Rwanda-native *Tetradenia riparia* (Hochst.) Codd: Phytochemical Profile, Antioxidant Toxicity, Anti-Inflammatory and Immunomodulatory Effects

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Abstract

Tetradenia riparia is a Rwanda-native plant used in traditional medicine. The crude extracts have multiple *in vitro* effects but its *in vivo* effects studies are limited. So, this work aimed to explore the toxicity, anti-inflammatory, and humoral immune response effects of hydroalcoholic extract of *T. riparia in vivo*. The phytochemical characterization indicated 17.67 mg GAE/GW for polyphenols and 7.87 mg QE /GW for flavonoids. The oral administrations of various doses (0.25- 5g/kg/w) of the extract to Wistar rats in single doses, for the acute toxicity studies or daily, for 28 days for sub-acute toxicity have shown no toxicity. The hematological and biochemical parameters have shown an increase on a number of white blood cells, lymphocytes, and basophils and decrease on urea and creatinine values compared to controls. The histological analysis had shown no significant structural damage in the spleen, liver, and kidney. LD50 was >5g/kg/w. The extract suppressed the carrageenan-induced paw edema swelling with reduction of white blood cells and inhibition of NO in the air pouch animal model and it did not substantially affect humoral response for all concentrations tested. An antioxidant activity was observed using the DPPH, FRAP and Phosphomolybdate methods. Finally, computational findings underscore the strong binding affinity between luteolin and stigma sterol to TNF-α which is implicated in inflammatory processes. In conclusion, the hydroalcoholic extract has shown no toxicity with antioxidant, anti-inflammatory activities and activation of cellular immune response.

Keywords: *Tetradenia riparia* (Hochst.) Codd, hydroalcoholic extract; Toxicity; Anti-inflammation; Immunomodulation; antioxidant activity.