**Research Article**

**Assessment of antiasthmatic activity of *Carissa carandas* L. leaves**

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**Abstract**

**Objective:** The objective of research work was to assessment of anti-asthmatic activity of *Carissa carandas* L. leaves. **Material and methods:** *Carissa carandas* L leaves was collected locally from Bhopal local region. Herbarium was prepared and submitted at department of botany, Safia College, Bhopal for authentication and was submitted herbarium specimen no.301 /Bot/Safia/2018. The plant material was extracted with methanol solvent using soxhlet apparatus. The phytochemical tests were performed and investigated the anti-asthmatic activity using goat trachea model. **Results:** Anti-asthmatic activity of methanolic extract of *Carissa carandas* leaves were investigated, with different concentration of extract as 40mg/ml, 80mg/ml, 120mg/ml, 160mg/ml and 200mg/ml respectively. The highest anti-asthmatic activity was found at 200 mg/kg of dose given and 62.213% of protection was observed, which was comparable to the percentage of standard chlorpheniramine maleate. **Conclusion:** The methanolic extract of *Carissa carandas* L. leaves were showed significant activity on isolated goat trachea chain model. The results of activity confirmed that it is can be used in the treatment of respiratory diseases.  

**Keywords:** Asthma, *Carissa carandas* L. leaves, extract, phytochemical screening

**Introduction**

The most common respiratory disease is asthma and it is the chronic condition, tedious to cure. 17-18 million people in United States are being affected by Asthma and in the last 20 years it is found to be increased about 75 %. As per the current status of asthma patients about 1 out of 13 children and 1 out of 20 adults are suffering from Asthma. It has been found that since 1980 number of cases of Asthma was increased for the children under the age of 5 years this alarming fact cannot be ignored. Children in school age 75% has captured by Asthma. 15-20 million asthmatic patients are estimated only in India. Data of death because of Asthma from developed countries reveals that the rate varies from 0.2-0.8 per 100,000 persons aged 6-35 (Nichols and Longworth, 1995). Symptomatic relief is pointing requirement for curing the attack of asthma by Ayurveda, Unani and traditional system. One of the most elite plants is mentioned in Ayurveda and Unani system for the treatment of Asthma (Shukla et al., 2011; Nichols et al., 1995).

The *Carissa carandas* L. locally called “karanda. It has been recognized in different system of traditional medicine to cure different diseases. It contains many potential phytochemical constituents related to terpenoids category. It has been reported bitter, stomachic, antidiarrhoeal and anthelmintic properties, while its leaves are prescribed in remittent fever, erache, soreness, hepatic-protective and syphilitic pain of the mouth only. A tincture of fruits has been used in infections and skin infections and a decoction of wood is employed as a tonic to strengthen the tendons of slim patient. The unripe fruit has been traditional used as an astringent. The others reported pharmacological activities of *Carissa carandas* are cardiotonic, hepatoprotective, free radical scavenging and xanthine oxidase inhibitory, histamine releasing, antirhematic, antibacterial, antiviral, anticonvulsant activity, asthmatic activity and H+ K ATase activity (Charde et al., 2011, Shukla et al., 2016). All these pharmacological activities showed, this plant might have potential source of bioactive compounds. Hence it needs to investigate and find out the structure of bioactive compounds. Consequently I was selected the leaves of this plant for further investigation of asthmatic activity of

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Carissa carandas plant leaves (Shukla et al., 2016).

Collection and authentication of plant material
Plant material was collected locally from Bhopal. Herbarium was prepared and submitted at botany department of Safia College, Bhopal for authentication. The plant authentificated by Dr. Ziaul Hasan, Department of Botany, Safia Science College, Bhopal. A voucher specimen no.301 /Bot/Safia/2018 of the plant.

Preparation of extract
Carissa carandas leaves of plant material were washed and air dried under shade. Dried leaves were crushed to fine powder using grinder at Pinnacle Biomedical Research institute (PBRI), Bhopal, India. An extraction method was applied to obtain a crude plant extract. About 150 gm powder of selected medicinal plants was subjected to extraction by using the 40-60°C petroleum ether solvent (for de-fatting) in a Soxhlet extractor. After defating the dried powder drug was extracted with solvent methanol and was continued extraction process until the solvent in the thimble became clear. After the effective extraction, solvents were concentrated at room temperature by distillation and using a rotary evaporator (Gucchi rota evaporator) and the extract obtained with each solvent was weighed. Its percentage was calculated. These extracts were stored in refrigerator. These extracts were subjected to chemical investigation. Dried extracts were kept in refrigerator and used for further investigation.

Chemicals
Histamine dihydrochloride, acetylcholine chloride, ketotifen, compound 48/80 were taken from Sigma-Aldrich Chemical Co., USA. All the other chemicals were of analytical grade used.

Phytochemical Screening
Preliminary phytochemical tests were performed on methanolic extract of Carissa carandas for the identification of phytochemical such as alkaloid, saponin, tannin, flavonoid, phenol, steroid and triterpenoids etc (Gupta et al., 2015; Bhati et al., 2014).

Isolated goat tracheal chain preparation
Isolated adult Goat tracheal tissue was obtained from the slaughter house and immediately Trachea was dipped into the bath of Kreb's solution, containing: NaCl 6.9, KCl 0.35, CaCl 0.28, MgSO 0.28, NaHCO 2.1, KHPO 0.16 and Glucose 2.0 g/litre, which was continuously aerated and maintained at 37 ± 0.5°C. Tissue was allowed to equilibrate for 45 min. under a load of 400 mg. After that trachea was cut into individual rings and tied together in series to form a chain. Dose response curves for histamine were recorded at variant molar concentrations, by maintaining 15 min time cycle. After obtaining a dose response curve of histamine (30μg/ml) on trachea, the Carissa carandas Linn extract (400μg/ml) was added to the reservoir and the same doses of histamine were repeated. Graph of percentage of maximum contractile response on ordinate and negative logarithm of molar concentration of histamine on abscissa was plotted to record dose response curve of histamine, in absence and in presence Carissa carandas Linn extract (Chaudhari et al., 1994; Gokhale et al., 1996).

Statistical analysis
All data were statistical analyses by using One-way analysis of variance (ANOVA) followed by Tukey's multiple comparison of the results in the all observations.

Results and discussion
The current study of the methanolic extract of leaves part of Carissa carandas were performed for the screening of anti-asthmatic activity of drug. The bronchial asthma disease, it is one of the chronic inflammatory diseases which produce

<table>
<thead>
<tr>
<th>Histamine (2.5 μg/ml)</th>
<th>Control group (% Maximum contraction)</th>
<th>Concentration of plant extract</th>
<th>Test group (% Maximum contraction)</th>
</tr>
</thead>
<tbody>
<tr>
<td>0.1</td>
<td>24.417±2.301</td>
<td>40mg/ml</td>
<td>13.412±1.162</td>
</tr>
<tr>
<td>0.2</td>
<td>51.011±3.562</td>
<td>80mg/ml</td>
<td>27.361±1.875</td>
</tr>
<tr>
<td>0.4</td>
<td>72.340±1.680</td>
<td>120mg/ml</td>
<td>44.67±2.968</td>
</tr>
<tr>
<td>0.8</td>
<td>89.737±1.321</td>
<td>160mg/ml</td>
<td>53.580±2.010</td>
</tr>
<tr>
<td>1.6</td>
<td>91.140±2.369</td>
<td>200mg/ml</td>
<td>62.213±4.842</td>
</tr>
</tbody>
</table>

Effect of the methanolic extract of Carissa carandas leaves (as) on histamine-induced contraction on the isolated goat tracheal chain preparation and the isolated guinea pig ileum preparation was tabulated. All values are expressed as mean±SEM of a sample size of n=6; level of significance chosen was *p<0.05. All treated groups were compared with control group.

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bronchoconstriction and inflammation in airway pathway that is accountable for the overexcited bronchial sensitivity to most of the stimuli likes' mast cell, T-lymphocytes and eosinophils. The contractile responses produce by various agents such as histamine, acetylcholine, bradykinin and 5-hydroxyltrytamine are responsible. The methanolic extract of leaves part of Carissa carandas was effect the right side shift of dose response curve in isolated goat chain. It is indicating anti-asthmatic action of drug extract (Table 1).

Anti-asthmatic activity were screening with different concentration of methanolic extract of Carissa carandas leaves such as 40mg/ml, 80mg/ml, 120mg/ml, 160mg/ml and 200mg/ml respectively. The highest anti-asthmatic activity were found at 200 mg/kg of dose given and 62.213% of protection was observed which is the very near to the percentage of 91.14% of standard chlorpheniramine maleate. 200mg/kg was found to be effective (p< 0.01) dose because this dose had statistical significance in post treated exposition and mean exposition time. Decrease in activity was found as the amount of dose increased (Table 1).

The steroidal bioactive compounds of Carissa carandas might be more effective in asthma treatment (Mitra et al., 1999). Extract of methanolic extract Carissa carandas leaves contains steroidal nucleus in the form of triterpenoides and many various sapogenins and saponin glycosides. So antiasthmatic activity showed by Carissa carandas may be because of these chemical moieties.

Conclusion

It can be concluded that the methanol extracts of Carissa carandas Linn leaves, possess potent anti-asthmatic and bronchodilator activity in-vitro. The test results revealed that the methanolic extract of plant may have anti-asthmatic and bronchodilator activity. It needs to explore and do some more research work to elucidate the structure of compounds which is responsible for the activity.

Declaration of interest

The authors report no conflicts of interest.

References


