Investigation of Antimicrobial Effect of Dry Distilled Extract of Cocos Nucifera Linn Endocarp

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Competing Interests:
Authors declares no competing interests.
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Author(s): Singla RK, Jagani H

Abstract

Endocarp of *C. nucifera* L.(Coconut fruit), a universally acceptable waste material is the plant part for our study. Dry distilled extract, RNDS, was prepared using the special procedure adopted by our lab. It was evaluated for its antimicrobial activity using Kirby bauer agar diffusion assay technique. In gram negative- *P. aeruginosa* & *E. coli* strains were used and in gram positive – *S. aureus* & *B. subtilis* were used, while four fungal strains like *A. oryzae*, *C. albicans*, *R. oligosporus* and *A. flavus* were part of current study. Results revealed that RNDS is expressing potential growth inhibition of *B. subtilis* and Aspergillus species. It was inactive against *R. oligosporus* at all concentrations.

Introduction

Herbal Medicine also called botanical medicine or phytomedicine refers using plant's seeds, berries, roots, leaves, stems, bark or flowers for medicinal purposes. The use of natural products with therapeutic properties is as ancient as human civilization [1-3]. Herbal Products are gaining progressively attention due to less toxicity and high efficacy against free radical mediated diseases[4]. Indian folk medicine comprises of numerous prescriptions for therapeutic purposes such a healing of wounds, inflammation, skin infections, leprosy, diarrhoea, scabies, venereal diseases ulcers, snakebite etc[5-21]. *C. nucifera* L., a plant of family Arecaceae, commonly known in the world as Coconut. Endocarp of *cocos nucifera* was supposed to be the hardest part of the its fruit, but ironically richest source of phenolic and flavanoid content. Scientific data has been found as evident for antioxidant, antibacterial, antifungal, vasorelaxant, antihypertensive of cocos nucifera endocarp[1-2, 10]. Dry distilled extract, RNDS, have significant total phenolic content and total flavanoid content. Till date, we had only used the clinical strains(Bacterial & fungal) to evaluate the growth inhibitory effects of RNDS, and results revealed that RNDS in inactive against all used clinical strains[2]. In the current study, we had taken the standard strains of bacterial and fungal species in consideration.

Materials & Methods

Collection & Authentication of Plant Material

Endocarps of *C. nucifera* Linn were collected from Kota village in Udupi district in the southwest part of Karnataka(India) and authenticated by Dr. Gopal krishna Bhat, Emeritus Professor, Department of Botany, Poorna Pragna College, Udupi, Karnataka, India. Voucher specimen were preserved for the future reference.

Preparation of Dry Distilled Extract (RNDS)

RNDS was prepared according to the standard procedure adopted by our lab[2].

Microorganisms Used

In bacterial strains, *P. aeruginosa*, *E. coli*, *B. subtilis* and *S. aureus* were used while *A. oryzae*, *C. albicans*, *R. oligosporus* and *A. flavus* fungal strains were used for the current study.

Antibacterial Assay

Standard procedure for antibacterial screening was adopted using Nutrient agar medium. Experiment was done in duplicate and mean of both the screenings were considered as results [2, 22-31].

Antifungal Assay

Standard procedure for antifungal screening was adopted using Potato dextrose agar medium. Experiment was done in duplicate and mean of both the screenings were considered as results [2, 22-31]. For each bacterial and fungal strains, individual positive control plates were also kept under study. Negative control for nutrient agar medium & potato dextrose agar medium were also kept under observation.

Results & Discussion

Table 1: Antibacterial Screening of Dry Distilled
Extract, RNDS of Cocos nucifera Endocarp.

See Illustration 1

Table 2: Antifungal Screening of Dry Distilled Extract, RNDS of Cocos nucifera Endocarp.

See Illustration 2

Dry distilled extract, RNDS, of the Cocos nucifera L. endocarp(hard shell) was prepared. It is oily in nature of density 1.079 gm/ml. Nutrient agar medium and the present environmental conditions duly supported the growth of P. aeruginosa, E. coli, B. subtilis and S. aureus. Similarly, Potato dextrose agar medium & present environmental conditions duly supported growth of A. oryzae, C. albicans, R. oligosporus and A. flavus. Negative controls had also provided us the worth output, favoring our mediums for the respective screening assays.

Previously, It has been evaluated for the antimicrobial activity using the clinical strains like MRSA, MSSA, E. coli, P. aeruginosa, E. faecalis, K. pneumonia, A. bauminii, C. Freundii, S. pyogens & C. albicans. Results revealed that RNDS had no growth inhibitory activity against these clinical strains[2]. But, we can observe here from Table 1, that RNDS is potential growth inhibitor for standard strains of P. aeruginosa, E. coli, S. Aureus, B. subitlis even at concentration of 200 µg/ml, out of all RNDS is highly significant inhibitor of B. subitlis, providing a clear zone of 26 mm at concentration 1000 µg/ml. Except R. oligosporus, RNDS is potentially good against all the fungal strains(Table 2). RNDS was found to be exceptionally good against Aspergillus species. Further exploration by isolating bioactive phytoconstituents from RNDS can be done.

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References


Illustrations

Illustration 1

Antibacterial Screening of Dry Distilled Extract, RNDS of Cocos nucifera Endocarp.

<table>
<thead>
<tr>
<th>Bacterial Strains</th>
<th>Zone of Inhibition (mm)</th>
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<tr>
<td></td>
<td>RNDS 200 µg/ml</td>
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<tr>
<td>P. aeruginosa</td>
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<tr>
<td>E. coli</td>
<td>13</td>
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<tr>
<td>S. aureus</td>
<td>14</td>
</tr>
<tr>
<td>B. subtilis</td>
<td>15</td>
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</tbody>
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Antifungal Screening of Dry Distilled Extract, RNDS of Cocos nucifera Endocarp.

<table>
<thead>
<tr>
<th>Fungal Strains</th>
<th>Zone of Inhibition (mm)</th>
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<tbody>
<tr>
<td></td>
<td>RNDS 200 µg/ml</td>
</tr>
<tr>
<td>A. oryzae</td>
<td>-</td>
</tr>
<tr>
<td>C. albicans</td>
<td>10</td>
</tr>
<tr>
<td>R. oligosporus</td>
<td>-</td>
</tr>
<tr>
<td>A. flavus</td>
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</table>
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