

Phytochemical screening of cumin seeds extract

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Abstract: Herein, we present the phytochemical analysis of the cumin seeds extract.

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Key words: phytochemical screening, cumin seeds, crude extract.

Experimental Details:

Preparation of cumin seeds extract:

The seeds of cumin were washed under running tap water. It was then dried under shade and ground into coarse powder in the electronic grinder.

Solvent extraction– Crude cumin seeds extract was prepared by Soxhlet extraction method. About 20gm of powdered cumin seed material was uniformly packed into a thimble and extracted with 250 ml of methanol. The process of extraction was continued till the solvent in siphon tube of an extractor became colorless. After that the extract was taken in a beaker and kept on hot plate and heated at 30-40°C till all the solvent got evaporated. Dried extract was kept in freezer at 4°C until further use.

Qualitative Phytochemical Analysis:

The crude extract was tested for the presence of bioactive compounds by using following standard methods.

Test for alkaloids

Crude extract was mixed with 2ml of 1% HCl and heated gently. Mayer's And Wagner's reagents were then added to the mixture. Turbidity of the resulting precipitate was taken as evidence for the presence of alkaloids.

Test for flavonoids

Crude extract was mixed with 2ml of 2% solution of NaOH. An intense yellow colour was formed which turned colourless on addition of few drops of diluted acid which indicated the presence of flavonoids. Another test was performed by mixing crude extract with few fragments of magnesium ribbon. Then concentrated HCl was added drop wise. The development of pink scarlet coloration after few minutes indicated the presence of flavonoids.

Test for saponins

Crude extract was mixed with 5ml of distilled water in a test tube and shaken vigorously then was left to stand for 10 minutes and the result was noted. No thick persistent froth was observed. This indicated the absence of saponins.

Test for glycosides

For detection of glycosides, crude extract was hydrolysed with concentrated HCl for 2 hrs on water bath, filtered and the hydrolysate was subjected to the following test.

Bortrager's test: To 2 ml of filtered hydrolysate, 3 ml of chloroform was added and shaken, chloroform layer was separated and 10% ammonia solution was added to it. The development of pink coloration indicated the presence of glycosides.

Test for proteins

Crude extract when mixed with 2 ml of Millon's reagent, white precipitate appeared which turned red upon gentle heating that confirmed the presence of proteins.

Test for steroids

Crude extract was mixed with 2ml of chloroform and concentrated H₂SO₄ was added sidewise. A red color produced in the lower chloroform layer indicated the presence of steroids.

Test for phenolic compounds and tannins

Crude extract was mixed with 2ml of 2% solution of FeCl₃. A blue-green coloration indicated the presence of phenolic compounds and tannins.

Test for fixed oils and fats

A few drops of 0.5 N alcoholic KOH were added to a small quantity of crude extract along with a drop of phenolphthalein. The mixture was heated on water bath for 2hrs. Partial neutralization of alkali indicated the presence of fixed oils and fats.

Test for carbohydrates

Molisch's test: Crude extract was mixed with 2ml of Molisch's reagent and the mixture was shaken properly. After that, 2ml of concentrated H₂SO₄ was poured carefully along the side of the test tube. Appearance of a violet ring at the interphase indicated the presence of carbohydrates.

Fehling's test: Equal volume of Fehling A and Fehling B reagents were mixed together and 2ml of it was added to crude extract and gently boiled. A brick red precipitate appeared at the bottom of the test tube indicated the presence of reducing sugars.

Results, Discussion and Conclusion

Qualitative Phytochemical Analysis:

Table 1. Phytochemical screening of crude seeds extract

Alkaloids	+
Flavonoids	+
Saponins	-
Glycosides	+
Proteins	+
Steroids	+
Phenolic compounds and tannins	+
Fixed oils and fats	+
Reducing sugars	+

+ = present

- = absent

The phytochemical characteristics of cumin seeds extract are summarized in the table 1. The results revealed the presence of bioactive compounds in the cumin seeds extract. From the table, it could be seen that, proteins, reducing sugars, alkaloids, flavonoids, steroids, glycosides, oils and fats, phenolic compounds and tannins are present in the cumin seeds extract. However, saponins are absent in the extract. These phytochemical compounds are known to be biologically active and therefore aid the medicinal as well as physiological activities. Alkaloids which are one of the largest groups of phytochemicals have been associated with medicinal uses for centuries and one of their common biological properties is their cytotoxicity. Flavonoids are hydroxylated phenolic substances known to be synthesized by plants in

response to microbial infection have been found to be antimicrobial substances against wide array of microorganisms in vitro. They also are effective antioxidant and show strong anticancer activities. Glycosides are known to lower the blood pressure. The phenolic compounds are one of the largest and most ubiquitous groups of plant metabolites. They possess biological properties such as anti-apoptosis, anti-aging, anti-carcinogen, anti-inflammation, anti-atherosclerosis, cardiovascular protection and improvement of endothelial function, as well as inhibition of angiogenesis and cell proliferation activities. Tannins bind to proline rich protein and interfere with protein synthesis. They are also known to react with proteins to provide the typical tanning effect which is important for the treatment of inflamed or ulcerated tissues. Reducing sugars serve as the chief fuel of biological systems, supplying living cells with usable energy. Steroids possess antibacterial properties and they are very important compounds especially due to their relationship with compounds such as sex hormones. Qualitative phytochemical analysis conducted on the crude cumin seeds extract revealed the presence of phytochemicals which are known to exhibit medicinal as well as physiological activities. Thus we can scientifically conclude that the cumin seeds extract could be seen as an increasingly valuable reservoir of bioactive compounds of substantial medicinal merit.

References:

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