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In-vitro study of antimicrobia activity of the cinnamomum cassia against the penicilium notatum and aspergillus Niger

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ABSTRACT

The aim of the present study was to investigate the antimicrobial activity of the Cinnamomum cassia against the fungi, Penicillium notatum and Aspergillus niger. Cinnamomum cassia is the dried bark of an evergreen busy tree. It is commonly known as Cinnamon. Cinnamon bark is widely used as a spice. It is principally employed in cookery as a condiment and flavoring material. In the present study different concentration of the crude extracts samples of Cinnamomun cassia and media were prepared (i.e-10%, 20%, 30% and 40%) and one plate is maintained as Control which contains only MRBA(Martin Rose Bengal Agar) media and fungal culture, not the extracts of the Cinnamomum cassia, are poured onto the different petri plates. This was left to solidify for 20 minutes. With the help of cork borer one hole was made in the center of each petri plate. The Fungus cultures of A.niger and P.notatum with the help of cork borer were removed from the pure culture one by one. This was then inoculated onto the Petri plates containing different concentration of the Cinnamomum cassia samples. Petri plates were wrapped with paraffin and incubated .After incubation of 4days at room temperature with P.notatum and A.niger the growth of fungus was observed. It was observed that as increase in the concentration of the Cinnamomum cassia sample the growth is inhibited. The growth is very less at the 40% of the sample used. The growth was totally inhibited by the Cinnamon extract as 40% against the fungus P. notatum.

Introduction

An antimicrobial is a substance that kills or inhibits the growth of microbes such as bacteria, fungi, protozoans or viruses. Antimicrobial drugs either kill microbes (microbicidal) or prevent the growth of microbes (microbistatic). Many works have been done which aim at knowing the different antimicrobial and phytochemical constituents of various spices and using them for the treatment of microbial infections (both topical and systemic applications) as possible alternatives to chemically synthetic drugs to which many infectious microorganisms have become resistant. Spices are an important therapeutic aid for various ailments. Scientific experiments on the antimicrobial properties of plant components were first documented in the late 19th century. In India, from ancient times, different parts of medicinal plants have been used to cure specific ailments. All spices containing active compounds are important .The beneficial medicinal effects of spice materials typically result from the combinations of secondary products present in the plant. In plants, these compounds are mostly secondary metabolites such as alkaloids, steroids, tannins, and phenol compounds, which are synthesized and deposited in specific parts or in all parts of the plant. These compounds are more complex and specific and are found in certain taxa such as family, genus and species, but heterogeneity of secondary compounds is found in wild species. The medicinal actions of spices are unique to a particular species or group, consistent with the concept that the combination of secondary products in a particular plant is taxonomically distinct The plants secondary products may exert their action by resembling endogenous metabolites, ligands, hormones, signal transduction molecules or neurotransmitters and thus have beneficial medicinal effects on humans due to similarities in their potential target sites.

Cinnamon bark is widely used as a spice. It is principally employed in cookery as a condiment and flavoring material. Cinnamon bark is one of the few spices that can be consumed directly. In medicine it acts like other volatile oils and once had a reputation as a cure for colds. It has also been used to treat diarrhea and other problems of the digestive system Cinnamon is high in antioxidant activity. The essential oil of cinnamon also has antimicrobial properties, which can aid in the preservation of certain foods.

Materials And Method

Media Preparation:

The MRBA (Martin Rose Bengal Agar) Media is used to culture the fungi. It contains the following ingredients per liter : K2HPO4- 0.5 g,KH2PO4- 0.5 g ,MgSO4.7H20-0.5 g, Dextrose-10.0 g, Peptone- 5.0 g, Yeast extract-0.5 g. Rose Bengal- 50 mg, Agar- 15.0 g. Streptomycin sulfate (30 mg) was aseptically added to the medium after autoclave sterilization.

Preparation of *Cinnamomum cassia* sample:

The Spice sample used for the experiment is Cinnamon. The Spice sample (Cinnamon) was collected from the local market. About 50 gm of fresh sample were weighed & ground to paste using a mixer with addition of 100ml distilled water. The paste was filtered through 8 layered muslin cloth. Further the filtrate was centrifuged @ 5000 rpm for about 10 min. The supernatant was collected and filtered using wattman filter paper. This filtrate was called the “mother solution”.

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Fungal strain:

The fungal strains investigated & identified. The microbes studied are: Penicilium notatum and Aspergillus niger. The fungal cultures were maintained at 4°C on MRBA media.

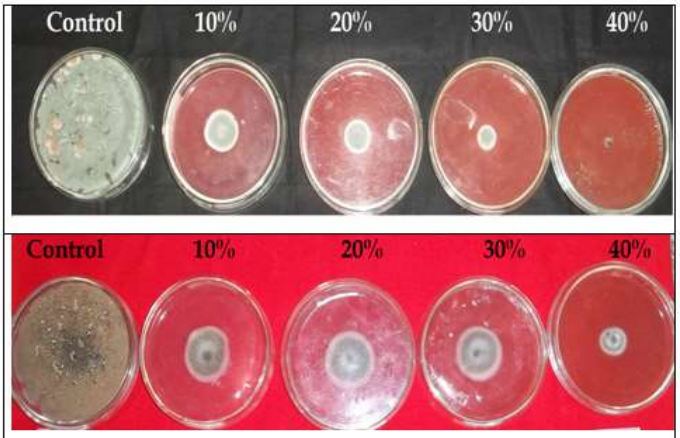

Fig- Showing gradual decrease in the growth of the fungus *P.notatum* and *A.niger* as the percentage of the extract used is increases. [The growth pattern of the Fungus at different concentrations (10%, 20%, 30%and 40%) of the *Cinnamomum cassia* extract used.]

Transferring of media & inoculation:

250 ml of MRBA media was prepared. Different concentration of samples (Cinnamon) and MRBA media was prepared (10%, 20%, 30%, and 40%) and poured onto the 10 petri plates. This was left to solidify for 20 minutes. Now, with the help of cork borer one hole was made in the center of each petri plate. Fungus culture (A.niger, P.notatum) with the help of cork borer was removed from the pure culture under aseptic condition. This was then inoculated onto the Petri plates containing different concentration of samples. Petri plates were wrapped with paraffin and incubated for 4 days at room temperature. After 4 days the results were observed. The experiment was repeated to confirm the result.

Results And Discussion

The present investigation aims the antifungal potentiality of the Cinnomon extract against the fungi P. notatum and A. niger. To achieve the objective, after incubation of 4days at room temperature with P. notatum and A. niger the growth of fungus was seen decreasing as the concentration of the sample used is increases. The extract has completely inhibited the growth of the fungi P. notatum at the 40% concentration of the extract used, from the present investigation it is very clear that the Cinnamon extract has higher antimicrobial activity for fungi P. notatum compared to A.niger.

Conclusion

The antimicrobial activity of spices may differ between strains within the same species. Moreover, the antimicrobial properties of spices may differ depending on the form of spices added, such as fresh, dried, or extracted form and also differ depending on the harvesting seasons and between geographical sources. However, there is evidence that the extracts of spices are strongly antimicrobial agents. The antifungal activity of Cinnamon extracts were tested using two different fungus. It was observed that the extract of Cinnamon was potentially active against Penicillium notatum and Aspergillus niger .The growth of fungus was seen inhibited at the lowest (10%) concentration also. In the case of Penicillium notatum no growth was observed at 40% concentration of the Cinnamon extract used., from the present investigation it is very clear that the Cinnamon extract has higher antimicrobial activity for fungi P. notatum compared to A.niger.

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