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isolated by column chromatography. The antimicrobial activity of the isolated compound was evaluated quantitatively by using broth microdilution assay. The crude extracts of the in vitro cultures showed various degree of activity against the tested microbes and better activity as compared to that of intact plant. Three antimicrobial active alkaloids were isolated and identified as arsorinine, graveolmine and skimmianine. The alkaloids showed activity against all tested microbes with minimum inhibitory concentration (MIC) ranged between 62.5 μg/ml and 1000 μg/ml.

Keywords: Ruta angustifolia, antimicrobial, callus, shoot cultures, alkaloids

DNA THERMAL DENATURATION STUDY OF ANTIANTIOXIDANT COMPOUNDS FROM METHANOL EXTRACT OF Euphorbia humifusa AS POTENTIAL ANTICANCER AGENTS

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Methanol extract of Euphorbia humifusa possesses cytotoxic effect toward mammaloma cell and high antioxidant activity: EC₅₀ = 56.26±0.66 μg/ml (Heo Seong Il, et al, 2008). This study aims for screening of antioxidant with potential anticancer activity by direct interaction with DNA. Extract of Euphorbia humifusa was obtained by soxhletation with methanol solvent. The extract was concentrated and suspended in water prior to partition with petroleum ether and ethyl acetate. The antioxidant activity of collected fraction of petroleum ether, ethyl acetate, and water was measured to DPPH. The IC₅₀ values found for petroleum ether, ethyl acetate, and water fraction were 91.50 μg/ml; 7.46 μg/ml and 56.18 μg/ml respectively. The ethyl acetate fraction was subjected to column chromatography on silica gel using chloroform with an increasing volume of methanol as eluent to give eight fractions. The fraction VI and VII showed highest antioxidant activity (30.73% and 66.12% respectively). The fraction VI and VII were further purified on a silica gel column with methanol:acetone:chloroform as gradient eluent. Further purification of fraction VI gave fraction I and fraction L that showed highest antioxidant activity (64.03% and 56.32%). In this research we observed the increase of thermal stability of DNA up to 11°C after mixing with fraction I. The result of phytochemical analysis of fraction I and fraction L indicate that compounds which showed antioxidant activity are alkaloids and essential oils. However, which compound interacts with DNA is still unknown, since purification has not been performed until single component.

Keywords: Euphorbia humifusa, Antioxidants, DNA recognition, Thermal Denaturation Study

STABILITY IMPROVEMENT OF Aloe vera Burm. Fil. LEAVES SKIN EXTRACT BY BETA-CYCLODEXTRIN COMPLEX INCLUSION IN GEL BASE

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Aloe vera leaves skin extract has been proved to have higher antioxidant activity than in the inner pulp (gel) of the plant. The phenolic compounds are substance that related to the antioxidant effect of the plant. It present larger in the skin fraction than in the gel of the leaves. The objective of this research is to increase the stability of Aloe vera leaves skin extract by complexation reaction with β-cyclodextrin (β-CD) in gel base. β-cyclodextrin is macromolecule that has a truncated structure, that cover guest in its cavity and improve the guest solubility and stability. Complex inclusion of Aloe vera leaves skin extract in β-cyclodextrin (β-CD) were made by co-precipitation method. To increase inclusion effectiveness, volume of solute used in