Abbreviations: DMBA, 7,12-dimethylbenz[a]anthracene; TPA, 12-O-tetradecanoylphorbol-13-acetate

Fig. 1. Structures of E- and Z-Ajoenes.

Z-ajoene was used in these experiments.
Fig. 2. Inhibition by Ajoene of Tumor Promotion by TPA.
All mice were initiated with DMBA and promoted with TPA given twice weekly starting 1 week after initiation. A, Percentage of mice bearing tumors. B, Mean number of tumors per mouse. Solid circles (group I), positive control; open circles (group II), treated with 50 μg of ajoene before TPA; open triangles (group III), treated with 100 μg of ajoene before TPA; open squares (group IV), treated with 250 μg of ajoene before TPA. Each value is expressed as the mean ± SE for 5 mice.

Table 1. Inhibition by Ajoene on the Promotion of Skin Tumor Formation

<table>
<thead>
<tr>
<th>Group</th>
<th>Treatment</th>
<th>Mean no. of tumors per mouse</th>
<th>Incidence (% of control)</th>
<th>Inhibition (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>I</td>
<td>TPA (Positive control)</td>
<td>12.2 ± 1.7</td>
<td>100</td>
<td>—</td>
</tr>
<tr>
<td>II</td>
<td>TPA + 50 μg of ajoene</td>
<td>4.0 ± 2.7*</td>
<td>32.8</td>
<td>67.2</td>
</tr>
<tr>
<td>III</td>
<td>TPA + 100 μg of ajoene</td>
<td>1.2 ± 1.2**</td>
<td>9.8</td>
<td>90.2</td>
</tr>
<tr>
<td>IV</td>
<td>TPA + 250 μg of ajoene</td>
<td>0.6 ± 0.4**</td>
<td>4.9</td>
<td>95.1</td>
</tr>
</tbody>
</table>

Results at 18 weeks are given as means ± SE.
* Each group had five mice.
** Significantly different from the control group (P < 0.05).

 sis of the differences between the means of tumors per mouse was done by Student's t-test. Differences with P < 0.05 were considered to be significant. 16)

The effects of ajoene on two-stage carcinogenesis of mouse skin are shown in Fig. 2 and Table 1. All 5 positive controls in group I, bore tumors as of 10 weeks, and the mean number of tumors per mouse was more than 10 by 18 weeks. In group II treated with 50 μg of ajoene, 80% of the mice bore tumors, and a mean of 4.0 tumors had formed per mouse by 18 weeks. With tumor formation of the positive controls as 100%, such formation was inhibited by 67.2%. With 250 μg of ajoene (group IV), at 18 weeks, a mean of 0.6 had formed per mouse, and inhibition was 95.1%. Treatment with ajoene inhibited later tumor formation, with effects dependent on the dose, and the effect of 250 μg was significant.

Oil-macerated garlic products contain 500 to 1000 μg/g of ajoene if prepared from two parts of garlic and one part of vegetable oil (unpublished data). Lawson has reported on the stability of compounds in such products; ajoene in gelatin capsules loses 1.5% per month at room temperature. These results allow the use of ajoene as a health food.

Ajoene protected strongly against TPA-promoted carcinogenesis on mouse skin. This compound is one of the active constituents of the effects of garlic against tumor promotion.

References


Antitumor Effects of Garlic Compound


