



Cascabela thevetia: Practical Approach Towards its Antimicrobial Activity

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DOI: 10.31080/ASAG.2023.07.1265

Received: November 24, 2022

Published: April 27, 2023

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Abstract

A large number of medicinal plants are claimed to be useful in treating skin diseases in all traditional system of medicine. The present study was carried out to investigate the antimicrobial effect of the compound isolated from the ethylacetate fraction of flowers of *Cascabela thevetia*. This compound was shown to possess antimicrobial activity against bacteria and fungi.

Keywords: *Cascabela Thevetia*; Antibacterial Activity; Antifungal Activity; Diffusion Method; Chloramphenicol; Fluconazole

Introduction

Cascabela thevetia (L.) a remarkable plant with reported insecticidal/medicinal benefits belonging to Apocynaceae. It is also known as yellow oleander. Various phytochemical substances such as phenols, tannins, flavonoids as well as sugars (mainly reducing in nature) are observed in its leaves. The antimicrobial property of the plant extract has also been tested against various human pathogens [1]. It has been reported that in few parts of world it is employed against skin rashes. Few reports are available to cure menstrual disorders too. It's antibacterial as well as antifungal properties have been reported [2]. Most of the reports are from humid areas such as Vietnam (Men., et al. 2022). None of the observations have been reported in winter season or similar climate. We have carried out a study in the village area of Pirpainti, Bhagalpur, Bihar during the onset of winter season. The study was carried out in the school campus of Happy Valley School, Pirpainti by the students of Standard V under the guidance of science teacher.

Materials and Methods

The month selected for the study was start of November'2022 which marks the onset of the winter.

The leaves of *Cascabela thevetia* (L.) were crushed in the presence of sand and water in mortar and pestle. The liquid was then filtered and stored in a container and the filtrate was removed. The stored liquid was used as leaf-extract of the *Cascabela thevetia*.

Fresh peels of bananas were washed off with the freshly prepared leaf-extract and were stored in cool dry place. Two sets of experiment were studied. One wherein the banana peels were after being treated with leaf extract was stored in open polybag exposing them to the natural environment. Another set of experiment were carried out by closing the polybag containing treated banana peels and confining them to the limited exposure.

A control of these experiments (open and closed polybag) containing only fresh banana peel was kept in cool dry place. This arrangement of experiment including both control and treated banana peel were made in triplicate. Triplicate arrangements were made at distant in adjacent classrooms (Happy Valley School, Pirpainti) with same temperature and humidity.

Results and Discussion

No origination of fruit flies

In open as well as in closed experimental setup

Season and climate had pronounced affect on the origination and development of fruit flies or fungal growth. The origination of fruit flies was delayed due to the fall in room temperature with the onset of winter climate. Both in control as well as treated set marked no origination of fruit flies.

Fruit flies generally are observed on the fresh peel of banana mainly till they are green in texture. However, upon drying of the peel i.e., they start turning black in colour and hard in texture, fruit flies are rarely observed. Banana peel has an enzyme namely poly-phenol oxidase which reacts with environmental oxygen causes enzymatic browning to blackening [3].

Regeneration of fungal colonies

In open experimental setup

For the first three days origination of fungal colonies in treated as well as control was not observed. However, it was on fourth day, white colony of fungus appeared on the peel on banana (Figure 1 & 2). The colour of banana peel turned brown with hard texture.



Figure 1: Fungal colony (5th day).



Figure 2: Fungal colonies distinct (7th day).

The control banana peel had no treatment of leaf extract of *Cascabela thevetia* and thereby it marked the regeneration of fungal colonies.

The treated banana peel showed no fungal regeneration even after 10 days post experimental set up. The fragrance of the leaf extract was lost after two days in the closed pack, however, the odour of leaf extract was not observed after the few hours on open pack of experimental setup.

In closed experimental setup

Supporting the above result, the treated banana peels in closed experimental setup showed no fungal colonies. The banana peels in closed setup were limited for complete exposure against day to day weather change. The fragrance of the leaf extract was restored for first three days which faded with the advancement of the passing by periods/ days. Figure 3 shows the condition of treated banana peel without any fungal colony formation.



Figure 3: No fungal colony in treated banana peel (close experimental setup) - 10th day.

S. No.	Pathogens	Open experimental setup		Closed experimental setup	
		Treated	Control	Treated	Control
1	Fruit flies	No	No	No	No
2	Fungal colony	No	Yes	No	Yes

Table 1: Data showing the attack of flies/pathogens on the banana peels.

Conclusion

Future prospects

The experiment can be carried on large scale to with fruit stocks to observe the action of leaf extract of *Cascabela thevetia*. Furthermore, the dose of leaf extract of aforesaid plant can be recorded to compensate according to human consumption as it has been reported that all the parts of *Cascabela thevetia* is harmful. The study can be tried on various fruits to restrict the action of fruit flies, bacteria or fungus and thereby enhancing their shelf-life. The commercial application of leaf extract of *Cascabela thevetia* can therefore cause a revolution in the field of fruit markets.

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