Activities of 2,4-Dihydroxy-6-*n*-pentylbenzoic Acid Derivatives

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Esters of 2-hydroxy-4-methoxy-6-*n*-pentylbenzoic acid (**2**–**8**) (methyl, ethyl, butyl, pentyl, isopropyl, *sec*-butyl and benzyl), olivetol (**9**), methyl, ethyl, butyl perlatolates (**10**–**12**), 2,4-dihydroxy-6-*n*-pentylbenzoic acid (**15**), and methyl and ethyl esters of (**15**) were prepared through structural modifications of perlatolic acid (**1**) with the aim to detect new antifungal and antibacterial substances and also to evaluate the toxicity by the brine shrimp lethality assay against *Artemia salina*. The antifungal assays were carried out against the fungus *Cladosporium sphaerospermum* through the bioautography method, and methyl 2,4-dihydroxy-6-*n*-pentylbenzoate (**13**) showed the highest antifungal activity (2.5 μg). Olivetol (**9**) and 2,4-dihydroxy-6-*n*-pentylbenzoic acid (**15**) are also potent inhibitors of the growth of the fungus (5.0 μg). Except for methyl (**10**), the ethyl (**11**) and butyl (**12**) perlatolates were less active than perlatolic acid (**1**). The activities presented by methyl (**2**) and ethyl (**3**) 2-hydroxy-4-methoxy-6-*n*-pentylbenzoates and methyl (**13**) and ethyl (**14**) 2,4-dihydroxy-6-*n*-pentylbenzoates suggest that compounds with a free hydroxy group in the aromatic ring (C-4) have a more pronounced effect against *C. sphaerospermum*. Antibacterial activities were tested by the disc diffusion method using pathogenic strains of *S. aureus* and *E. coli*. The compounds were weakly active with inhibition zones between 9–15 mm. The 2-hydroxy-4-methoxy-6-*n*-pentylbenzoic esters **2**–**8** and alkyl perlatolates **10**–**12** were selective against *E. coli*. Perlatolic acid (**1**) and methyl 2-hydroxy-4-methoxy-6-*n*-pentylbenzoate (**2**) were the most active with LD_{50} values of 24.1 μM and 27.2 μM, respectively. The other compounds were not toxic to *Artemia salina* larvae.

Key words: Lichen, Perlatolic Acid, 2,4-Dihydroxy-6-*n*-pentylbenzoic Acid