

# Anti-Bacterial Efficacy of *Cinnamomum Cassia* & *Moringaoleifera*

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## ABSTRACT

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**Introduction:** Food poisoning is one of the major illnesses around the world. Eating spoiled food is the leading cause of food poisoning. The reason behind is that spoiled food has a huge number of disease-causing bacteria, which include *Escherichia coli*, *Staphylococcus aureus*, *Bacillus subtilis* and *Bacillus cereus*. Medicinal plants are equipped with phytochemicals like tannins and flavonoids etc. More than 70% of the people in poor nations relies on traditional drugs made from plants. As a result, people are looking for such herbal plants more often. Above 500 medicinal plants have been identified and used in Asia, and about 800 medicinal plants have been used in the traditional medical practices of the region (Oladeji et al., 2020). Hippocrates, approximately 2500 years ago supported the maxim, "Let food be thy medicine and medicine be thy food," and it is currently gaining popularity. Nutrition and healthcare are closely related in traditional societies, and many plants have been used both as food and medicine (Singh, 2018).

**Objective:** The current study aim to authenticate the antibacterial potential of *Cinnamomum cassia* (Cinnamon) and *Moringaoleifera* (Sohanjna), using their ethanolic extract. The test strains include *Escherichia coli*, *Staphylococcus aureus*, *Bacillus subtilis* and *Bacillus cereus*.

**Methodology:** Test strains were obtained from Microbiology Lab, department of Zoology, University of Sargodha and following the biochemical characterization of test strains, serial dilutions were made for further processing. Plants are obtained from botanical arrangements of Department of Botany, University of Sargodha and their ethanolic extract was prepared using protocol of Joshi et al.(2020) for *Moringaoleifera* and Abdul rasheed et al.(2019) for *Cinnamomum cassia*. Agar well diffusion assay was used for MIC and zone of inhibition (Bereksi et al., 2018) study. Moreover, the plant extract was also characterized at various temperature and pH ranges.

**Results:** These plant's extract were found effective against the tested strains of bacteria, showing varying minimum inhibitory concentration (MIC), which was 50mg/ml used for both the medicinal plants under study. The size of zones of inhibition was observed to be improved with the increase in the concentration. In *Cinnamomum cassia*, the zones showed maximum sizes at 250 mg/ml. *Moringaoleifera* showed maximum growth inhibition at 150mg/ml especially against *Staphylococcus aureus* which was 4.5mm. Similarly, by varying temperature, the zone size also showed variations. At a higher concentration, the ethanolic cinnamon extract showed high antibacterial activity on lower temperatures and decreased with the increase in temperature. *Staphylococcus aureus*, *Bacillus subtilis* and *Bacillus cereus* showed maximum zones at acidic pH of 5, with sizes of 2.36mm, 2.23mm and 3.30mm respectively at a concentration of 250mg/ml. *Moringaoleifera* showed a prominent antibacterial activity against all bacteria at the concentrations 50mg/ml and 250mg/ml. One-way ANOVA was used to compare mean of all the values.

**Conclusion:** The study concluded that increase in concentration and temperature results in an increase in the antibacterial activity of *Cinnamomum cassia* and *Moringaoleifera*, while variation in pH showed variable trend in controlling the bacterial strains.

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**Keywords:** Cinnamomum cassia, Moringaoleifera ,Escherichia coli, Staphylococcus aureus, Bacillus subtilis and Bacillus cereus

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