ANTIMICROBIAL ACTIVITIES ON FRESH LONGAN AND DRIED LONGAN SEED
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Abstract: The objective in this study was to screen antimicrobial activities against selected pathogenic bacteria of longan seeds extract as natural antimicrobial agents. Screening for antimicrobial activities of the selected fresh and dried longan seeds were performed against *Bacillus cereus*, *Staphylococcus aureus* and *Salmonella typhi*. Organic fresh and dried longan seeds have been prepared in fresh extract and alcoholic extract. The screening of antimicrobial activities on fresh extract and alcoholic extract were performed by using Agar Diffusion Method. Highest potential of alcoholic extracts from fresh longan seeds against *Bacillus cereus* were 13.25±0.75 mm, high potential against *Staphylococcus aureus* and *Salmonella typhi* were 11.75±0.75 and 11.00±0.00 mm respectively, while dried longan seeds showed highest potential against *Staphylococcus aureus* and *Salmonella typhi* were 17.00±1.00 and 15.50±4.50 mm respectively, high potential against *Bacillus cereus* were 9.50±0.50 mm. The fresh longan seeds of fresh extracts showed moderate potential against *Bacillus cereus* and *Salmonella typhi* were 8.25±1.25 and 8.00±2.00 mm respectively, low potential against *Staphylococcus aureus* were 6.25±0.25 mm. However, dried longan seeds fresh extracts showed no inhibition against selected pathogenic bacteria. Identification of active compounds and suitable purification method in these organic longan seeds have been suggested to further studies. The results from this study may lead to use longan seeds as natural drug in the near future.

Introduction: Longan (*Dimocarpus Longan* Lour.) is a fruit from warm climates grown in several Asian countries. In Thailand longan is one of the most important commercial fruit, harvest from June to August. Longan fruit contains several vitamins and minerals including iron, calcium and phosphorus and large amounts of vitamins C. The longan flesh between the peel and the seed is gelatinous and of pleasant flavor. The peel separates from the flesh readily. Only the flesh is consumed. Longan fruit is consumed fresh, dried, frozen and canned. Most of longan seeds are treated as the waste from their production process becoming the source of pollution. The objective in this study was to investigate longan seeds as natural antimicrobial agents. Antimicrobial activity of longan seeds has been proposed.

Methodology: All studied longan were purchased from a local market in Bangkok. The fresh and dried longan seeds were selected to screen for antimicrobial activities against *Bacillus cereus*, *Staphylococcus aureus* and *Salmonella typhi*. Organic fresh and dried longan seeds had been prepared in fresh extract by washing, peeling, separate seeds, drying for dried longan seeds, blending the seeds by using electrical blender, add amount distilled water and squeezing to get fresh extract. The alcoholic extracts have been done by soaking each of the blended longan fresh and dried seeds in 95 % Ethanol overnight (16 hrs.) followed by alcohol evaporation using Rotary evaporator (Buchi, Rotavap) to get alcoholic extract. The screening of antimicrobial activities on the fresh extracts and alcoholic extracts were performed by using Agar Diffusion Method. Antimicrobial activities were considered by inhibition zones produced. All data has been recorded. All experiment has been performed in duplication. Statistical analysis has been done by using SPSS program.
**Results, Discussion and Conclusion:** The results of this study showed antimicrobial activities of fresh and dried longan seeds were tested against *Bacillus cereus*, *Salmonella typhi* and *Staphylococcus aureus*. Fresh longan seeds from fresh extracts indicated moderate potential antibacterial activity against *Bacillus cereus* and *Salmonella typhi* were 8.25±1.25 and 8.00±2.00 mm respectively of inhibition zone produced as shown in Table 1 and Figure 1(A), 3(A) and showed low potential antibacterial activity against *Staphylococcus aureus* were 6.25±0.25 mm of inhibition zone produced as shown in Table 1 and Figure 2(A). Dried longan seeds fresh extracts showed no inhibition activities as shown in Table 1 and Figure 1(B), 2(B), 3(B). All alcoholic extracts from fresh and dried longan seeds showed inhibition zone produced against *Bacillus cereus* were 13.25±0.75 and 9.50±0.50 mm as shown in Table 1 and Figure 1, against *Staphylococcus aureus* were 11.75 ± 0.75 and 15.50±4.50 mm as shown in Table 1 and Figure 2 and against *Salmonella typhi* were 11.00±0.00 and 17.00±1.00 mm as shown in Table 1 and Figure 3. Fresh longan seeds alcoholic extracts in this study show highest potential antibacterial activity against *Bacillus cereus*, high potential antibacterial activity against *Staphylococcus aureus* and *Salmonella typhi*. While dried longan seeds alcoholic extracts showed high potential against *Bacillus cereus*, highest potential against *Staphylococcus aureus* and *Salmonella typhi*. Identification of active compounds and suitable purification method in these organic longan seeds have been discussed and suggested to further studies. The waste utilization of longan seeds have been concerned on natural drug development. The result from this study indicates the possibility to use longan seeds as antimicrobial agent in the near future.

**Table 1.** Antimicrobial activities from fresh longan seeds and dried longan seeds extract with inhibition zone produced against *Bacillus cereus*(B. cereus),*Salmonella typhi* (S. typhi) and *Staphylococcus aureus* (S. aureus) by using Agar Diffusion Method.

<table>
<thead>
<tr>
<th>Type of Sample</th>
<th>Fresh Extracts</th>
<th>Alcoholic Extracts</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td><em>B. cereus</em></td>
<td><em>S. aureus</em></td>
</tr>
<tr>
<td>Fresh Longan Seeds</td>
<td>8.25±1.25</td>
<td>6.25±0.25</td>
</tr>
<tr>
<td>Dried Longan seeds</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>Ampicillin (10 µg/disc)</td>
<td>14.25±1.75</td>
<td>12.75±0.75</td>
</tr>
<tr>
<td>95% Ethanol (20 µl/disc)</td>
<td>-</td>
<td>-</td>
</tr>
</tbody>
</table>

**Interpretation:**
- Clear zone ≥ 6 - 7 mm low potential antibacterial activity
- Clear zone > 7 - 9 mm moderate potential antibacterial activity
- Clear zone > 9 - 12 mm high potential antibacterial activity
- Clear zone > 12 mm highest potential antibacterial activity

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Figure 1. Antimicrobial activity against *B. cereus* of Fresh longan seed extract (A) including Alcoholic Extracts (a) and Fresh Extracts (b), Dried longan seeds extract (B) including Alcoholic Extracts (c) and Fresh Extracts (d)
Figure 2. Antimicrobial activity against *S. aureus* of Fresh longan seed extract (A) including Alcoholic Extracts (a) and Fresh Extracts (b), Dried longan seeds extract (B) including Alcoholic Extracts (c) and Fresh Extracts (d)

Figure 3. Antimicrobial activity against *Salmonella typhi* of Fresh longan seed extract (A) including Alcoholic Extracts (a) and Fresh Extracts (b), Dried longan seeds extract (B) including Alcoholic Extracts (c) and Fresh Extracts (d)
References:
5. Lorian V. Antibiotic in Laboratory Medicine, 3rd edition Williams & Wikins, Mary land, USA 1991.

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Keywords: antimicrobial activities, longan, longan seed, longan seed extract, natural antimicrobial agent