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Anti-TB and Antibacterial Activities of Natural Products Extracts

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Samples of numerous plant species were received from the southwestern part of the USA from Richard Spjut, and plant samples were collected here in Illinois. All were extracted with typical solvents, giving crude residues, some of which were submitted for anti-TB and/or antibacterial testing. In some cases, crude extracts were subjected to chromatographic methods. Some of the fractions were submitted for testing.

Abstract

Antibacterial Data

<table>
<thead>
<tr>
<th>Sample</th>
<th>MIC [μg/ml]</th>
<th>MIC [μM]</th>
</tr>
</thead>
<tbody>
<tr>
<td>60-1</td>
<td>64</td>
<td>256</td>
</tr>
<tr>
<td>62-4</td>
<td>32</td>
<td>128</td>
</tr>
<tr>
<td>64-3</td>
<td>32</td>
<td>128</td>
</tr>
</tbody>
</table>

Antibacterial Data

<table>
<thead>
<tr>
<th>Sample</th>
<th>MICs in μg/mL</th>
</tr>
</thead>
<tbody>
<tr>
<td>60-1</td>
<td>S. aureus: 64, P. aeruginosa: 256, E. faecium: 64</td>
</tr>
<tr>
<td>64-3</td>
<td>S. aureus: 32, P. aeruginosa: 128, E. faecium: 16</td>
</tr>
</tbody>
</table>

Results, Conclusions, and Further Work

We sent crude residues, selected CCC fractions, and one FCC fraction (P8) to the Institute for Tuberculosis Research, College of Pharmacy, University of Illinois at Chicago, where they were tested for anti-tuberculosis activity, as shown in the “ANTI-TB DATA” table.

As for CCC, which we applied only to the sw/usa samples, and using one of our active crude samples, DA-1, as an example, although its MIC (minimum inhibitory concentration) values were appreciably above those of known anti-TB compounds (RMP, INH, and PA824) used as “standards” for comparisons, we submitted DA-1 (a crude residue) to CCC, and had selected fractions tested for anti-TB activity, to see if one or more of the fractions had about the same or higher activity than the crude residue. Since at least one of those fractions, DA-19, had about the same activity, we expect that it contains at least one of the active compounds. Therefore, we figure that DA-19 is worthy of further purification.

We did the same thing with another crude residue, DA-17. One of its fractions, DA-3, showed higher activity than DA-17. How much higher we don’t know because (of course) we don’t know how high “>50” really was (for DA-17) and hence we don’t know how low its activity really was. DA-3 is also worthy of further purification. Next, we plan to do the same thing with crude residue, DA-12.

As for FCC, which we applied only to the plant samples collected here in Illinois, fraction P8 had anti-TB activity (43.1), but none of the other FCC fractions had any anti-TB activity. We figure that P8 is worthy of further purification.

We also sent crude sw/usa residues to Notre Dame University for antibacterial testing. Three had activity against one or more of the bacterial species included in this study, as shown in the ANTIBACTERIAL DATA table. All samples had values of 256 or >256 for E. coli, E. aerogenes, A. baumanii, and K. pneumoniae, so these bacterial species are not included in the table.

References


Xiao-Tian Liang, Wei-Shuo Fang (editors), Medicinal Chemistry of Bioactive Natural Products (2006), Wiley-Interscience.