

# Anti-Microbial Effect of Cardamom Extract on Staphylococcus Aureus: An Original Research Study

Nikan Makadia<sup>1</sup>, Manali Vaghasia<sup>2</sup>, Dhruv kumar Patel<sup>3</sup>, Hitesh Patel<sup>4</sup>, Reet Kaur<sup>5</sup>, Jeel Shah<sup>6</sup>

1- BDS, College Of Dental Sciences And Research, Ahmedabad. 2,6-BDS, AMC Dental College, Ahmedabad 3,4-BDS, Karnavati School Of Dentistry, Ahmedabad. 5- BDS, College Of Dental Sciences, Davangere.

Correspondence to:  
Dr. Nikan Makadia, BDS, College Of Dental Sciences And Research, Ahmedabad.  
Contact Us: www.ijohmr.com

## ABSTRACT

**Introduction:** Dental pathologies caused by bacterial, viral or fungal infections are acknowledged as the foremost human health problems throughout the biosphere. Cardamom also referred to as cardamon, is a strong spice made from seeds of variegated plants of Amomum with penetrating medicinal uses. **Aim:** The core aim was to weigh the efficacy of the antimicrobial effect of alcoholic extracts of cardamom seeds on staphylococcus aureus. **Materials and Methods:** The list of materials involved in the research includes cardamom, micro-organism staphylococcus aureus in the bacterial type culture collection, agar, and blood-agar plates. This was followed by armamentarium which includes standard scale along with weighing mechanism and centrifugal apparatus, plastic-lidded Petrie-dish for cell culture, disc punch and some quantity of distilled water and a bunch of disinfected flasks. There is an engagement of Ditch plate method in the research. **Results:** At 6% concentration, cardamom extract had zero anti-microbial activity while 18% and 30% concentrations revealed high activity against the bacteria. Thus, inflation in the anti-microbial activity was pragmatic as the concentration augmented from 6 to 30%. **Conclusion:** In conclusion, the results acquired from the study points that cardamom extracts had antimicrobial accomplishments against staphylococcus aureus when obtained to a necessary concentration.

**KEYWORDS:** Cardamom seeds, S. Aureus, Anti-Microbial Effect, Alcoholic Extracts

## INTRODUCTION

The customary utilization of plants and its products in the form of extracts from seeds have staged a vital role in the remedy of numerous pathologies.<sup>1</sup> Those groups of drugs owing to their origin in plants which are believed to possess medicinal value are referred to as the herbal groups.<sup>2</sup> The use of such traditional medicines in the form of Ayurveda has a staunch foundation in India, which is now widely followed in developed nations like the United States and Japan.<sup>3</sup> The World Health Organization conveyed that over 76% of the population in the world depend predominantly on traditional remedies that encompass the custom of herbal extracts or their dynamic ingredients. Such medicines have not only revealed positive results in general body infection but also have encouraging results in oral pathologies and infections.<sup>4</sup> Cardamom also referred to as cardamon, is a strong spice made from seeds of variegated plants of Amomum with penetrating medicinal uses. Amomum is a terrestrial herb which is found in plentiful magnitude in the Himalayas and is also cultured in Nepal and North-Eastern part of India.<sup>5</sup> The oil of cardamom extracted from Amomum has been studied comprehensively for its anti-microbial effect, and the results have been promising.<sup>6</sup>

Staphylococcus aureus was first identified in the year

1880 in Scotland from the pus obtained from an abscess in the knee joint. Since then it has been designated and characterized as a gram-positive bacterium accountable for extreme morbidity in the world. It is accountable for causing human infections in the skin and other tissues. Presently, it is amongst the top five most common bases of hospital-acquired infections. The bacterium has been reported to be resistant to an enormous number of antibiotics due to the transference of resistance genes on plasmid by transposons. It is imperative to get back to herbal medicines to reduce the dependency on antibiotics and hence the aim of the article was to weigh the efficacy of the antimicrobial effect of alcoholic extracts of cardamom seeds on staphylococcus aureus.

## MATERIALS AND METHODS

The current in-vitro study was piloted to assess the antimicrobial efficiency of variegated concentrations of cardamom extract against S. Aureus.

**Preparation of cardamom extracts:** Cardamom seeds were acquired from a local arcade and were desiccated in broad sunlight. It was subject to drying and grinding resulting into a fine uniform powder. The 10 g of finely

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powdered cardamom was then soaked with 100 ml of absolute methanol for 48 hours. It was then exposed to filtration with Whatman filter paper to gain a vibrant filtrate. The filtrate acquired was subsequently reduced at a squat temperature of less than 45°C to procure a solid filtrate of cardamom extract by eliminating the methanol. The extracts were kept in sterile bottles after which about 0.6 gram of such solid filtrated extract of cardamom was dissolved in 10 ml of di-methyl-formamide to attain 6% concentration of the cardamom extract. 1.8 gram of solid extract was dissolved in 10 ml of di-methyl-formamide to acquire 18% concentration of the cardamom, and 3.0 gram of solid extract was dissolved in 10 ml of di-methyl-formamide to acquire 30% concentration of the cardamom extract.

**Preparation of cultural media:** *Staphylococcus aureus* obtained from a local Culture Collection and Gene Bank was added to a liquid infused with nutrient referred to as the nutrient broth which was incubated at 37°C for a phase period of 24 hours. The additive culture is then cultured on the nutrient agar plate, and it was passed through an incubation cycle at a temperature of 37°C for a time period of 24 hours.

**Ditch plate method:** The anti-microbial efficiency of variegated concentrations of cardamom extract against *S. Aureus* was tested with the help of ditch plate method. Ditches were prepared in Petrie-dishes with the aid of a punch. The ditches were packed with the equivalent quantity of cardamom extract. The entire process was repeated to test the three different concentrations of cardamom extract. The ditch plates were then incubated at 37°C for a period of 48 hours.

**Study process:** The ditches were intended on the blood agar plates with the aid of a punch consisting of 3mm radius. An equal quantity of each of 6%, 18%, and 30% cardamom extracts was rested onto Petri dishes. The plates were kept at the normal temperature for a period of 1 hour which was then followed by incubation at 37°C for a period of 48 hours. The zone of inhibition was then scrutinized and noted in millimeters.

## RESULTS

Table 1 exhibits the effects of variegated concentrations of cardamom extracts on *S. Aureus*. There was nearly zero zone of inhibition detected with 6% cardamom extract. Zone of inhibition of 9.0 mm was witnessed with 18% cardamom extract, and zone of inhibition of 11.0 mm was witnessed with 30% cardamom extract.

Concentration of cardamom extracts	Zone of inhibition (in mm)
6%	0
18%	9.00
30%	11.00

TABLE 1 - Effects of variegated concentrations of cardamom extracts on *S. Aureus*

## DISCUSSION

Medicinal plants linger to be a vital beneficial aid for lightening the disorders of the human body.<sup>7</sup> Presently,

there is a rehabilitated curiosity in cultural medicine and a cumulative mandate for drugs from plant foundations. This revitalization of curiosity in plant-based medications is largely due to the existing prevalent certainty that Ayurveda is innocuous and more reliable than the exorbitant man-made medicines, most of them having adverse side-effects.<sup>8</sup> The presence of diversity in plants of medicinal use in India has made it possible to provide an alternate solution to the allopathic medicine used.

Cardamom is an Asian spice that instigated in countries like India and Nepal. Currently, it is reflected as the Crowned head of Spices and is the third most expensive spice in the world. Cardamom has various constituents in the form of vitamins and minerals like Vitamin A, riboflavin, sodium, calcium and phosphorous amongst many other. Recent studies have suggested that cardamom possesses the anti-carcinogenic properties, especially against colon-rectal cancer. A study by Mr.Sen and his associates have demonstrated that the use of cardamom in daily diet could significantly counteract cancer to just fewer than 50%. Cardamom has also been tested to reduce the cholesterol levels in the human body, thereby reducing the risk of the cardiac pathologies in the human body. The anti-depressive property of the cardamom is widely known along with its anti-spasmodic activity. Moreover, cardamom extract is also used in the formation of toothpaste and some mouthwashes to reduce the oral ulceration.

The anti-microbial property of cardamom is linked to its ability to inhibit the growth of the micro-organisms, especially acting against *S. Aureus*. In this particular study, a very negligible anti-microbial effect was perceived with 6% cardamom extract. 18% extract displayed some anti-microbial effect with a mean zone of inhibition of 9.0 mm. Nevertheless, the maximum anti-microbial effect was displayed by 30% extract with a zone of inhibition of 11 mm. The results of the current study could not be associated with other studies as this is perhaps the first study of its kind. Necessary revisions must be conducted to confirm the anti-microbial effect of cardamom extracts at higher concentrations.

## CONCLUSION

The anti-microbial activity of the cardamom extract was perceived with 6%, 18%, and 30% clove extracts. Anti-microbial action augmented as the concentration amplified from 6 to 30%. With the results attained from the study, it can be determined that cardamom extracts have anti-microbial property against *S. Aureus*.

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