Short report

Antibacterial activity of xanthorrhizol from Curcuma xanthorrhiza against oral pathogens

J.K. Hwang*, J.S. Shim, Y.R. Pyun

Department of Biomaterials Science and Engineering & Bioproducts Research Center, Yonsei University, Seoul 120-749, South Korea

Received 11 September 1999; accepted in revised form 2 November 1999

Abstract

The antibacterial activity of xanthorrhizol, isolated from the methanol extract of Curcuma xanthorrhiza roots, was evaluated against oral microorganisms in comparison with chlorhexidine. © 2000 Elsevier Science B.V. All rights reserved.

Keywords: Curcuma xanthorrhiza; Xanthorrhizol; Antibacterial activity

Plant. Curcuma xanthorrhiza Roxb. (Zingiberaceae), dried rhizomes collected in Yokjakarta, Indonesia, in January 1998 and identified by Dr N.I. Baek, Institute of Life Science, Kyunghee University, Yongin 449-701, Korea. A voucher specimen is deposited in Bioproducts Research Center, Yonsei University.

Uses in traditional medicine and reported activities. Curcuma xanthorrhiza has been traditionally used to treat stomach diseases, liver disorders, constipation, bloody diarrhoea, dysentery, children’s fevers, haemorrhoids, and skin eruptions [1,2]. Antitumor [3], hypotriglyceridaemic [4], anti-inflammatory [5], and hepatoprotective [6] activities have been reported.

* Corresponding author.
E-mail address: jkhwang@yonsei.dcc.kr (J.K.Hwang)
Previously isolated constituents. Arturmenone, \( \alpha \)-curcumene, \( \beta \)-curcumene, curzerenone, germacrene, \( \beta \)-sesquiphellandrene, \( \alpha \)-turmerone, \( \beta \)-turmerone, and xanthorrhizol [7].

Tested material. Xanthorrhizol (1,3,5,10-bisabolatetraen-3-ol) [8] (yield: 0.2%), isolated from the EtOAc soluble fraction (4.8) of the MeOH extract (11.2).

Studied activity. Antibacterial activity determined in terms of minimum inhibitory concentration (MIC) [9] and minimum bactericidal concentration (MBC) [10] using chlorexidine as active reference substance.

Used microorganisms. Listed in Table 1.

Table 1
Antibacterial activity of xanthorrhizol

<table>
<thead>
<tr>
<th>Bacteria</th>
<th>Xanthorrhizol</th>
<th>Chlorhexidine</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>MIC</td>
<td>MBC</td>
</tr>
<tr>
<td>Actinomyces viscosus KCTC 9146</td>
<td>16</td>
<td>16</td>
</tr>
<tr>
<td>Candida albicans ATCC 10231</td>
<td>125</td>
<td>250</td>
</tr>
<tr>
<td>Lactobacillus casei ATCC 4646</td>
<td>250</td>
<td>500</td>
</tr>
<tr>
<td>Lactobacillus acidophilus ATCC 4356</td>
<td>500</td>
<td>500</td>
</tr>
<tr>
<td>Porphyromonas gingivalis W50</td>
<td>32</td>
<td>32</td>
</tr>
<tr>
<td>Streptococcus mutans ATCC 25175</td>
<td>4</td>
<td>4</td>
</tr>
<tr>
<td>Streptococcus salivarius ATCC 13419</td>
<td>4</td>
<td>8</td>
</tr>
<tr>
<td>Streptococcus sobrinus ATCC 23751</td>
<td>4</td>
<td>4</td>
</tr>
<tr>
<td>Streptococcus sanguis ATCC 35105</td>
<td>4</td>
<td>8</td>
</tr>
</tbody>
</table>

\( ^a \)MIC, MBC as \( \mu \text{g/ml} \).

Results. Reported in Table 1.

Conclusions. Xanthorrhizol exhibited the highest antibacterial activity against Streptococcus species causing dental caries [11] and also demonstrated antibacterial potential against \( A. \) viscosus and \( P. \) gingivalis which are responsible for periodontitis [12]. In contrast, \( C. \) albicans and Lactobacillus species were somewhat resistant to xanthorrhizol. These results suggest that xanthorrhizol could find application in food and dental products for preventing oral diseases.

Acknowledgements

This work was supported by the Korea Science and Engineering Foundation (KOSEF) through the Bioproducts Research Center at Yonsei University.
References