

HYDROXYPHENYLALKANONES FROM *AMOMUM MELEGUETA*\*

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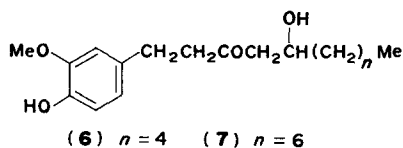
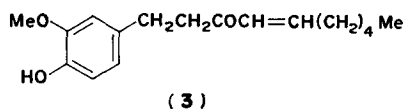
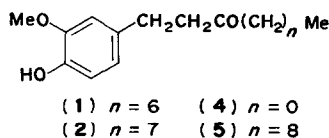
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**Key Word Index**—*Amomum melegueta*; Zingiberaceae; hydroxyphenylalkanones; zingerone; (6)-paradol; (6)-shogaol; (7)-paradol; (8)-paradol.

**Plant**—*Amomum melegueta* Roscoe (Zingiberaceae), also known as Grains of Paradise, Guinea pepper or Melegueta pepper. Voucher specimens are on deposit at the Faculty of Pharmacy, University of Science and Technology, Kumasi, Ghana. **Source**—Ghana. **Uses**—Spice [1]. **Previous work**—On the hydroxyphenylalkanones of seeds from equatorial Africa [2]. On the terpenoid constituents of *A. korarima* [3], *A. subulatum* [3], *A. cardamomum* [4], *A. globosum* [4].

**Present work.** The powdered seeds (150 g) of *A. melegueta* were macerated with Me<sub>2</sub>CO. TLC of the extract concentrate (7.5 g) over Si gel with C<sub>6</sub>H<sub>6</sub> revealed the presence of five spots [*R<sub>f</sub>*'s 0.94, 0.72, 0.47 (trace), 0.28 and 0.09] (KMnO<sub>4</sub> spray). Column chromatography of the concentrate over silicic acid (200 g) with light petroleum and light petroleum–C<sub>6</sub>H<sub>6</sub> mixtures afforded the less polar terpenoid hydrocarbon constituents. Elution with C<sub>6</sub>H<sub>6</sub> and C<sub>6</sub>H<sub>6</sub>–CHCl<sub>3</sub> mixtures afforded a yellow oil (1.49 g) (*R<sub>f</sub>* 0.28) which stained deep blue with phosphomolybdic acid spray + NH<sub>3</sub>. GLC of the oil on a 160 cm column of 3% OV-17 on Gas Chrom Q (80–100 mesh) showed the presence of 3 major compounds. GLC–MS of the oil revealed

that the 3 compounds had M<sup>+</sup> *m/e* 278, 276 and 292 respectively and accounted for 33, 38 and 29% of the mixture.



Careful rechromatography of the oil over silicic acid (50 g) and elution with C<sub>6</sub>H<sub>6</sub> afforded (6)-paradol (1) (M<sup>+</sup> *m/e* 278) (UV, IR, NMR, MS). Further elution with C<sub>6</sub>H<sub>6</sub> and C<sub>6</sub>H<sub>6</sub>–CHCl<sub>3</sub> mixtures afforded mixtures of (6)<sup>‡</sup>-paradol (1) (M<sup>+</sup> *m/e* 278) and (7)-paradol (2) [M<sup>+</sup> *m/e* 292 (13%), 194 (2), 179 (4), 151 (4), 137 (100) and 119 (3)] while elution with C<sub>6</sub>H<sub>6</sub>–CHCl<sub>3</sub> mixtures and CHCl<sub>3</sub> afforded (6)-shogaol (3) (M<sup>+</sup> *m/e* 276) (UV, IR, NMR, MS). Finally, trace amounts of zingerone (4) and (8)-paradol (5) were detected (GLC–MS) in various column fractions. In summary, the 3 major hydroxyphenylalkanones of the Me<sub>2</sub>CO extract of

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‡ The number in parentheses represents the number of C atoms in the aldehyde which would be generated by a retroaldol reaction on the gingerol (6). Cf. [2].

Ghanian Grains of Paradise are (6)-paradol (**1**), (7)-paradol (**2**) and (6)-shogaol (**3**), the second of which, to our knowledge, has not previously been reported in nature. In an earlier study [2], the hydroxyphenylalkanones from equatorial African Grains of Paradise were examined; in this case (6)-gingerol (**6**) and (6)-paradol (**1**) were the major constituents with trace quantities of (6)-shogaol (**3**), (8)-gingerol (**7**) and (8)-paradol (**5**) [2]. However no gingerols were detected in our extract. Obviously, chemical variation in the seeds of *A. melegueta* from different sources needs further examination.

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