

## **ANTIOXIDANT ACTIVITY OF *COCCINIA GRANDIS* AND *COSTUS SPECIOSUS* AT DIFFERENT EXTRACTION TEMPERATURES**

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*Coccinia grandis* (Kowakka) and *Costus speciosus* (Thebu) are two commonly used anti-diabetic herbs in the Sri Lankan pharmacopoeia. Only the leaves of these herbs are consumed mostly in the form of salads added with grated coconut or with rice porridge. Studies have been conducted on the antioxidant properties of both these herbs – a characteristic which is heavily dependent on the temperature in which the extract is prepared. The method used for quantification also has a significant effect on estimating the antioxidant potency. Thus, the objective of this study was to determine the antioxidant activity of the extracts of both herbs prepared at different temperatures from two assay methods based on two different chemical reactions.

Authenticated leaves of the two herbs were dried and ground into powder. One gram of each powder was added to 20 mL of water and heated to temperatures of 60, 70, 80, 90 and 100 °C. The remnants were filtered and the extracts were subjected to Oxygen Radical Absorbance Capacity (ORAC) and DPPH radical scavenging assays. The total phenolic contents of all the extracts were also determined. The total phenolic contents of both herbs increased proportionately with the extraction temperature. *Coccinia grandis* had the highest total phenolic content at all extraction temperatures. The ORAC and the DPPH EC<sub>50</sub> values had an increase in both herbs proportionate to the extraction temperatures and the total phenolic contents. At 100 °C, the ORAC and DPPH EC<sub>50</sub> values of both herbs were comparable to the values of vitamin C (which is a known antioxidant), in that there was not statistically significant difference ( $P < 0.05$ ) between the ORAC and DPPH EC<sub>50</sub> values between the two herbs and vitamin C. The temperatures of 60, 70, 80, 90 and 100 °C were chosen to represent the typical processing conditions used in the preparation of herbal extracts. Although high temperatures are hypothesized to destroy the efficacy of antioxidants and other phytochemicals, results from this study contradictorily demonstrated that the antioxidant activity proportionately increased with the extraction temperature owing to the higher extraction of phenolic compounds. The ORAC values had a better linear correlation with the total phenolic content for both herbal extracts than the DPPH EC<sub>50</sub> values, indicating that the ORAC assay was more suitable for assessing the antioxidant potential of phenolic compounds. Both assays were carried out in the study to cover the possible free radical scavenging mechanisms of antioxidants. However, the ORAC values may have had a better correlation with the total phenolic contents since the phenolic compounds present in the herbal extracts may have been better scavengers of peroxy radicals.

In conclusion, the extraction temperature of herbal extracts plays a significant role in assessing the antioxidant activity of an herb. The selection of the assay should also be taken into account when claiming the antioxidant potency of an herb, since not all antioxidant assays are sufficiently sensitive to the free radical scavenging mechanisms of phytochemicals.

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