

mg GAE /g, 1.4-2.2 mg AE /100g and 3.5-4.2 mg AE /100g respectively. The mean TPC and DPPH radical scavenging activities for both raw and cooked rice flour were in the order of *Suduheenati* > *Masuran* > *Rathdel* > *Kahawanu*. The order of FRAP for both raw and cooked rice flour were in the order of *Suduheenati* > *Masuran* > *Kahawanu* > *Rathdel*. Among raw and cooked rice flour, red rice (*Suduheenati*, *Masuran*) had significantly ($P \leq 0.05$) high antioxidant properties compared to white rice (*Rathdel*, *Kahawanu*). Cooking has reduced the TPC of red rice flour significantly ($P \leq 0.05$) whereas the reduction was not significant ($P \geq 0.05$) in white rice flour, DPPH scavenging activity and antioxidant power of FRAP have also reduced but not significantly ($P \geq 0.05$) for rice flour of the selected varieties. A positive

significant correlation ($P \leq 0.01$) was observed between mean TPC contents and DPPH radical scavenging activity ($r = 0.919$) and FRAP ($r = 0.910$) for cooked rice flour with four samples, indicating that phenolic compounds present in rice provide the antioxidant activity by both the radical scavenging mechanism and reduction of oxidized intermediates in the chain reaction. The selected rice varieties exhibited high FRAP activity compared to DPPH radical scavenging activity indicating that reduction of oxidized intermediates in the chain reaction occurs more predominantly.

Keywords: Antioxidant properties, Traditional rice, Red and white rice, Raw and cooked rice

Abstract No: TO 5

Antioxidant Properties of Selected *Hela Suwaya* Herbal Porridge

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Herbal porridges that contain high amounts of plant materials are rich sources of antioxidants. These are made by incorporating rice, different leaf extracts and coconut milk. Commercial availability of easy to prepare porridges is currently a trend due to the lifestyle changes of people. No research has been done previously to study the antioxidant potential of commercially available herbal porridges. Thus in the present study the antioxidant potentials and total phenolic content of commercially available four *Hela Suwaya* herbal porridges were determined. Preparation of four (white, green, blue and yellow) porridges was done according to the written instructions provided with the specific pack, by using rice/flour mixture and the pre-prepared packet of spices supplied within the pack separately. It requires few ingredients including coconut milk to be added fresh as instructed. Folin-Ciocalteu method was used to determine the total phenolic content (TPC), whilst 2, 2-diphenyl-1-picrylhydrazyl (DPPH) and potassium ferric reducing antioxidant power (FRAP) assays were performed to measure the antioxidant activities of porridges. Gallic acid (GA) and ascorbic

acid (AA) was used as the standards. All the selected herbal porridges exhibited high antioxidant capacity as well as high amount of total phenolic compounds. The total phenolic contents of porridges were found to vary from 50.7 – 113.2 mg Gallic Acid Equivalents (GAE)/100 mL. Antioxidant potentials of porridges ranged from 5.7 – 9.5 mg Ascorbic acid Equivalents (AAE)/100 mL and 6.7 – 20.2 mg AAE/100 mL in DPPH assay and FRAP assay respectively. The Green porridge that was made incorporating rice, spices and mainly gotukola had the highest TPC and antioxidant potential. Types of rice and spices used are almost similar in all other porridges as well. The white porridge that was made using the least amount of herbs showed the least TPC and antioxidant potential. Results obtained indicated that the antioxidant potential varied significantly ($P \leq 0.05$) from porridge to porridge. There was a positive significant ($P \leq 0.01$) correlation between antioxidant activities and total phenolic content for the DPPH assay ($r = 0.95$) and for the FRAP assay ($r = 0.87$) even with four samples analyzed. These findings show that commercially available *Hela Suwaya* herbal porridges are a good source

of antioxidants and antioxidant potentials are mainly due to the phenolic compounds present

Keywords: antioxidant potential, herbal porridges, Folin Ciocalteu assay, DPPH assay, FRAP assay

Abstract No: TO 6

Changes of the quality of palmyrah fruit pulp (pfp) exposed to open-air and the antimicrobial effect of herbal extracts on common microbes in spoiled pfp

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Palmyrah (*Borassus flabellifer* L.) Fruit Pulp (PFP) has more health benefits. Spoiled PFP is mainly caused by acid-producing microbes like *A. aceti* and alcohol-producing microbes like *S. cerevisiae*. Chemically preserved PFP partially loses its natural characteristics during its storage for a long time. Edible natural preservatives which are harmless to human might be used to preserve the PFP effectively. The aim of this work is to analyze the changes in the quality of PFP when it is exposed to the open-air environment and also to compare the antimicrobial activity of the extracts from specific parts of edible herbal plants against prominent microbes present in the spoiled PFP. Initially, PFP was exposed to an open-air environment for three days for spoilage. Quality parameters such as Total Soluble Solids (TSS), pH, acidity, sugar (total and reducing), and Total Phenolic Content (TPC) of both fresh and spoiled PFP samples were determined using refractometric, potentiometric, titrimetric, Lane & Eynon, and Folin–Ciocalteu methods respectively. Screening of antimicrobial activity was done with reference to the organisms, *A. aceti*, *S. cerevisiae*, *S. aureus* and *E. coli* using agar well diffusion technique where chloramphenicol was used as a positive control. Broth dilution method was employed to determine the Minimum Inhibitory Concentration (MIC) of extracts. Parts of six different herbs; seeds of *Myristica fragrans* and *Syzygium cumini*, barks of *Cinnamomum verum* and *Vateria copallifera* and root of *Acorus calamus* and *Curcuma longa* were selected and their ethanolic (aq) extracts were obtained using both Soxhlet and maceration along with the ultra-sonication method. TSS of fresh PFP declined from 23.64±1.19 to 12.20±0.31 in spoiled PFP.

The reduction might be due to the conversion of sugars to organic acids by microbial activity. Percentage of both total and reducing sugars dropped from 16.71±0.52, 4.84±0.29 to 10.18±0.62, 3.49±0.17 respectively. The pH of fresh PFP declined from 5.12±0.10 to 3.25±0.28 in spoiled PFP and acidity (%) of fresh PFP raised from 0.40±0.05 to 1.54±0.03 in spoiled PFP. TPC (mg GAE/g) of fresh PFP was decreased to 0.619±0.14 from 9.289±0.15 when it was spoiled. It was found that TPC of *V. copallifera* extract from both maceration and Soxhlet treatment (431.14±4.78 and 475.44±4.80 mg GAE/g of crude extract respectively) was higher than other plant extracts. Antimicrobial effectiveness of plant extracts were tested against microbes at concentrations of 10 mg/ml extract from both maceration and Soxhlet treatment. The highest antimicrobial effect was observed in the *V. copallifera* extracts from maceration treatment, against the microbes, *A. aceti*, *S. cerevisiae*, *S. aureus* and *E. coli* with zone of inhibition of 23, 18, 19 and 19 mm, respectively. *V. copallifera* extracts showed considerable inhibitory effect when compared with chloramphenicol (0.1mg/ml). MIC of *M. fragrans*, *C. verum*, *V. copallifera* and *A. calamus* showed higher value (< 0.2 mg/ml) against *A. aceti* and *S. aureus* compared to other plant extracts. The results indicated that these plant extracts that demonstrated effectiveness against the particular microbes could be used as natural preservatives to control the spoilage of PFP.

Keywords: Antimicrobial activity, Herbal extracts, Palmyrah fruit pulp