Optimization of Aqueous Extraction of the Australian Maroon Bush (*Scaevola Spinescens* R. Br.) to Maximize Bioactive Compound and Antioxidant Yield

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***Background*:** *Scaevola spinescens* is an endemic Australian shrub that is linked to various health benefits and traditionally used as a medicine by decoction. To date, the extraction efficiency of the plant under various conditions has not been well understood. This study aimed to optimize aqueous extraction conditions of *S. spinescens*, for maximum extraction of total phenolic compounds, flavonoids and saponins, as well as antioxidant activities.

***Methods*:** Response surface methodology was used to determine the influence of four independent parameters including temperature, time, sample-to-water ratio and pH. The optimal ranges of temperature (60-90°C), time (30-60 min), sample-to-water ratio (2-6 g/100 mL) and pH (3-7) were determined in preliminary experiments. Following assessment and optimization of the response surface methodology models, validation experiments were conducted to compare predicted and experimental values.

***Results*:** The RSM models showed that extraction temperature, time and sample-to-water ratio significantly affected total phenolic compound yields. Extraction temperature and time significantly affected flavonoid yields, while only sample-to-water ratio significantly affected saponin yields. Optimal conditions for extraction were determined to be: 90°C, 53 min, 2:100 (g/mL), and pH of 4.5, if saponins are the target compounds for extraction. For phenolics, flavonoids and antioxidant capacity, a higher sample-to-water ratio of 6:100 (g/mL) is recommended.

***Conclusion*:** Response surface methodology proved to be a reliable method for predicting yields of bioactive compounds and antioxidant capacity in *S. spinescens*. These findings can be used for efficient decoction by practitioners and end users, or by researchers for further isolation and purification of bioactive compounds from *S. spinescens* extracts.

Keywords: *Scaevola spinescens*, maroon bush, response surface methodology, optimization, bioactive compounds, antioxidant activity.