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Determination toxic effects of Hystrix Brachyura Bezoar extracts using cancer cell lines and embryo zebrafish (Danio rerio) models and identification of active principles through GC-MS analysis (Article)

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Abstract

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Ethnopharmacological relevance: Porcupine bezoar (PB) is used as folk medicine for various medical conditions including cancer treatment in Malaysia. However, its toxicity profile has never been thoroughly ascertained to confirm its safe nature as an efficacious traditional medicine in the treatment of cancer as well as other ailments. Aim of the study: This study was aimed to reveal three different PBs' aqueous extracts(viz. PB-A, PB-B, PB-C) chemical constituent's profile using GC-MS analysis, anticancer property on A375, HeLa and MCF7 cancer cells, toxicity profile on zebrafish embryo morphology, EC_{50}, LC_{50} and teratogenicity index. Materials and methods: PBs' extracts characterization was performed through GC-MS analysis, in vitro anticancer effect was carried out on A375, HeLa and MCF7 cancer cell lines and finally and toxicity properties on three different PBs aqueous extracts (viz. PB-A, PB-B, PB-C) were determined using zebrafish embryo model. Results: The GC-MS analysis revealed 10 similar compounds in all PBs' extracts. Dilauryl thiodipropionate was found to be a major compound in all PBs' extracts followed by tetradecanoic acid. An in vitro anticancer study revealed PB extracts exerted median inhibition concentration (IC_{50}) <50 μg/mL, on cancer cells viz. A375, HeLa and MCF7 with no significant toxicity on normal cells viz. NHDF cells. In vivo toxicity of PBs extracts found affecting tail detachment, hatching, craniofacial, brain morphology, soft tissues, edema, spinal, somites, notochord and cardiovascular system (brachycardia, disruption of blood circulation) deformities. The LC_{50} and EC_{50} demonstrated PB extracts effect as dose and time dependent with median concentration <150.0 μg/mL. Additionally, teratogenicity index (TI) viz. >1.0 revealed teratogenic property for PB extracts. Conclusions: The findings revealed that all three PBs aqueous extracts possessed anticancer activity and exhibited significant toxicological effects on zebrafish embryos with high teratogenicity index. Hence, its use as an anticancer agent requires further investigation and medical attentions to determine its safe dose.

SciVal Topic Prominence

Topic: Zebrafish | Lab-On-A-Chip Technology | Xenotransplantation

Prominence percentile: 94.395

Chemistry database information

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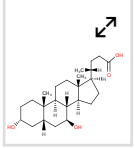
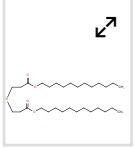
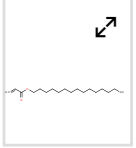
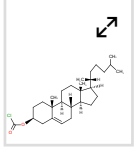
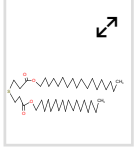
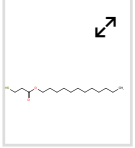

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