^{o}C, and crystalline cellulose concentration 2 % (w/v). In each case, it recorded the highest enzymatic activity at the specified factor, reached to 95.00 UmL^{-1} in some cases. Partial purification of the enzyme increased its activity up to 180 UmL^{-1}. Molecular weight determination revealed the presence of two distinct bands of about 81 and 43 KDa. [Academia Arena, 2009;1(5):89-98]. ISSN 1553-992X.

Keywords: Actinomycetes, *Streptomyces*, Mangrove Sediment, Cellulase, Antibiotic.

1. Introduction

Cellulose, a polymer of glucose residues connected by *β*-1, 4 linkages, being the primary structural material of plant cell wall, is the most abundant carbohydrate in nature (Saha *et al*., 2006). Cellulose is commonly degraded by an enzyme called cellulase. Cellulase is the enzyme that hydrolyzes the *β*-1, 4-glycosidic bonds in the polymer to release glucose units (Nishida *et al*., 2007). This enzyme is produced by several microorganisms, commonly by bacteria and fungi (Immanuel *et al*., 2006). Although a large number of microorganisms are capable of degrading cellulose, only a few of these produce significant quantities of cell free enzymes capable of completely hydrolyzing crystalline cellulose *in-vitro*. Fungi are the main cellulase producing microorganisms, though a few bacteria and actinomycetes have also been reported to yield cellulase activity. In general, bacterial cellulases are thought to be constitutively produced, while fungal cellulase is produced only in the presence of cellulose (Suto and Tomito, 2001).

A wide variety of bacteria are known for their production of extracellular hydrolytic enzymes including cellulases, with streptomycetes being the best known enzyme producers (Vinogradova and Kushnir, 2003). Within the eubacteria there is considerable concentration of cellulolytic capabilities among the predominantly aerobic order Actinomycetales (phylum Actinobacteria). Actinomycetes, one of the known cellulase-producers, have attracted considerable research interest due to its potential applications in recovery of fermentable sugars from cellulose (Jang and cheng, 2003).

The architecture of bacterial cellulases classification has always considerable functional variations. Davies and Henrissat (1995) reported that some bacterial cellulases display both modes of cellulase action, endo- and exo-. Lynd *et al*. (2002) reported a very acceptable model for synergy among different cellulases according to the region of action on the cellulose crystal as follows. Exocellulases (exoglucanases) are described as active on the crystalline regions of cellulose; whereas, endocellulases (endoglucanases) are typically active on the more soluble amorphous region of the cellulose crystal. There is a high degree of synergy seen between exoglucanases and endoglucanases, and it is this synergy that is required for the efficient hydrolysis of cellulose crystals. Some bacteria also produce intra- or extra-cellular *β*-glucosidases to cleave cellobiose and cellodextrins and produce glucose to be taken up by or assimilated by the cell.

In many previous studies, *Streptomyces* species have been always reported as a source of thousands of bioactive compounds. Enzymes are one of the important products of this unusual group of bacteria. Throughout past decades, in the genus *Streptomyces*, cellulose-degrading activity has been found in some strains reported by many workers, for example; Enger and Sleeper (1965); Kluepfel *et al*., (1986); and Spear *et al*., (1993).

So, the aim of the current study was to continue exploring the range of bioactive compounds (cellulases in the current study) of an antibiotic producing *Streptomyces* isolate previously reported by Abdel-Shakour (2007), *Streptomyces* sp. isolate H-1. This isolate was previously isolated from mangrove sediment from Hurgada natural protectorates in Egypt, and characterized by stability over years of sub-culturing since, 2002. Also, it was characterized by producing aromatic compound very similar to the antibiotic Tubermycin A (C_{17} H_{16} O_2 N_2), active mainly against Gram-positive bacteria *Bacillus subtilis* and *Staphylococcus aureus*, besides a good evidence for harboring conjugative plasmid molecule, which makes this isolate a very fit model for industrial microorganism. Conventional taxonomic methods were previously revealed that the isolate H-1 was likely a variety of *S. griseoincarnatus*. Also, identification of the isolate was assessed by using RNA polymerase *β*-subunit gene analysis, proved by Kim *et al.* (2004), and the isolate H-1 was found to has high sequence similarity (98 %) to *S. coelicolor* A3(2) followed by (93 %) sequence similarity to *S. avermitilis* MA-4680 (Abdel-Shakour, 2007).

2. Materials and methods

2.1. The microorganism used

Streptomyces isolate H-1 was used to detect cellulase activity in the current study. This isolate was previously isolated, identified, and investigated, as mentioned in introduction section, as to produce bioactive compounds in the work of Abdel-Shakour (2007).

2.2. Media used for cultivation and enzyme production

Two commercial semisynthetic cellulose substrates were used in this study, carboxymethylcellulose (CMC) and crystalline cellulose; purified cotton seed linters. The following medium was used which could be considered a modified inorganic salts starch nitrate medium into which starch was replaced by the cellulose substrates under study, CMC and crystalline cellulose of cotton linters, as soluble and insoluble cellulose substrates, respectively. The medium composed of (g/L): cellulose substrate (as the only carbon and energy source), 20; $NaNO_3$, 2.0; K_2HPO_4 (anhydrous basis), 1.0; $MgSO_4.7H_2O$, 0.5; KCl, 0.5; $FeSO_4.7H_2O$, 0.01 and tap water, 1000 ml. The pH value was checked & adjusted at 7 before sterilization if necessary. This medium was used for cultivation and enzyme production optimizing conditions in the form of crystalline cellulose broth which inoculated heavily with a spore suspension of the selected isolate under study and incubated aerobically (200 rpm), if otherwise stated, at 30 °C $\pm$ 2 for one week, then; the culture filtrate (about 50 ml) was assayed *in-vitro* as it contains the crude enzyme. CMC agar plates (2 % agar was added) were used for qualitative assay, while, CMC broth for *in-vitro* quantitative assay was used as mentioned below.

2.3. Antimicrobial activity test

The isolate was inoculated into crystalline cellulose broth medium and incubated for 7 days on a rotary shaker (200 rpm) at 30 ^{o}C. Testing the antimicrobial activity was carried out by using the classical filter paper/agar diffusion method (Cooper, 1972) after collection of supernatant and exclusion of cellulose residue by filtration. The following microbial cultures were used as test organisms: *Bacillus subtilis* (NCTC 10400) & *Staphylococcus aureus* (NCTC 7447).

2.4. Cellulase activity qualitative assay

The cellulase activity was determined by inoculating carboxy methyl cellulose (2 % w/v CMC) agar plates (pH 4.5) and was incubated at 30°C. After 3 & 7 days of growth, the hydrolysis zone was visualized around the culture by treating the plates with an aqueous solution of 0.1% Congo red for 15 min and then destained by washing with 1 M NaCl (Apun *et al.*, 2000 and Ariffin *et al.*, 2008). Also, the same plates were used for *in-vitro* assay using the culture filtrate of crystalline cellulose broth (2 % w/v at pH 7), where, agar wells were cut away and the filtrate was placed and allowed to diffuse for 6 hours at 30°C. In both cases, formation of a clear zone of hydrolysis indicated cellulose degradation by the produced enzyme of the tested isolate.

2.5. Cellulase activity quantitative assay

The cellulase activity of the same culture filtrate, after growth on crystalline cellulose broth as above in qualitative assay, was measured by determining the amount of reducing sugars liberated by using Dinitrosalicylic acid (DNS) method **(Miller, 1959)**. Briefly, a reaction mixture composed of 0.5 ml of CMC broth, 0.5 ml of crude enzyme (culture filtrate) and 0.5 ml of 0.05 M citrate buffer pH 4.8 were

incubated for 30 minutes at 40 °C before adding 2 ml of DNS solution. The treated samples were boiled for 15 min prior to cool down in cold water bath for color stabilization. Then, the optical density was read at 540 nm against reagent blank by UV/VIS spectrophotometer. By using a calibration curve for glucose, results were interpreted in terms of enzyme activity in which one unit (U) of enzyme activity was defined as the amount of enzyme, which liberates 1 μmol of glucose equivalent per minute, or, one unit of enzyme was expressed as 1 μmol of reducing sugar released per min per ml, under the above assay conditions.

2.6. Protein determination & Biomass yield

Extracellular protein concentrations, of the same culture filtrate, after growth on crystalline cellulose broth as above in qualitative assay, were determined and expressed as mg per ml by using Lowry method with bovine serum albumin as a standard according to Lowry *et al*., (1951). Biomass yield of the isolate under study was also measured by dry weight determination. The biomass residue was dried at 40 ^{o}C for 24h and the yield was expressed as mg mL^{-1}.

2.7. Enzyme production optimization

The effect of different incubation factors on the production of cellulase enzyme by the isolate under study was conducted. The variables tested were the incubation period, aerobic incubation under static and shaking conditions, incubation temperature, the pH of the culture medium, and different concentrations of the used cellulosic substrate under study (purified cotton seed linters). The above cultivation medium (crystalline cellulose broth) was used and at the end of incubation, both enzyme activity and the protein concentrations, for each culture under the tested variable were determined, besides, measuring the biomass yield as described above. The incubation under static and shaking conditions (100 & 200 rpm) at 30 ^{o}C for one week was tested first. Then, the incubation period was conducted for 3, 5, 7, 9 and 11 days. The effect of different pH values (4, 5, 6, 7 & 8), and temperature range (25, 30, 35, 40 & 45 ^{o}C) on cellulase production was conducted by incubating the selected isolate for one week (at 200 rpm & 2 % w/v C source). Also, the C source concentration of the used substrate (purified cotton seed linters) was tested from 0.5-2.5 % (w/v).

2.8. Enzyme production, concentration, and purification

The isolate under study was allowed to grow and produce cellulase under the determined optimum conditions. Then, the culture filtrate (about 50 ml) was collected by centrifugation at 5000 rpm for 5 min at 4 ^{o}C. The crude enzyme in the supernatant was then concentrated by ethyl alcohol precipitation. Ethyl alcohol (70 %) was added to the filtrate by percentage of 3:1 (v/v), then, allowed for precipitation for an hour and then centrifuged at 5000 rpm for 5 min at 4 ^{o}C. The precipitated enzyme was dissolved in 30 ml of sodium acetate buffer (0.2 M) at pH 5.5 and was dialyzed against the same buffer overnight at 4°C for partial purification. The obtained enzyme (about 5 ml) was concentrated against sucrose and then refrigerated at 4°C until further analysis. The partially purified enzyme was then subjected to enzyme activity and protein concentration determinations as described above, as well as, determination of molecular weight as described briefly below.

2.9. Determination of molecular weight

The molecular weight of cellulase enzyme obtained from the isolate under study was determined by using Sodium Dodecyl Sulphate – Poly Acrylamide Gel Electrophoresis (SDS-PAGE) technique according to Sambrook *et al*., (1989). The gel was analyzed using AlphaEaseFC 4.0 software.

3. Results

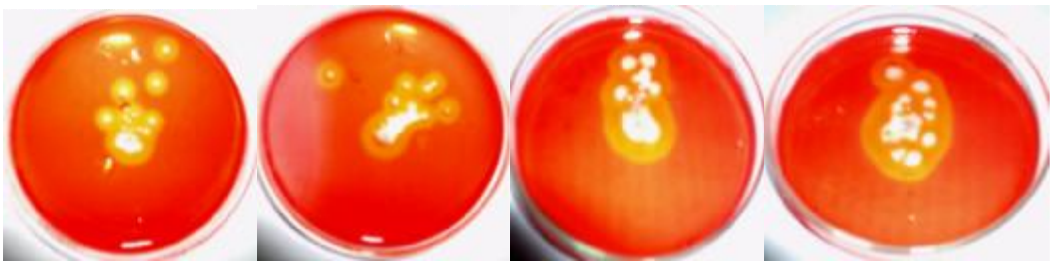
3.1. Evaluating antimicrobial and cellulolytic activities of *Streptomyces* sp. H-1

The isolate *Streptomyces* sp. H-1 was, as previously mentioned, isolated from mangrove sediment from Hurgada natural protectorates in Egypt. This isolate was previously isolated, identified, and investigated, as mentioned in introduction section, as to produce bioactive compounds in previous work of Abdel-Shakour (2007). Also, it was characterized by producing aromatic compound very similar to the antibiotic Tubermycin A, active mainly against Gram-positive bacteria *Bacillus subtilis* and *Staphylococcus aureus*, when grown on starch nitrate broth medium.

In the current study, we used crystalline cellulose, in the form of cotton linters, broth medium to investigate the ability of this isolate to utilize cellulose as the only carbon source while maintaining its antimicrobial activities against the tested microbial cultures under investigation. It was found that the

results of this test confirmed the presence of the antibiotic activity of the isolate detected by the clear zones of inhibition around the filter paper discs impregnated with the culture filtrate at the end of the incubation period after seven days on a rotary shaker (200 rpm) at 30 ^{o}C. The tested microbial cultures were *Bacillus subtilis* (NCTC 10400) & *Staphylococcus aureus* (NCTC 7447), and, the diameter of the inhibition zone ranged from 1.3 to 1.7 mm.

On the other hand, the same filtrate was used to detect *in-vitro* cellulase activity of the isolate using Carboxymethylcellulose (CMC) agar plates into which agar wells were cut and the filtrate was placed and allowed to diffuse for 6 hours at 30°C. In parallel, similar plates of the same composition were first inoculated with the isolate under study to investigate cellulase enzyme production *in-vivo* after three and seven days of growth at 30°C (Figure 1). In both cases, formation of a clear zone of hydrolysis, upon addition of an aqueous solution of Congo red (0.1%) indicated cellulose degradation by the produced enzyme of the tested isolate.



A. **B.** **C.** **D.**

Figure 1. Growth and cellulolytic activity of the isolate *Streptomyces* sp.H-1 on 2 % CMC agar after; three days of incubation (A & B), and, seven days of incubation (C& D).

3.2. Cellulase enzyme production optimization by *Streptomyces* sp. H-1

The effect of different incubation factors on the production of cellulase enzyme by the isolate under study was conducted. The variables tested were the incubation period, aerobic incubation under static and shaking conditions, incubation temperature, the pH of the culture medium, and different concentrations of the used cellulosic substrate under study (cotton linters). The cultivation medium (crystalline cellulose broth), as above in qualitative assay, was inoculated and at the end of incubation, we determined the enzyme activity of the culture filtrate, by measuring the amount of reducing sugars liberated, the extracellular protein concentration, and the biomass yield for each culture under the tested variable.

Results revealed that the incubation under shaking conditions (200 rpm) was best where the recorded cellulase activity was 81.00 UmL^{-1} and the protein concentration & the biomass yield were 0.80 & 9.30 mg mL^{-1}, respectively (Table 1). Results also revealed that the incubation period for seven days was best where the recorded cellulase activity was 87.00 UmL^{-1} and the protein concentration & the biomass yield were 0.89 & 9.5 mg mL^{-1}, respectively (Table 2). On the other hand, while, results in table (3) revealed that incubation at pH value 7.00 was best where the recorded cellulase activity was 89.00 UmL^{-1} and the protein concentration & the biomass yield were 0.95 & 9.30 mg mL^{-1}, respectively, results in table (4) revealed that the incubation at temperature 35 ^{o}C was best where the recorded cellulase activity was 95.00 UmL^{-1} and the protein concentration & the biomass yield were 1.10 & 9.00 mg mL^{-1}, respectively. Finally, results revealed that growth of the isolate under study was best on crystalline cellulose (cotton linters) concentration of 2.0 % (w/v) where the recorded cellulase activity was 85.00 UmL^{-1} and the protein concentration & the biomass yield were 1.00 & 9.40 mg mL^{-1}, respectively (Table 5).

Table 1. Effect of aerobic incubation under static and shaking conditions of the culture medium on cellulase production by the isolate *Streptomyces* sp. H-1

Incubation condition	Enzyme activity U mL^{-1}	Protein concentration mg mL^{-1}	Biomass yield mg mL^{-1}
Static	27.00	0.30	2.70
Shaking (100 rpm)	49.00	0.47	6.50
Shaking (200 rpm)	81.00	0.80	9.30

Table 2. Effect of the incubation period of the culture medium on cellulase production by the isolate *Streptomyces* sp. H-1

Incubation period days	Enzyme activity U mL^{-1}	Protein concentration mg mL^{-1}	Biomass yield mg mL^{-1}
3	25.00	0.28	3.00
5	53.00	0.57	6.20
7	87.00	0.89	9.50
9	77.00	0.84	9.00
11	73.00	0.84	9.20

Table 3. Effect of different initial pH values of the culture medium on cellulase production by the isolate *Streptomyces* sp. H-1

Initial pH value	Enzyme activity U mL^{-1}	Protein concentration mg mL^{-1}	Biomass yield mg mL^{-1}
4	7.00	0.07	0.90
5	24.00	0.28	2.70
6	51.00	0.60	5.90
7	89.00	0.95	9.30
8	81.00	0.90	8.80

Table 4. Effect of different incubation temperatures of the culture medium on cellulase production by the isolate *Streptomyces* sp. H-1

Incubation temperature ^{o}C	Enzyme activity U mL^{-1}	Protein concentration mg mL^{-1}	Biomass yield mg mL^{-1}
25	59.00	0.67	5.50
30	79.00	0.98	8.00
35	95.00	1.10	9.00
40	73.00	0.92	7.70
45	49.00	0.59	4.80

Table 5. Effect of different cellulose concentrations of the culture medium on cellulase production by the isolate *Streptomyces* sp. H-1

Cellulose concentration % (w/v)	Enzyme activity U mL^{-1}	Protein concentration mg mL^{-1}	Biomass yield mg mL^{-1}
0.5	18.00	0.20	1.90
1.0	45.00	0.50	4.70
1.5	70.00	0.85	8.20
2.0	85.00	1.00	9.40
2.5	68.00	0.80	7.80

3.3. Characterization of partially purified cellulase produced by *Streptomyces* sp. H-1

The isolate under study was allowed to grow and produce cellulase under the determined optimum conditions depicted in table (6). Then, the culture filtrate, containing the crude enzyme was collected and subjected to partial concentration and purification including ethyl alcohol precipitation, centrifugation, and dialysis against sucrose. The partially purified enzyme was then subjected to enzyme activity and protein

concentration determinations, as well as, determination of molecular weight using SDS-PAGE technique.

The results obtained revealed that the activity of the partially purified cellulase produced by the isolate under study had increased by about factor of two where the recorded activity was 180 UmL^{-1} while the protein concentration determined reached to 1.70 mg mL^{-1}. Also, the approximate molecular weight for the enzyme was determined from a constructed standard curve for the known protein marker against the distance migrated in mm. Results in figure (2) showed that the cellulase enzyme had separated into two distinct bands of approximate molecular weights of 81 and 43 KDa.

Table 6. The optimum cultural conditions for cellulase-production by *Streptomyces* sp. H-1

Optimum conditions	**Cellulase activity (U mL^{-1})**
Shaking incubation (200 rpm)	81.00
Incubation period (7 days)	87.00
Initial pH value (7.00)	89.00
Incubation temperature (35 ^{o}C)	95.00
Cellulose concentration (2.00 % w/v)	85.00

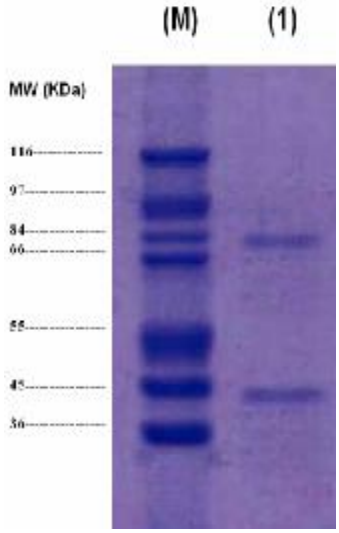


Figure 2. Molecular weight determination of cellulase produced by *Streptomyces* sp.H-1 using SDS-PAGE; (M) is the protein marker & (1) is the enzyme sample.

4. Discussion

Aerobic cellulose degraders, both bacterial and fungal, utilize cellulose through the production of substantial amounts of extracellular cellulase enzymes that are freely recoverable from culture supernatants (Schwarz, 2001). The individual enzymes often display strong synergy in the hydrolysis of cellulose. It is also notable that most aerobic cellulolytic bacterial species common in soil are classified within genera well known for secondary (non-growth-associated) metabolism, including the formation of distinct resting states and/or production of antibiotics (*Bacillus, Streptomyces*, and *Micromonospora*) and other secondary metabolites. While antibiotic production in cellulolytic species has not been systematically investigated, production of such compounds might provide additional selective fitness to compensate for their rather modest maximum growth rate on cellulose. An ability to form resting states relatively resistant to starvation or other environmental insult also provides a selective advantage in nature (Lynd *et al.*, 2002).

Ulrich and Wirth (1999) conducted a phylogenetic study of culturable cellulolytic soil bacteria diversity across an agricultural encatchment and found that the ratio of actinomycetes within total isolates ranged from 0.73 to 0.94, and also, based on 16S rDNA sequence analysis, isolates of the dominant as well as the specific pattern groups could be assigned to the genus *Streptomyces*. Previously, LI (1997) has isolated an actinomycete strain, which decomposes cellulose, and was identified as a member of the genus *Streptomyces* on the basis of morphological characteristics and chemo-type of the cell wall. Sakon *et al.*, (1997) reported that the family 9 cellulase of aerobic *Thermomonospora fusca* has provided strong

evidence for enzymes that can exhibit both endoglucanase and exoglucanase activities. Veiga *et al.*, (1983) reported the presence of actinomycetes capable of cellulose decomposition from marine sediments.

The current study aim was to evaluate the antimicrobial and cellulolytic activities of *Streptomyces* sp. H-1, previously isolated from mangrove sediment from Hurgada natural protectorates in Egypt while growing on the used crystalline cellulose substrate (cotton linters). This isolate was identified and investigated previously by Abdel-Shakour (2007). Also, it was characterized by producing aromatic compound very similar to the antibiotic Tubermycin A. The use of commercial cotton crystalline cellulose was to approach the nature of cellulosic biomass which is more complex than that of pure celluloses. The isolate was able to utilize crystalline cellulose in broth medium as the only carbon and energy source and also produced its antibiotic active against *Bacillus subtilis* and *Staphylococcus aureus*. Growth on insoluble crystalline cellulose supported the hypothesis that this isolate produce a powerful cellulase enzyme system *In-vivo* composed of endocellulase, exocellulase, and *β*-glucosidase in order to obtain glucose.

The screening process of cellulolytic bacteria usually conducted using the Congo red test. Since the sole carbon source in the agar is CMC, therefore, the result of the test is a strong evident that cellulase was produced in order to degrade cellulose (Lynd *et al*., 2002; Wang *et al*., 2008).

In our study, the clear zone around *Streptomyces* colonies after staining with Congo red indicated the hydrolysis of CMC, despite absence of crystallinity, as a result of cellulases produced and this phenomenon has been reported also by Abdel-Nasser and Ahmed (2007). Moreover, it was reported that *Geobacillus* strain was capable in hydrolyzing cellulose (Miyazaki *et al*., 2007). As detected from Congo red method, the isolated strain had endoglucanase activity, one of the enzymes required for conversion of cellulose to glucose as reported by Sirisena and Manamendra (1995). According to Ariffin *et al*., (2008) cellulolytic bacteria, *Bacillus pumilus* EB3 was successfully isolated and produced clear zone around the colony after staining with Congo red on CMC agar.

So, in our study, both *In-vivo* & *In-vitro* cellulase assay for detecting endocellulase, exocellulase, and *β*-glucosidase activity was conducted by using the culture filtrate (crude enzyme) onto agar wells cut in CMC agar plates. In parallel, similar plates of the same composition were first inoculated with the isolate under study to investigate cellulase enzyme production. In both cases, formation of a clear zone of hydrolysis, upon addition of an aqueous solution of Congo red indicated cellulose degradation by the produced enzyme of the tested isolate. However, the result of this test confirm only the presence of endocellulase or endoglucanase only specially when the enzyme tested *In-vitro*.

Cellulase enzyme production optimization by *Streptomyces* sp. H-1 was conducted. The variables tested were the incubation period, aerobic incubation under static and shaking conditions, incubation temperature, the pH of the culture medium, and different concentrations of the used cellulosic substrate under study (cotton linters). The cultivation medium (crystalline cellulose broth), as above in qualitative assay, was inoculated and at the end of incubation, we determined the enzyme activity of the culture filtrate, by measuring the amount of reducing sugars liberated using CMC broth as a substrate, the extracellular protein concentration, and the biomass yield for each culture under the tested variable. However, the used enzyme-substrate (CMC) will confirm endocellulase activity definitely, but, provide a little about exocellulase and *β*-glucosidase, since both exocellulose and cellobiose give positive results in this test as they contain reducing ends as glucose. At least, we report that, the isolate must produced the three set of enzymes as it was grown on crystalline cellulose broth. Hence, in other studies, cellulase activity was determined by filter paper method of Stephen *et al*., (2003) as this method is a combined assay for endo- and exo-glucanases *In-vitro*.

Our results revealed that the aerobic incubation under shaking conditions (200 rpm) was best where the recorded cellulase activity was 81.00 UmL^{-1} and the protein concentration & the biomass yield were 0.80 & 9.30 mg mL^{-1}, respectively. Results also revealed that the incubation period for seven days was best where the recorded cellulase activity was 87.00 UmL^{-1} and the protein concentration & the biomass yield were 0.89 & 9.5 mg mL^{-1}, respectively. On the other hand, our results revealed that incubation at pH value 7.00 was best where the recorded cellulase activity was 89.00 UmL^{-1} and the protein concentration & the biomass yield were 0.95 & 9.30 mg mL^{-1}, respectively, and also the incubation at temperature 35 ^{o}C was best where the recorded cellulase activity was 95.00 UmL^{-1} and the protein concentration & the biomass yield were 1.10 & 9.00 mg mL^{-1}, respectively. Finally, results revealed that growth of the isolate under study was best on crystalline cellulose concentration of 2.0 % (w/v) where the recorded cellulase activity was 85.00 UmL^{-1} and the protein concentration & the biomass yield were 1.00 & 9.40 mg mL^{-1}, respectively.

Similar studies were conducted by many authors with variations, for example, Theberge *et al.*, (1992) reported that the optimum pH for endoglucanase from a strain of *Streptomyces lividans* was 5.50. Solingen *et al.*, (2001) reported that an alkaline novel *Streptomyces* species isolated from east African soda lakes have an optimal pH of 8.00. McCarthy (1987) reported that the optimal temperature for cellulase activity in the range of 40-55 °C for several *Streptomyces* species including *S. lividans, S. flavogrisus, and S. nitrosporus.* Jang and Chen (2003) described a CMCase produced by *Streptomyces* T3-1 with optimum temperature 50 °C, whereas Schrempf and Walter (1995) described a CMCase production by *S. reticuli* at an optimum temperature 55 °C. It has been reported that the biosynthesis of cellulase is induced during growth on cellulose or other cellulose derivatives (Fernandez- Abalose *et al.*, 1997; Godden *et al.*, 1989). In all cases, it has been found that it is essential to keep the required nutrients at low level to insure maximum accumulation of fermentation products (Priest, 1984). However, the purpose of Jaradat *et al*., (2008) study was to determine the influence of growth conditions and medium composition on the cellulase enzyme production by *Streptomyces* sp. (Strain J2) and he reported that the highest crude enzyme activity (432 U/L) was observed after 3 days of incubation at pH 7.00 and 60 °C in CMC broth that was supplemented with 0.5% glucose, 0.2% starch, and 0.2% NH_4Cl.

Finally, characterization of partially purified cellulase produced by *Streptomyces* sp. H-1 under the determined optimum conditions revealed that the activity had increased by about one fold where the recorded activity was 180 UmL^{-1} and protein concentration determined reached to 1.70 mg mL^{-1}. Also, the approximate molecular weight for the cellulase enzyme was determined and the enzyme had separated into two distinct bands of 81 and 43 KDa in size, despite the subsidiary subunits constituents of each band. The determined molecular weights of the cellulase of our isolate under study were in agreement with the many other studies of bacterial cellulases molecular weights range determinations, see (Lynd *et al*., 2002) for reviews.

Before closing comments, we must address here that novel cellulase producing bacteria still need more research for discovery of unusual enzyme systems and determine their efficiency especially for the industrial use applications. For example, a bacterial strain B39 previously isolated and identified through 16S rRNA gene sequencing and phylogenetic analysis to be a novel cellulose-degrading *Paenibacillus* sp. strain with a high-molecular weight (148 kDa) cellulase was discovered. The endocellulase or CMCase activity of the newly isolated cellulase was much higher than the activity on Avicel or filter paper and this cellulase was found to have maximum CMCase activity at 60°C, pH 6.50. Due to the promising thermostability and slight acidic tolerance of this enzyme, it has good potential for industrial use in the hydrolysis of soluble cellulose as well as activity on microcrystalline sources of cellulose (Wang *et al*., 2008).

Similarly, a multifunctional enzyme was found to be produced by *Terendinibacter turnerae* T7902, which is a bacterial symbiont isolated from the wood-boring marine bivalve *Lydrodus pedicellatus*. This CelAB was found to have two catalytic and two carbohydrate-binding domains. It binds both cellulose and chitin and possesses cellobiohydrolase and beta-1,4(3) endoglucanase activity allowing it to degrade multiple complex polysaccharides. This enzyme is marginally acid-tolerant at an optimum pH of 6 and mesophilic with a temperature optimum of 42°C. Additionally, this enzyme was able to reduce viscosity of CMC approximately 40% after 25 minutes, displaying promising characteristics for bio-fuel industry (Ekborg *et al.*, 2007).

In conclusion, the results of this study revealed the promising of using our isolate, *Streptomyces* sp.H-1, in *In-vivo* crystalline cellulose degradation and antibiotic production effectively. The development of our enzyme for *In-vitro* industrial use still needs more research, especially the physiology of the organism itself, apart from studies on the effect of growth conditions on enzyme production and improving the yield. Also, this will be feasible especially through development of rapid and reliable methods for screening of cellulases from microorganisms for industrial use. Finally, the biotechnological approaches to developing practical processes for the conversion of cellulose to fuels and commodity chemicals involve, to a greater extent, the microbial cellulose utilization approach.

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