

Isolation of a new cytotoxic compound, 3-((Z)-heptadec-14-enyl) benzene - 1-ol from *Rhus natalensis* root extract

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Abstract

Background

R. natalensis. Bernh ex C. Krauss (Anacardiaceae) is used by Traditional Health Practitioners (THPs) in Same district, north eastern Tanzania, for treatment of cancer and other diseases. The current study was done to determine its cytotoxic activity.

Methodology

Dried root powder was extracted by cold maceration with a 1:1 mixture of methanol and dichloromethane. Sequential VLC fractions (Petroleum ether, ethyl acetate, and methanol) of the extract were made and tested for toxicity against brine shrimp (*Artemia salina*) larvae. The ethyl acetate fraction, which exhibited the highest toxicity against brine shrimp larvae, was used for bioassay-guided isolation and to test for cytotoxic activity against HeLa cervical cancer cells and antioxidant activity.

Results

The ethyl acetate extract was the most toxic against the brine shrimp larvae with LC₅₀ 7.2 µg/mL at (95 % CI of 4.993/10.033), while the methanol fraction gave an LC₅₀ 346.8 µg/mL. The ethyl acetate extracts exhibited antioxidant activity in both the DPPH and FRAP with EC₅₀ = 83.05 ± 0.06 µg/mL and (58.75 ± 0.091 µmol Fe²⁺ /g dry weight respectively. It also revealed cytotoxic activity against HeLa cervical cancer cells with IC₅₀ of 17.2 ± 3.4 µg/mL. A new compound, 3-((Z)-heptadec-14-enyl) benzene -1-ol, isolated from the ethyl acetate extract exhibited a weak cytotoxic activity of 35.24 ± 3.5 µg/mL on HeLa cells. Cell cycle analysis showed that the ethyl acetate extract inhibited mitosis and induced apoptosis as evidenced by activation of caspase 3 and membrane phosphatidylserine translocation.

Conclusion

The present results provide initial evidence that the root extract of *R.natalensis* contains compounds with both cytotoxic and antioxidant activity. Further studies are needed to determine activity on other cancer cell lines and to further elucidate the mechanism of cytotoxic activity.