SHORT REVIEW OF THE ANTICANCER AND CYTOTOXIC ACTIVITY OF SOME SPECIES FROM GENUS *EUPHORBIA*

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INTRODUCTION

The genus *Euphorbia* is the largest genus of the medicinal plants widely distributed in China, India, Bangladesh and Pakistan [1]. It was reported that Euphorbiaceae family comprises about 300 genus and 10,000 species, which are used in folk medicine against venomous bites and trichiasis, also known as wart remover. Several plants of Euphorbiaceae family have been tested for their anticancer property, but most of them have been used in traditional medicine as treatment for various human diseases [2]. Antitumor activity against sarcoma and ascites, leukemia in mice and cytotoxic activity against certain cancer cell lines has also been observed. A number of interesting biological activity were also reported such as cytotoxic, hepatoprotective, antispasmodic, pesticide, molluscicidal, larvicidal, anti-inflammatory, antibacterial, antifungal, anti-mutagenic, and antiviral activities [3].

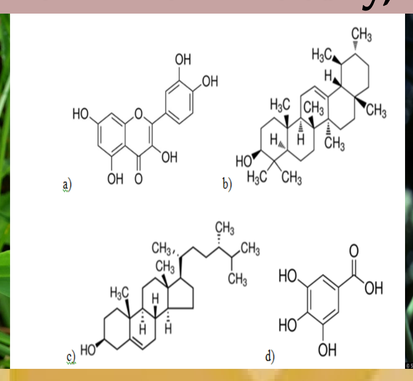


Fig.1 *Euphorbia hirta* L. and chemical structures of major constituents isolated by *Euphorbia hirta* L. – a) quercetin, b) α-amyrin (c) campesterol and d) gallic acid

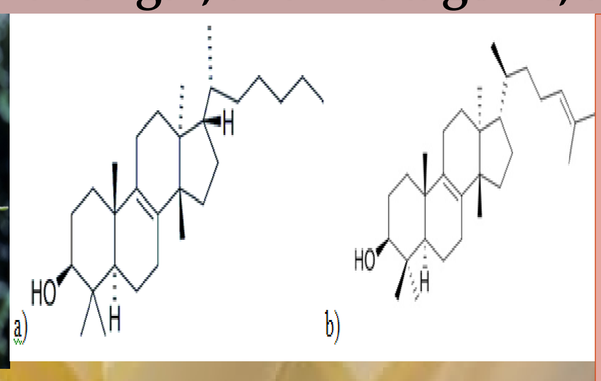
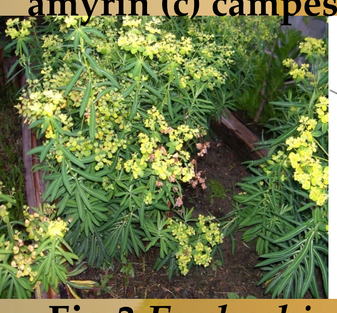


Fig.2 *Euphorbia tirucalli* L. and major active compounds in *E. tirucalli* – a) euphol and b) tirucallol

MATERIALS AND METHODS

After reviewing on the clinical human studies on the *PubMed* database, related to the anticancer and cytotoxic activity of some species from genus *Euphorbia*, we have evaluated a several clinical studies relevant to prove their cytotoxic activity.



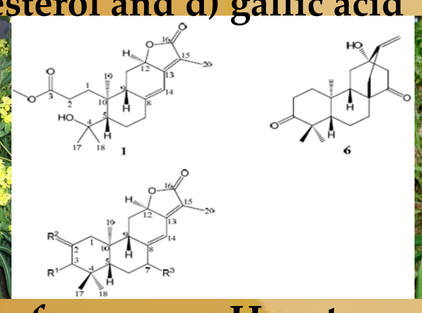


Fig.3 *Euphorbia formosana* Hayata and chemical structures of compound 1-6 discovered in *Euphorbia formosana* Hayata

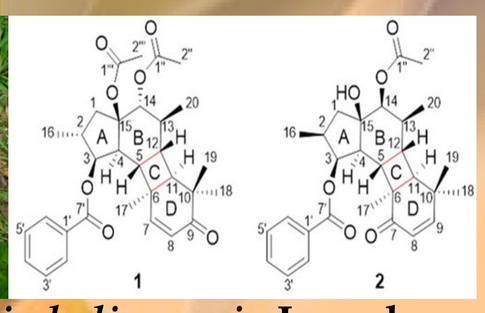


Fig.4 *Euphorbia helioscopia* L. and Heliosterpenoids A (1) and B (2) isolated from *Euphorbia helioscopia* L.

RESULTS
-anticancer and cytotoxic activity-

MEDICINAL PLANT	
E. hirta L.	The ethanol extract exhibited a weak activity against A549 cells and it was inactive against K562 cells. The methanol extract (1000 μg/ml) exerted a significant genotoxic and mitodepressive effect [4].
E. tirucalli L.	Cell viability assays were conducted on the pancreatic cancer primary tumor cell line to assess the relative toxicity of the *Euphorbia tirucalli* L. extracts. The toxicity of both extracts was found to be dose dependent, with cell viability decreasing with increasing extract concentration. Both aqueous and methanol extracts demonstrated similar activity at 50μg/mL with a viability of 50%, while only the methanol extract exerted a significant decrease in cell viability from 25μg/Ml [5].
E. formosana Hayata	Leukemic cell lines, THP-1 and HL-60, have been inhibited in a dose dependent after 24h of treatment with 400μg/mL *Euphorbia formosana* Hayata. *In vitro* anticancer activity assays of *Euphorbia formosana* Hayata suggest potent anticancer effects that cause both cell cycle arrest and apoptosis of leukemic cancer cells [6].
E. Helioscopia L.	The ethanolic extract of *Euphorbia helioscopia* L. inhibited the growth of only three cancer cell lines, Hep-2 (27%), T-47D (7%) and PC-5 (11%) [7].

CONCLUSION

From this review it could be concluded that its extracts selectively inhibited the growth of leukemic cancer cells, solid human cancer cells are less sensitive to EFW, and EFW has low toxicity to normal cells. Since now, Euphorbia extracts have shown cytotoxic activity mainly to leukemic cell, fibroblastoma cell line, pancreatic carcinoma cells, hepatocelular, gastric and colorectal carcinoma cells. The pronounced cytotoxic activity of this very few species from the genus Euphorbia, suggest that it could be very interesting to investigate more deeply about their potent anticancer ability. According to the results of this study, *Euphorbia hirta* L. have shown the weakest cytotoxic activity to the assessed cancer cell lines, and other species of *Euphorbia* have shown strong to moderate activity.

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