

Can *Cerbera odollam* Fruit Extract Serve as an Anti-microbial Ingredient in Deodorants?

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Abstract

The antimicrobial activity of the methanolic extract of *Cerbera odollam* (suicide tree) seed kernel was studied against the common skin bacteria viz. *Staphylococcus epidermidis*, *Micrococcus luteus* and *Propionibacterium acnes*. *Cerbera* kernel methanolic extract failed to record significant antimicrobial effect when compared to Triclosan & Farnesol and hence its use for deodorant benefit may not be viable.

Keywords: *Cerbera odollam*, Suicide tree, Skin bacteria, deodorant, antimicrobial efficacy.

Introduction

Cerbera odollam Gaertn. (*Cerbera manghas* L.), commonly known as the Suicide tree, Pong-pong, and Othalanga, is a medicinal plant belonging to the family Apocynaceae, native to India and other parts of Southern Asia. It grows preferentially in coastal salt swamps and in marshy areas. It grows wild along the coast in many parts of Kerala, India and has been grown as a hedge between home compounds. It is cited that the fruit of this plant is extremely poisonous if ingested (1, 2, 3 & 4). The fruits are used for manufacturing bio-insecticides and deodorants (5). However, it is not clear whether the extract of the fruit of this plant has anti-microbial effects on skin bacteria to justify its use in deodorants. The present study was undertaken to study the anti-bacterial efficacy of methanolic extract of *Cerbera odollam* seed kernel by Agar dilution technique against common skin bacteria viz. *Staphylococcus epidermidis*, *Micrococcus luteus*, and *Propionibacterium acnes* and compare its activity with other common antimicrobial ingredients (Triclosan & Farnesol) used in

deodorants.

Materials and Methods

Collection of plant sample

The fruits of *Cerbera odollam* were collected from Cholayil Medicinal Plants Conservation Park, Velagapuram, Chennai, India and authenticated using regional flora (6). Description of fruit: The fruit, when still green, looks like a small mango, with a green fibrous shell enclosing an ovoid kernel measuring approximately 2 cm × 1.5 cm and consisting of two cross-matching white fleshy halves. On exposure to air, the white kernel turns violet, then dark grey, and ultimately brown or black.

Preparation of extracts

40 g of fresh kernels (from fresh and semi dried fruits) cut in to small pieces and extracted in methanol by cold maceration method (3 to 4 days) until the complete extracts were obtained. The combined extracts were concentrated on water bath at low temperature and the final residue was weighed.

Antimicrobial testing

Media: Soybean Casein Digest Agar (Hi-Media M 290).

Cultures: *Staphylococcus epidermidis*, *Micrococcus luteus*, and *Propionibacterium acnes*

Procedure:

1. The methanolic extract of *Cerbera odollam* was weighed at different concentrations ranging from 1, 2, 5, 10 and up to 150 mg directly in to sterile Petri plates.
2. 10 ml of molten medium was added and the actives were homogenized in the medium.
3. The plates were air dried to remove moisture.
4. Forty micro liters (μl) of culture suspension (10^3 dilutions) of 24-hour old test organisms were spread plated on to the media plates in triplicates.
5. Appropriate controls were maintained.
6. The plates were incubated at 37 °C for 3 days.
7. Growth was recorded.
8. Similar method was adapted for testing the efficacy of Triclosan and Farnesol against the test organisms simultaneously.

Interpretation Scale

The growth evaluation was done on a scale of

0 - Total inhibition on contact area

1 - Minimal growth on edge of contact area

2 - Occasional isolated micro-colonies on the contact area

3 - Small number of micro-colonies on the contact area

4 – Luxuriant growth on the contact area, same as control zone

Results

The activity of *Cerbera* extract was recorded to be in scale 4 for all organisms. (Growth is luxuriant and is almost comparable to control). There was no inhibition up to a concentration of 1.5 % for all the tested organisms. (Tables 1,2, 3 & Plates 1, 2). Triclosan inhibited all the test organisms at 0.1% level and Farnesol at 0.2% level

Table 1: Comparative activity of *Cerbera* extract with other antimicrobial ingredients on *Staphylococcus epidermidis*

S. No	Ingredients	Minimum Inhibiting concentration (in %) on <i>as is</i> basis
1	<i>Cerbera odollam</i> methanolic extract	Not active up to 1.5%
2	Triclosan	0.1%
3	Farnesol	0.2%

Table 2: Comparative activity of *Cerbera* extract with other antimicrobial ingredients on *Micrococcus luteus*

S. No	Ingredients	Minimum Inhibiting concentration (in %) on <i>as is</i> basis
1	<i>Cerbera odollam</i> methanolic extract	Not active up to 1.5%
2	Triclosan	0.1%
3	Farnesol	0.2%

Table 3: Comparative activity of *Cerbera* extract with other antimicrobial ingredients on *Propionibacterium acnes*

S. No	Ingredients	Minimum Inhibiting concentration (in %) on <i>as is</i> basis
1	<i>Cerbera odollam</i> methanolic extract	Not active up to 1.5%
2	Triclosan	0.1%
3	Farnesol	0.2%

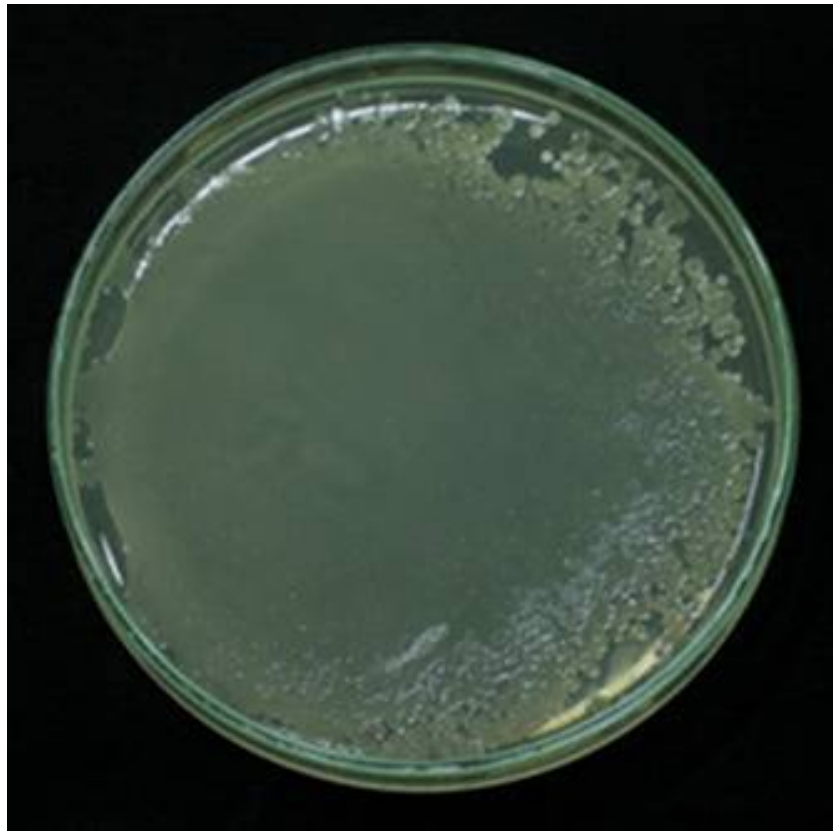


Plate 1: Control – *Staphylococcus epidermidis*



Plate 2: Luxuriant growth of *S. epidermidis*
at 1.5% methanolic extract of *Cerbera odollam*

Discussion and Conclusion

Body odour is a major concern, which results in social stigma and psychological stress in people all over the world. The eccrine or apocrine sweat secretions are odourless fluids.

The bacteria of the skin surface multiply using the lipids present in the apocrine secretions to produce lower chain fatty acids. Some of these fatty acids are volatile and malodor is associated with them. *Staphylococcus epidermidis*, *Propionibacterium acnes* and *Corynebacteria*, which represent the predominant flora of the skin surface, act in conjunction with the other Gram-positive skin bacteria in the formation of body odour (7 & 8). Any anti-microbial ingredient in a deodorant should therefore inhibit the growth of skin bacteria causing malodor. Hence it was planned to test the *Cerbera odollam* extract for its efficacy in inhibiting the growth of the common skin bacteria.

Cerbera odollam methanolic extract failed to record antimicrobial activity against *S. epidermidis*, *Micrococcus luteus*, and *Propionibacterium acnes* even up to a concentration of 1.5% as against the other common antimicrobials viz. Triclosan (0.1%) and Farnesol (0.2%) that is commonly used in deodorants. The study concludes that the methanolic extract of *Cerbera* kernel can not be used as an antimicrobial agent for consideration in deodorants. Further the literature cited concerns on its toxicity (1-4), also needs to be concerned and hence this study discourages the use of the extract of *Cerbera* fruit/kernel for cosmetic purposes such as use in deodorants.

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