

Joint Event

4th EUROPEAN BIOPHARMA CONGRESS

&

6th International Conference and Exhibition on PHARMACOLOGY AND ETHNOPHARMACOLOGY

November 09-11, 2017 Vienna, Austria

Up-regulation of cd4+ t-lymphocytes by isomeric mixture of quercetin-3-o-rutinoside and quercetin-3-o-robinobioside isolated from the leave extract of millettia aboensis

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Context: *Millettia aboensis* (Hook. F.) Baker (Fabaceae) is popular in ethno-medicine due to its acclaimed efficacy in a number of disease conditions.

Objective: To evaluate the immunomodulatory effect of the leaf extract of. Materials and method: Humoral and cellular immune responses of albino mice to tetanus toxoid and cyclophosphamide, respectively, were used to monitor immunomodulatory activities of the ethanol leaf extract and fractions of *M. aboensis* at 200, 300 and 400 mg/kg. Most active fraction was subjected to chromatographic purification and isolation of active compounds. Stimulation of specific T-lymphocytes was used to evaluate immune enhancing activity of the isolated compounds.

Results: The extract and fractions evoked increase in both humoral and cellular immunity. At 400 mg/kg, normalized mean secondary IgG₁ and IgG_{2a} antibodies response of the butanol fraction were 9.0 and 7.7 respectively compared to 13.2 and 16.5 produced by Noni capsule®. Findings from the nature of cytokine up-regulation by butanol fraction following secondary challenge with tetanus toxoid revealed that IL-12, IL-17A, IFN- γ and IL-4 were expressed by 48.14, 41.37, 38.22, and 31.03%, respectively. Structural elucidation of the active compounds revealed presence of isomeric mixtures of quercetin-3-O-rutinoside and quercetin-3-O-robinobioside. This compound mixture exhibited *in vitro* up-regulation of specific CD₄⁺ lymphocytes that were largely interferon gamma (IFN γ) releasing. Up to 43.7% stimulatory effect of IFN γ was produced at 6.25 μ g/mL compared to the baseline effect in DMSO control group.

Discussion and conclusion: *M. aboensis* expressed strong immune-enhancing properties, which may explain its ethnopharmacological use in disease management.