

ANTIMICROBIAL ACTIVITY OF *PLANTAGO OVATA* FOR STAPHYLOCOCCUS SPECIES

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ABSTRACT

Plantago ovata (isabgol) is a medicinal herb used in traditional medicine for centuries. This study aimed to look into the antibacterial capabilities of ethanolic and methanolic extracts of *plantago ovata* seed husks. The 50-200mg ml⁻¹ concentrations of these extracts were tested against staphylococcus species using the disc diffusion method. Synthetic antibiotic discs were used as control. The seed of *plantago ovata* was dried at room temperature for ten days and then ground to a fine powder. then prepared to extract 10 ml of alcohol (ethanol or methanol) in 1 gram of plant powder. Centrifuge for 3000 rpm for 15 minutes and collect the supernatant using filter paper. The process was repeated three times. Prepare the MHA plate staphylococcus colony were isolated. Then using the disc method plant sample was taken 50-200 µl disc was tipped in the plant sample and placed in an MHA plate, and the control is a tetracycline antibiotic, then incubated at 37°C overnight. After incubation, measure the zone size in mm. With technological advancements, *plantago ovata* is being used as a dietary fibre supplement, majority laxative, and colon cancer care. Based on these findings, it can be concluded that these plants have an appropriate antimicrobial action and can be considered a new source of antibiotic discovery and development for infectious disease treatment.

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1. INTRODUCTION

Since the classical era, medicinal herbs have been employed [1]. There is evidence of using these natural resources (herbal remedies) in iron dating back to that time, and numerous scholarly records exist in this area [2]. Avicenna published several books on several disciplines, but he is perhaps best known for his laws of pharmacological activities, which include sections on the composition of medicine, general medicine, and other topics of interest that explain medicinal plants in detail [3]. Antibiotic resistance has been a worldwide concern, and this issue is particularly pressing in underdeveloped nations, where infectious diseases continue to be significant causes of morbidity and mortality among humankind [4-6]. Plants rapidly generate substances that defend themselves against insects, herbivores, and microbes. Herbs also may yield good antimicrobial metabolites as part of their normal growth and development cycle or in reaction to stressors [7].

Plantago ovata is a medicinal herb utilized in behbahan for centuries (Khuzestan, southwest of Iran). *Plantago ovata* is a winter annual plant that thrives in the northern hemisphere's arid regions between 26 and 36 degrees latitude [8, 9]. Psyllium has been the husk from *Plantago ovata*, and psyllium is the husk from the seed of *Plantago ovata*. This plant has hypocholesterolemic, antidiabetic, and low antioxidant properties [10, 11]. *Plantago ovata* powder has also been documented to produce allergic reactions in those exposed to it at work

[12]. The essential oil of this plant has been shown to have antibacterial and antifungal action in limited studies, but there have been no findings on its extract. This investigation aimed to examine if ethanolic and methanolic extracts of *Plantago ovata* seed husk have antibacterial activity against various clinical pathogens. *Plantago ovata* can help lower cholesterol levels in the blood, have an anti-diarrheal action, and regulate blood sugar levels. Although it has been used as a laxative, it is now more commonly utilized as a genuine dietary fiber that can help relieve constipation and mild diarrhoea symptoms.

2. METHOD

2.1. Sample Collection

The seed of plants was collected from an ayurvedic shop in chengalpattu - the most potent parts of the plants that could exhibit antimicrobial activity (Figure 1). The seeds are used to detect antimicrobial activity for staphylococcus species.



Figure 1. *Plantago ovata* seed

2.2. Preparation of *Plantago ovata* (isabgol) extract

The *Plantago ovata* seeds were obtained from an ayurvedic shop and were dried in sunlight. The dried seeds were then a powder. 2 grams of fine powder were dissolved in 20 ml of methanol in a conical flask. A cotton plug covered the extract to avoid solvent evaporation stored at room temperature for ten days. After ten days, the plant sample was filtered with the whatmann no.1 filter paper. Then centrifuge for 3000 rpm for Three minutes. This process was repeated three times, and collected the supernatant in a sterile container or tube. The test tube contains 20ml of plant extract (Figure 2).

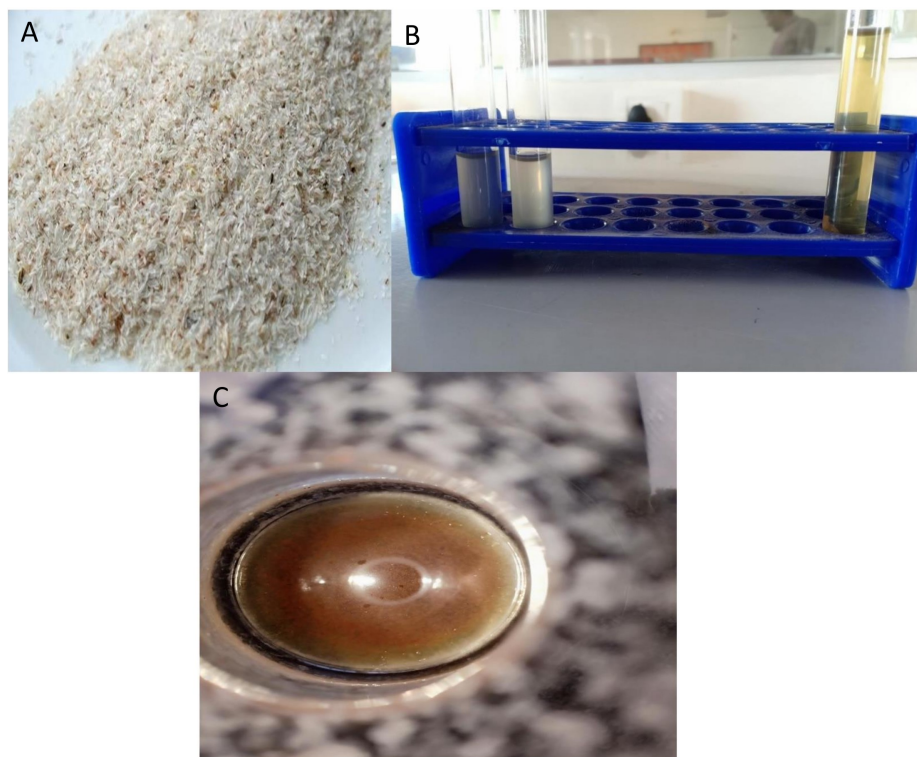


Figure 2. A. *Plantago ovata* seed; B. *Plantago ovata* extraction; and C. Methonolic extract of *Plantago ovata*.

2.3. Bacterial strains

Staphylococcus species.

2.4. Disc diffusion method

Disc diffusion method made by petri dish. Staphylococcus species were isolated from an infected urine sample to investigate the plant extract's antibacterial properties. The isolated species were inoculated in 5ml of peptone for 1 hour. After 1 hour, the colony were inoculated in mueller hindon agar medium. Prepare a disc using Whatman no.1 filter paper. The sterile filter paper disc was saturated in a different quantity of plant extract (50,100,150,200 μ l). Then the sterile filter paper disc was placed on a culture plate. To incubate 37 $^{\circ}$ c for 24 hours, the inhibition zone around each disc was measured in mm. Tetracyclin act as a positive control. Tetracyclin 250 mg antibiotic diluted to 10 ml of distilled water. The sterile filter paper was saturated with antibiotic solution and placed on a culture plate. To measure the inhibitory zone in mm.

3. RESULTS AND ANALYSIS

The above studies the zone of inhibition ranging (18mm,22mm,24mm,21mm) for respective concentration of (50,100,150,200 μ l) plant extract the synthetic antibiotic zone of inhibition (40mm,42mm). Infectious illnesses are among the most frequent diseases worldwide, costing human society a lot of money. In the last several decades, synthetic antibiotics have become increasingly significant in the control of bacterial illnesses. Nevertheless, due to the overuse of these prescriptions and the challenges associated with antimicrobial resistance, more herbal treatments are being used as antibiotic alternatives. The presence of phenolic chemicals, saponins, tannins, and flavonoids in plant organs is often associated with their antibacterial action. These chemicals' antibacterial characteristics are linked to their influence on cellular membranes or suppression of structural enzymes. *Plantago ovata* is one of the most prominent Indian medicinal plants medicine in India's southern regions. The extract showed an antibacterial impact against gram (+)ve staphylococcus species, according to the antibacterial investigations (Figure 3).

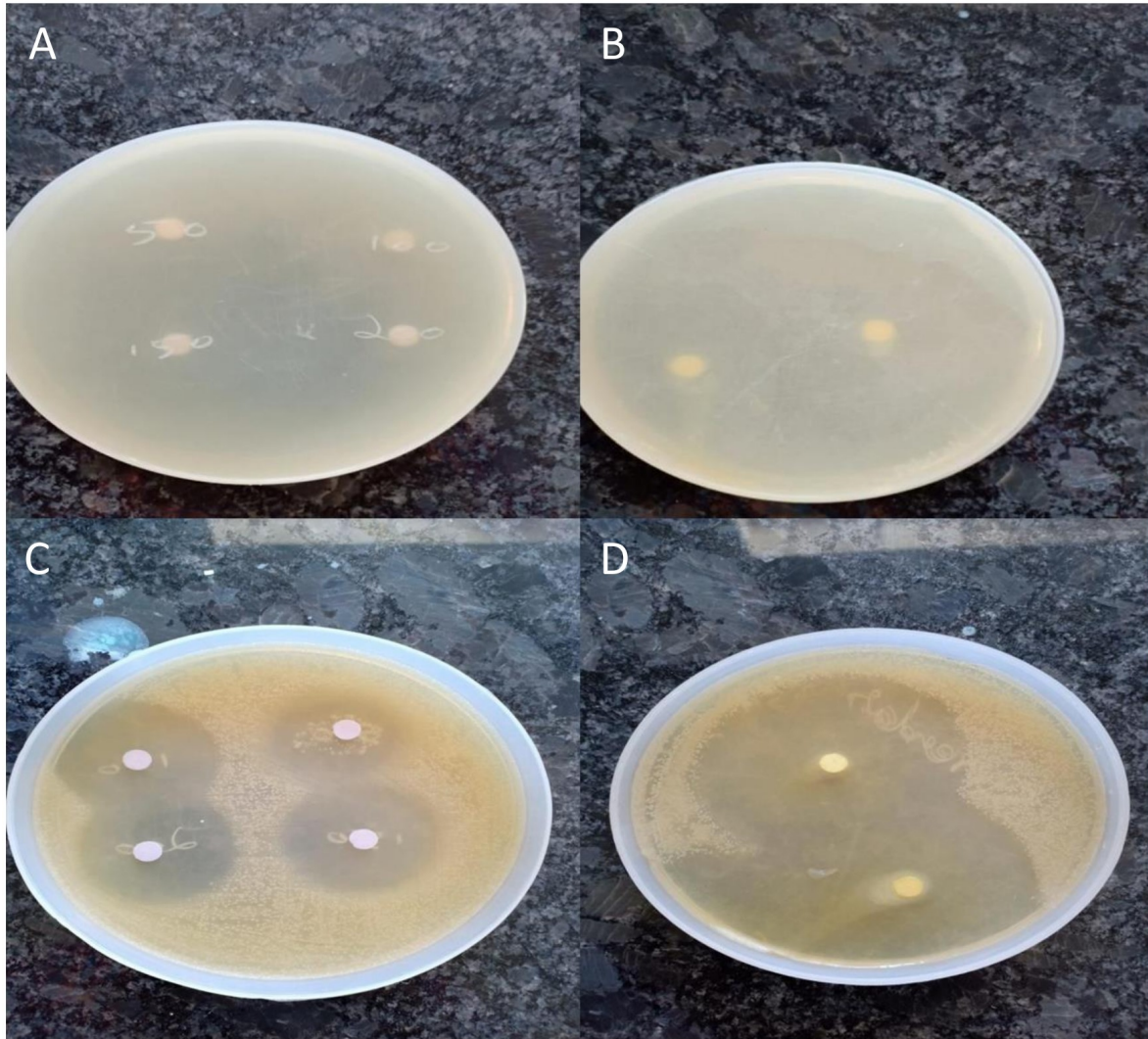


Figure 3. A. Isolation of *Staphylococcus* sp; B. Antibiotic (Before incubation) with plant extract; C. Zone of incubation *Staphylococcus* sp; and D. Zone of Incubation.

4. CONCLUSION

The *Plantago ovata* had antibacterial activity against gram-positive staphylococcus species. When compacted to antibiotic disc, the zone of inhibition of plant extract had very low antibacterial activity if we intake of antibiotic leads to causes the severe side effect of minimizing the side effect intake of plant extract leads to eradicate the gram(+ve) bacterial infection in a sustained manner.

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ETHICAL APPROVAL

The study was approved by the Institutional Ethics Committee.

COMPETING INTEREST

The authors declare no conflict of interest.

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