Volatile Compounds from “Som Poy” (*Acacia concinna* DC.)

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**Abstract**

Volatile compounds of “Som Poy” (*Acacia concinna* DC.) were studied using the extract obtained by steam distillation and extraction with dichloromethane. The analysis was done using gas chromatography-mass spectrometry (GC-MS). The main constituents of volatile compounds were fatty acids such as palmitic and linoleic acid with rather high amount of furfural and 5-methyl-2-furfural. Some esters such as methyl salicylate, methyl palmitate and isopropyl palmitate were also identified as well as linalool oxide. The occurrence of these compounds may contribute to the aroma of “Som Poy”.

**INTRODUCTION**

“Som Poy” is the name in Thai of soap-pod (*Acacia concinna* DC.). It is also called “Som Kon”. The plant is a prickly, scandent shrub, occurring in tropical jungles. Its leaves are bipinnate with yellow globular auxiliary heads flowers. It has brown pods that wrinkle when dry.

Thai people believe that the plant brings luck and happiness and that it can be considered as an auspicious plant. The pods of “Som Poy” are used in Thai tradition and festivals such as “Songkran”, where the plant is put in holy water to wash out bad luck. Formation of soap suds due to saponin and its pleasant oriental odor may be the properties of the pod that makes its suitable for its use as shampoo.

A decoction of pods relieves biliousness and acts as a purgative. It is used to remove dandruff and to improve hair appearance. An ointment prepared from the ground pods is good for skin diseases. The pods are also powdered and perfumed and sold in the market as soap nut powder.

The main chemical constituents of “Som Poy” is saponins. The bark also contains saponin, which on hydrolysis yields lupeol. The sugars identified are glucose, arabinose and rhamnose.

The pods of *A. concinna* subjected to alcoholic extraction yield a colorless saponin, which on hydrolysis with sulphuric acid, yields acid genin and its diacetyl lactone. The acid has been identified as acacic acid (Varshney and Shamsuddin, 1964). The structure and reaction of some sapogenins which are a part of saponins from the pods have been studied (Anjaneyulu et al., 1979).

The use of the pods in many products especially for shampooing makes its organoleptic properties important. Unpleasant smell may affect the acceptance of the products. Studies on aroma constituents help to understand and improve such quality. In this work, the main objective was to elucidate the composition of *A. concinna* pods aroma.

**MATERIALS AND METHODS**

The pods of *A. concinna* used for the preparation of volatile aroma extract were purchased from Chiang Mai local market. 100 g of dry pods were mixed with 3 L of water in a 5 L round bottom flask. The distillation was carried out and the distillate was accumulated from ten distillations. Dichloromethane was used for extraction of volatile

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aroma compounds from the distillate. The extract was finally concentrated by removal of the solvent by purging under a stream of nitrogen gas. About 1 mL of the extract thus obtained was used for further GC-MS analysis.

Combined GC-MS analysis was carried out with a Shimadzu QP 2000A gas chromatograph-mass spectrometry equipped with a 0.25 mm x 30 m J&W 122-1-32 DB-1 capillary column. The oven temperature was held at 70°C for 2 minutes, programmed from 70 to 220°C at a rate of 10°C/min. and finally held at the final temperature for 3 min. The injector temperature and carrier gas (He) pressure were set at 230°C and 11.04 psi., respectively with carrier gas flow rate of 1.2 ml/min. MS analysis was done at CI mode at an ionization voltage of 70 eV. The peaks in the resulting chromatogram were identified by comparing their mass spectra with those appeared in the library search data (NIST Mass Spectral Database).

RESULTS AND DISCUSSION

The GC-MS analysis resulted in the chromatogram shown in Fig. 1. The compounds identified are listed in Table 1 together with their relative percentages. The mass spectra of some identified compounds compared to those of reference compounds are shown in Fig. 2 to 6.

Among the compounds identified, the main groups are long chain fatty acids with esters and five members oxygenated heterocyclic compounds. Furfural, 5-methyl-2-furfural are furan compounds that may originate from pyrolysis or Maillard reaction of carbohydrates (Bauer and Garbe, 1985). They have a characteristic burnt odor resembling freshly baked bread and burnt caramel, respectively. Linalool oxides are also heterocyclic compounds produced by oxidation of linalool. The mixture of cis and trans isomers of linalool oxides have earthy-flowery, slightly bergamot-like odor.

Apart from the main compounds mentioned, phenylacetaldehyde and methyl salicylate are present in significant amounts. The former has been identified in many essential oils and as a volatile constituent in foodstuffs with a sweet green odor reminiscent of hyacinth. It is used in perfume composition in particularly for hyacinth and for rose notes. The latter is known very well because it is used for the preparation of ointment.

The role of fatty acids and their esters in the aroma of the pods seems to be limited. They are not important as fragrance or aroma substances.

CONCLUSION

In conclusion, compounds that contribute to A. concinna pods aroma are heterocyclic and aromatic compounds. The mixed odor of these compounds cause the typical aroma. It is therefore interesting to study conditions that lead to the accumulation of these compounds.

Literature Cited


Table 1. Volatile compounds of *Acacia concinna* (Willd.) DC.

<table>
<thead>
<tr>
<th>Peak Number</th>
<th>Compound</th>
<th>Relative Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Furfural</td>
<td>15.50</td>
</tr>
<tr>
<td>2</td>
<td>5-Methyl-2-furfural</td>
<td>9.98</td>
</tr>
<tr>
<td>3</td>
<td>Phenylacetaldehyde</td>
<td>1.76</td>
</tr>
<tr>
<td>4</td>
<td>cis-Linalool oxide</td>
<td>1.18</td>
</tr>
<tr>
<td>5</td>
<td>trans-Linalool oxide</td>
<td>1.41</td>
</tr>
<tr>
<td>6</td>
<td>Methyl salicylate</td>
<td>2.30</td>
</tr>
<tr>
<td>7</td>
<td>α-Terpinolene (tentative)</td>
<td>0.97</td>
</tr>
<tr>
<td>8</td>
<td>Geranyl acetone</td>
<td>0.61</td>
</tr>
<tr>
<td>9</td>
<td>Tetradecanoic acid</td>
<td>1.36</td>
</tr>
<tr>
<td>10</td>
<td>6,10,14-Trimethyl-2-pentadecannone</td>
<td>2.62</td>
</tr>
<tr>
<td>11</td>
<td>Methyl palmitate</td>
<td>1.14</td>
</tr>
<tr>
<td>12</td>
<td>Palmitic acid</td>
<td>22.92</td>
</tr>
<tr>
<td>13</td>
<td>Isopropyl palmitate</td>
<td>1.35</td>
</tr>
<tr>
<td>14</td>
<td>Methyl linoleate</td>
<td>0.63</td>
</tr>
<tr>
<td>15</td>
<td>Linoleic acid (tentative)</td>
<td>16.52</td>
</tr>
</tbody>
</table>
Figures

Fig. 1. Chromatogram of volatile compounds of *Acacia concinna*.

Fig. 2. Mass spectrum of compound number 1 compared with mass spectrum of furfural.
Fig. 3. Mass spectrum of compound number 2 compared with mass spectrum of 5-methyl-2-fufural.

Fig. 4. Mass spectrum of compound number 3 compared with mass spectrum of phenylacetaldehyde.
Fig. 5. Mass spectrum of compound number 4 compared with mass spectrum of cis-linalool oxide.

Fig. 6. Mass spectrum of compound number 5 compared with mass spectrum of trans-linalool oxide.