EVALUATION OF THE POTENTIAL ROLE OF AQUEOUS LEAVES EXTRACT OF AVERRHOA CARAMBOLA FOR IN VITRO ANTICANCER STUDIES

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Received: 12 November 2023, Revised and Accepted: 16 January 2024

ABSTRACT

Objective: Averrhoa carambola is known as a tree. Averrhoa carambola leaves are commonly used in Ayurvedic and traditional Chinese medicine is used for inflammatory skin disorders and fungal skin infections. The leaves of star fruit are rich in Vitamin C and bioactive compounds such as phenols and flavonoids abundant sources of antioxidants.

Methods: The qualitative phytochemical study of these plant extracts indicates the presence of tannins, saponins, flavonoids, alkaloids, proteins, and phenol. The herb has been used traditionally from antiquity, in the treatment of neurological health, memory issues, and breast cancer. It chiefly possesses the pharmacological study.

Results: Plant explains about antibacterial, antioxidant, antifungal, anticatalytic, and antiviral activities. The work is an endeavor to explore and assemble the various pharmacological action and pharmacognostic aspects of the leaves A. carambola reported to date.

Conclusion: The current research has shown that natural sources have therapeutic properties without much toxicity. This potential of plants is due to the presence of secondary metabolites. The results prove that A. carambola leaf extract has antioxidant, antibacterial, and antifungal activity. In addition to this, the present investigation revealed that A. carambola leaf extract can act as a potential drug for treating breast cancer.

Keywords: Ayurvedic, Skin disorders, Fungal skin infection, Phenols, Flavonoids, Antioxidants.

INTRODUCTION

Averrhoa carambola bioactive compounds are responsible for medicinal properties. Averrhoa Carambola has proved to be effective in curing multiple diseases [1]. The percentage of antioxidant activity was assessed by DPPH and the reducing power of the extract was also determined [2]. The bioactive compounds were analyzed in photochemical screening and antibacterial and antifungal activity was also determined [3].

The project will be carried out on A. carambola as a chemotherapeutic agent [5]. Thus, it can be stated that these leaves are suitable drugs and can be further explored and exploited to meet the global demand for natural, cost-efficient, and safer bioactive compounds. A. carambola contains tannins, saponins, flavonoids, alkaloids, proteins, and phenols [6]. The pharmacological investigations revealed that they possessed antibacterial, antioxidant, anticancer, and antidepressant [7].

METHODS

Leaves of A. carambola leaves treated with cold extraction of phytochemical analysis, antioxidant activity, and in vitro cytotoxicity using VERO cell lines.

Cold extraction

10 g of sample was weighed and soaked in 100 mL of aqueous. The extract was allowed to stand overnight and filtered using sterile filter paper. The filtrate was collected and incubated at room temperature for evaporation. Then measure the weight and find the yield by calculating.

\[ \text{Yield} = \text{initial weight} - \text{final weight} \]

Aqueous extract [2.12 g/10 g leaves powder]

DISCUSSION

The A. carambola leaves were extracted using aqueous. The yield was observed in aqueous extract (2.12 g/10 g leaves powder). Similarly, Shu et al. (2014) reported that leaves and fruits from A. carambola (10 g) were extracted thrice with acetone: water (7:3). The final yield of acetone: water extracts (AWE) of leaves and fruits was 430 g and 579 g, respectively [8].
Table 1: Phytochemical analysis of aqueous extract of *Averrhoa carambola* leaves

<table>
<thead>
<tr>
<th>S. No</th>
<th>Contents</th>
<th>Aqueous extract of <em>Averrhoa carambola</em> leaves</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td>Tannins</td>
<td>+</td>
</tr>
<tr>
<td>2.</td>
<td>Saponin</td>
<td>+</td>
</tr>
<tr>
<td>3.</td>
<td>Flavonoids</td>
<td>+</td>
</tr>
<tr>
<td>4.</td>
<td>Alkaloids</td>
<td>+</td>
</tr>
<tr>
<td>5.</td>
<td>Proteins</td>
<td>+</td>
</tr>
<tr>
<td>6.</td>
<td>Steroid</td>
<td>-</td>
</tr>
<tr>
<td>7.</td>
<td>Quinones</td>
<td>-</td>
</tr>
<tr>
<td>8.</td>
<td>Terpenoid</td>
<td>-</td>
</tr>
<tr>
<td>9.</td>
<td>Cardiac Glycosides</td>
<td>-</td>
</tr>
<tr>
<td>10.</td>
<td>Phenol</td>
<td>+</td>
</tr>
</tbody>
</table>

(+): positive  (-): negative

Table 2: Hydroxyl radical scavenging assay

<table>
<thead>
<tr>
<th>Concentration (µg)</th>
<th>Blank 0.45</th>
<th>100</th>
<th>200</th>
<th>300</th>
<th>400</th>
<th>500</th>
</tr>
</thead>
<tbody>
<tr>
<td>Standard OD</td>
<td>3.11</td>
<td>0.31</td>
<td>0.25</td>
<td>0.19</td>
<td>0.15</td>
<td>0.11</td>
</tr>
<tr>
<td>% inhibition</td>
<td>31.1</td>
<td>44.4</td>
<td>57.7</td>
<td>66.6</td>
<td>75.5</td>
<td></td>
</tr>
</tbody>
</table>

Phytoconstituents of the *A. carambola* aqueous extract of leaves were analyzed qualitatively. Our results showed the presence of tannin, saponin, flavonoid, protein, alkaloid, and phenol in the aqueous extracts[9]. These secondary metabolites could be the source of the therapeutic effects. Pal *et al.* (2019) revealed that the preliminary phytochemical screening of...
The amount of total unsaturated fatty acids in leaves of A. carambola comprised more than 77% of total fatty acid by weight. This high percentage of unsaturation indicates the presence of secondary metabolites, which are known to play a significant role in the biological activities of the plant.

The results prove that A. carambola leaf extract has antioxidant, antibacterial, and antifungal activity. In addition to this, the present investigation revealed that A. carambola leaf extract can act as a potential drug for treating breast cancer. Toxicity and antitumor activity of the sample were evaluated by VERO cell lines and cancer efficacy was found to be low at a low concentration compared to cytotoxicity. Hence, the study has proven that it could be recommended for the pharmaceutical industry.

CONCLUSION

The current research has shown that natural sources have therapeutic properties without much toxicity. This potential of plants is due to the presence of secondary metabolites.

ACKNOWLEDGMENT

The author appreciates the Department of Biotechnology and Biochemistry. Plant authentication is done by the Department of Biotechnology laboratory, Faculty of Biochemistry, Annamalai University Chidambaram for synthesis, biological activities analysis in the Annamalai University, Department of Biotechnology and Biochemistry.

AUTHORS CONTRIBUTION

The author declares no conflicts of interest

REFERENCES