

RARE

484

**Determination of Antioxidant and Nutritional Properties of Toddy,
Coconut Water and Alcohol Reduced Toddy**

by
I.P.N.A.Pathirana [B.Sc Honors]
Department of Chemistry
University of Kelaniya
Kelaniya
Sri Lanka.

Dissertation submitted as a partial
requirement for the M.Sc. Degree in
industrial and environmental chemistry
of University of Kelaniya, Sri Lanka.

ප්‍රවේශ අංකය	484
වර් අංකය	

August, 2004

Abstract

In Sri Lanka there are about 0.44 million hectares of coconut cultivation. The annual production of coconut in Sri Lanka is 2710 million nuts. 70% of the total production of coconut is used for the domestic consumption. Coconut is one of the largest shares of export earnings in Sri Lanka. Productions of desiccated coconut, preparation of copra for the extraction of coconut oil and alcohol distillation from toddy are the main coconut-based industries in Sri Lanka. In desiccated coconut and copra processing industries coconut water is fully discarded as a waste. Also, in alcohol distillation from toddy, after recovering 5-8 % of alcohol the rest of the toddy is discarded as a waste resulting environmental pollution. Research on effective utilization of this wasted water is very important in protecting the environment. In addition, use of this water for economically beneficial purposes will open up more opportunities for local industrial sector. The objective of this research is to investigate the possibility of using this discarded coconut water as sources of antioxidants. Total phenolic compounds and antioxidant properties of toddy, coconut water and discarded toddy after recovering alcohol were investigated. Total phenolic contents of toddy, coconut water and alcohol free toddy after distillation were determined according to the Folin-Denis colorimetric assay and reducing power was determined according to the method of Oyaizu. Antioxidant activity was measured in linoleic acid system. Individual phenolic compounds were quantified by HPLC. Reducing sugar contents of toddy, coconut water and alcohol free toddy after distillation were determined by Somogyi-Nelson Copper method. The fatty acid composition of toddy and coconut water was determined by Gas Chromatography. The results obtained show that the toddy, coconut water and alcohol free toddy after distillation are rich



sources of phenolic antioxidants. Toddy exhibited the highest total phenol content (550.1 to 991.6 mg/L as Galic Acid Equivalent (GAE)) compared to coconut water (311.6 to 793.6 mg/L as GAE) and alcohol free toddy after distillation (134.4 to 169.0 mg/L as GAE). Highest reducing power exhibited by Toddy (0.725 to 1.125 nm) with compared to alcohol reduced toddy (0.342 to 0.545 nm) and coconut water (0.214 to 0.280 nm). The highest antioxidant activity per unit mass of total phenol was exhibited by coconut water (0.160 to 0.234) with compared to toddy (0.161 to 0.204) and alcohol reduced toddy (0.118 to 0.171). (-)-Epicatechin is the most abundant antioxidant in toddy (49.78 mg/L) and in alcohol free toddy (52.05 mg/L). However (-)-epicatechin was not detected in coconut water. Catechin was the other major flavonoid compound present in toddy (4.02 mg/L) and coconut water (3.67 mg/L). Ferrulic acid was the only phenolic acid detected in toddy (0.865 mg/L) and in alcohol reduced toddy (0.795 mg/L). Antioxidant activity is well correlated with total phenol content of toddy ($r_p = 0.990$, $p = 0.010$), coconut water ($r_p = 0.950$, $p = 0.050$) and alcohol free toddy ($r_p = 0.969$, $p = 0.031$). In addition, there is a close relationship between total phenol content and reducing power of toddy ($r_p = 0.997$, $p = 0.000$), coconut water ($r_p = 0.991$, $p = 0.009$) and alcohol free toddy ($r_p = 0.999$, $p = 0.001$).