

Triterpenes from *Euphorbia spinidens* with their immunomodulatory activity

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Background and Aims: Recent studies in natural product sources resulted in many compounds that are being developed to treat immunosuppressive disorders. *Euphorbia* species are traditionally used in folk medicine to treat inflammations and tumors. In recent studies by the authors, cycloartanes isolated from *euphorbia* species has showed immunostimulatory properties. In this study the authors decided to isolate a number of triterpenes from this genus and evaluate their immunomodulatory effects for further pharmaco-immunological research.

Methods: The compounds were purified using column chromatography run by Merck, Silica gel, and HPLC column YMC Pack-Sil, (25*300 mm). The structures of the isolated compounds were elucidated by ¹³C- and ¹H-NMR as well as 2D-NMR, IR and by the aid of mass fragmentation pattern and comparing with the literature. In phagocyte chemiluminescence assay, oxidative burst by phagocyte cells, different concentrations of compound were incubated with human whole blood in triplicate and the chemiluminescence activity of phagocytic cells were measured by using serum opsonized zymosan and luminol. For lymphocyte proliferation assay, peripheral human blood lymphocytes were incubated with different concentrations of the test compound in supplemented RPMI-1640 along with 5.0 µg/mL phytohemagglutinin (PHA) at 37° C in CO₂ environment for 72 hours and proliferation level was determined by Beta-scintillation counter.

Results: In this research, dried acetone:chloroform extract of aerial parts of *Euphorbia spinidens* collected from the khorasan province in North East part of Iran, afforded two triterpenoids, lup-20(29)-ene-3, 28-diol, commonly known as betulin and (3β,23E)-Cycloarta-23-ene-3,25-diol for the first time isolated from this plant. In phagocyte chemiluminescence assay, betulin showed moderate inhibitory effect on oxidative burst in neutrophils while addition of betulin triterpene to phytohemagglutinin (PHA) stimulated peripheral human blood lymphocytes (PBLs).

Conclusions: *Euphorbia spinidens* could be considered as a new source for (3β,23E)-Cycloarta-23-ene-3,25-diol (0.03% of plant dry weight).

Keywords: *Euphorbia spinidens*; Lupane type pentacyclic triterpenes; Cycloartane