Thesis Title	Chemical Constituents and Biological Activities from *Garcinia xanthochymus* Hook. f.
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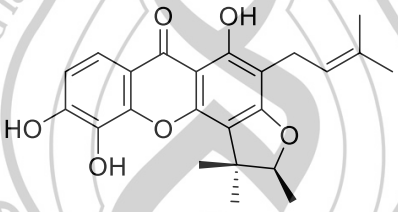
ABSTRACT

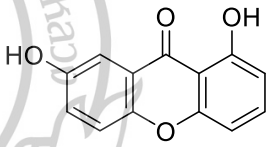
Phytochemical investigation of bark and twig of *Garcinia xanthochymus* Hook. f. led to the isolation of 22 known compounds, including 13 xanthones (**GXBA-sm1** (formoxanthone C), **GXBA-sm2** (euxanthone), **GXBA-sm3** (pyranojacreubin), **GXBA-sm4** (7-geranyloxy-1,3-dihydroxyxanthone), **GXBA-sm7** (6-hydroxy-2,3-dimethoxy xanthone), **GXBA-sm8** (xanthone V1), **GXBA-sm10** (morusignin I), **GXBA-sm11** (dulxanthone B), **GXBA-sm12** (1,5-dihydroxy-3-methoxyxanthone), **GXTM-sm19** (2,5-dihydroxy-1-methoxyxanthone), **GXTM-sm20** (2,6-dihydroxy-1,5-dimethoxyxanthone), **GXTM-sm21** (1,2,5-trihydroxyxanthone), and **GXTM-sm22** (1,2,5-trihydroxy-6-methoxyxanthone)), six of flavonoid scaffolds (**GXBA-sm6** (kaempferol), **GXBA-sm9** ((*2R,3S*)-morelloflavone), **GXTM-sm13** (GB-2a), **GXTM-sm14** (GB-1), **GXTM-sm15** ((*2S,2'S,3R)*-GB-1a), and **GXTM-sm16** (volkensiflavone)), two of benzene derivatives (**GXTM-sm17** (4-hydroxybenzoic acid) and **GXTM-sm18** (4-hydroxy-3-methoxybenzoic acid)), and one anthraquinone (**GXBA-sm5** (damnacanthal)). In addition, metabolite profiling by UHPLC-QTOF-MS was also investigated, resulting in the identification of 14 xanthones, 6 flavonoids, and 2 benzene derivatives.

The extracts and some isolated compounds were also evaluated for their antioxidant and in vitro anticancer activities against four human cancer cell lines: MDA-MB-231 (breast), Huh-7 (liver), A549 (lung), and SW480 (colon). Antioxidant assays revealed that the methanol bark extract (GXBM) showed the highest DPPH scavenging activity (IC_{50} = 23.4 ± 1.0 µg/mL), while the dichloromethane bark extract

(GXBD) showed the strongest activity in ABTS (IC_{50} = 133.8 ± 1.7 µg/mL) and FRAP (IC_{50} = 104.1 ± 3.2 µg/mL) assays. The isolated compound, *(2R,3S)*-morelloflavone (**GXBA-sm9**) exhibited potent antioxidant activity across all assays: DPPH (34.5 ± 0.7 µM), ABTS (298.7 ± 11.0 µM), and FRAP (92.2 ± 0.2 µM), surpassing standard antioxidants ascorbic acid and BHT (IC_{50} = 44.1 ± 6.6 µM and 414.3 ± 12.6 µM in DPPH assay, 129.6 ± 0.8 µM and 174.7 ± 3.4 µM in ABTS assay, and 245.4 ± 8.6 µM and 1162.1 ± 16.8 µM in FRAP assay). Cytotoxicity, apoptosis, and colony formation were assessed via MTT, Annexin V-FITC/PI staining, and colony formation assays. Among all extracts, the hexane extract (GXBH) demonstrated the strongest cytotoxicity with IC_{50} values of 66.9 ± 5.1 µg/mL (MDA-MB-231), 64.7 ± 14.9 µg/mL (Huh-7), 80.0 ± 11.9 µg/mL (A549), and 65.4 ± 7.8 µg/mL (SW480). 7-Geranyloxy-1,3-dihydroxyxanthone (**GXBA-sm4**) also showed strong activity against MDA-MB-231 (IC_{50} = 24.5 ± 2.31 µM). GXBH significantly induced apoptosis and inhibited colony formation in all four cell lines. These findings demonstrate the potential of *G. xanthochymus* as a natural source of antioxidants and anticancer agents, supporting its development as an alternative therapeutic candidate.



GXBA-sm1



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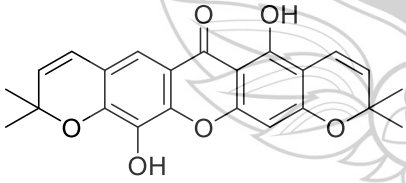

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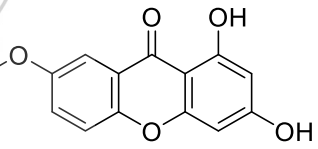

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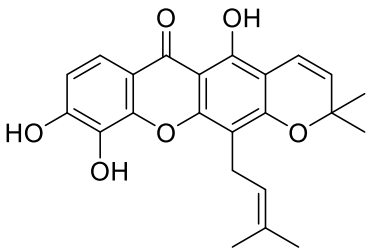

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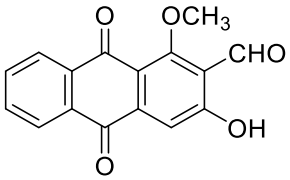

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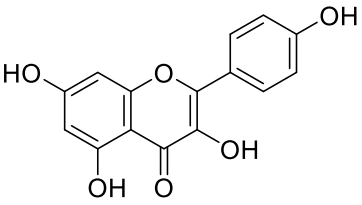

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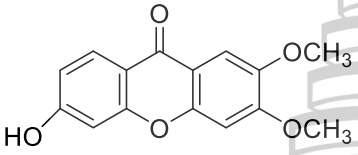

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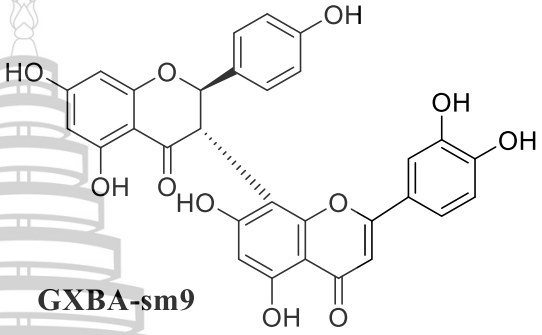

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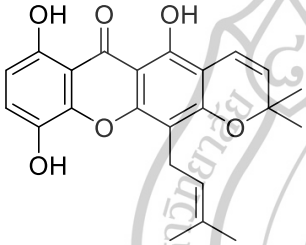

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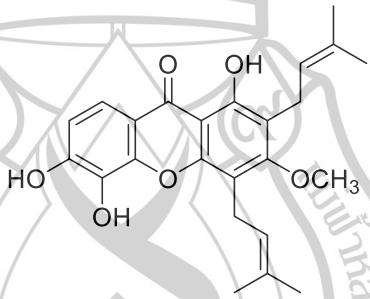

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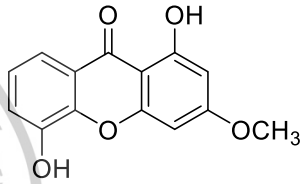

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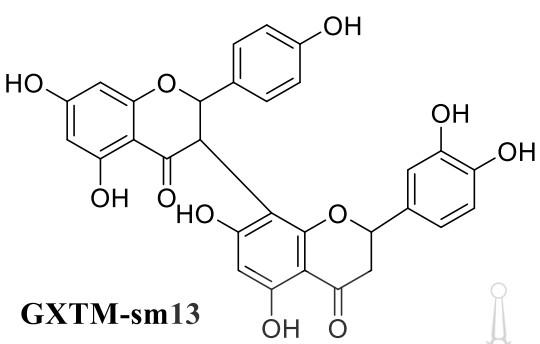

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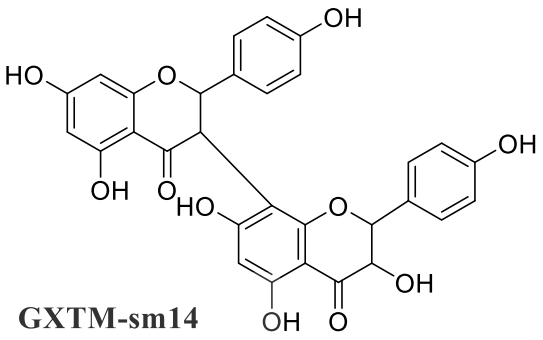

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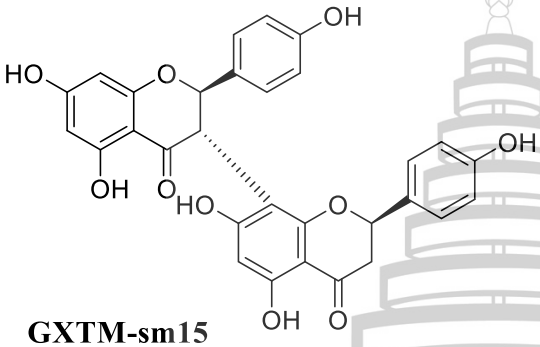

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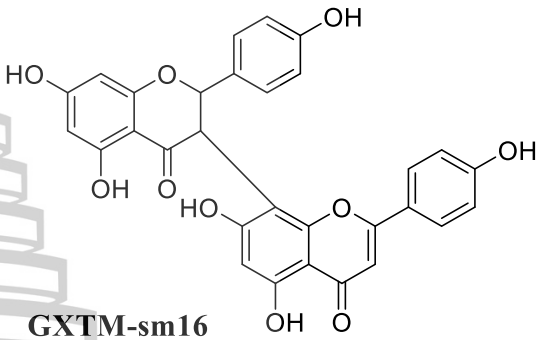

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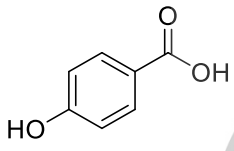

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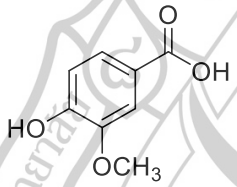

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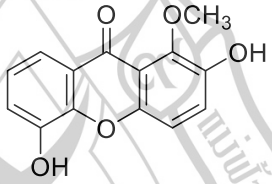

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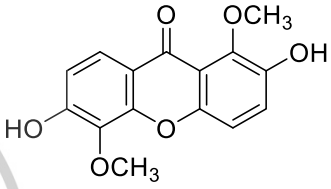

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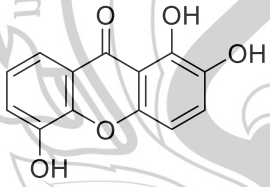

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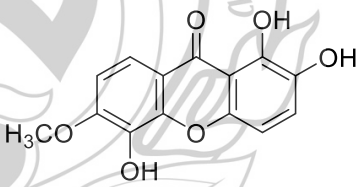

GXTM-sm22

Keywords: *Garcinia xanthochymus*, Antioxidation Activity, Anticancer Activity