Comparative Analysis of the proximate Composition of palmyrah pinattu and flours (Odiyal, Boiledodiyal)

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***Abstract*—** *Palmyrah (Borassusflabellifer) fruit is mostly used as fresh fruit, because of its perishable nature it is traditionally preserved as dried fruit pulp called as pinattu (fruit leather). It contained pectin as well as contain appreciable amount of saponinbecause of that fruit pulp having important medicinal properties. Considering these facts the phytochemical constituents of solvent extracts of pinattuwas identified and evaluated. Samples was collected from the three different branches ofPalmyrah Development Board.*

Pinattu, boiled odiyal flour and odiyal flour contained 16.6±(0.008), 11.66±(0.001), 10.66±0.001 g/100g of moisture, 2.23±0.062, 6.51±0.062, 6.7813±0.06 g/100g of protein, 0.08±0.001, 0.28±0.008, 0.43±0.013 g/100g of Fat, 0.04±0.001, 0.02±0.0003, 0.02±0.0002 g/100g of Ash, 5.06±0.01, 7.13±0.18, 4.49±0.15 g/100g of crude fiber and (75.91±0.61, 74.37±0.65, 77.59±0.5 g/100g of carbohydrate respectively. There were significant different ($p<0.05$) between the each samples for all the nutrient content except moisture content.

Keywords*— *Pinattu, Odiyalflour, Boiled odiyal flour, Nutritional.

I. INTRODUCTION

*Borassusflabellifer*L. , belongs to family Arecaceae,(Asmussenet al., 2006) commonly known as Palmyra palm or Asian toddy palm is a native of tropical Africa (Nesbitt, 2005). The coconut like fruits are three sided when young, becoming rounded or more or less oval, 12-15 cm wide, and capped at the base with overlapping sepals (Morton, 1988).This plant has a commercial and medicinal value (Ghosh et al., 2012). The fruit pulp of *B. flabellifer*has been used in traditional dishes The different parts of the plant is used for the various ailments like secondary syphilis, antiperiodic, heart burns, liver and spleen enlargement etc. It has anti-inflammatory effects (Nadkarni, 1954; Vaidyaratnam, 1994; Kapoor, 2000).

The availability of good data provides a strong foundation for the more important next step - the analysis of the information. So Proximate Nutritional Composition Determination of pinattu, Boiledodiyal flour and odiyal flour also in the analysis of information and facilitate a better understanding of palmyrah products. Measurement of nutritional status is one of the key indicators for monitoring the overall welfare of a population and measuring the impact of change in factors that affect the welfare of a population. Negative change in the nutritional status of a population indicates a problem. (Food Security Analysis Unit for Somalia (FSAU). 2005) and nutrition is the science of food in relation to health. Nowadays the focus on nutrition is based on a new definition of health as "prevention of disease" in which nutrition plays a key role yet most people are unsure whether certain foods are good or bad for them so the Nutritional analysis was most important for the population. **Dried raw tuber flour (odiyal Flour)** Raw tubers are split into two halves. Usually they are stored in the form of dried pieces and milled only when needed for make odiyal flour. **Boiled odiyal flour** Boiled tubers are split into two halves and sun dried then milled into flour is known as Boiled odiyal flour ('Pullukodiyal flour').

II. MATERIAL AND METHOD

2.1 Sampling

Palmyrah samples were obtained from the three different branches of PDB (Palmyrah Development Board) then pool together. After that 100g of sample was weighted in random manner**.**

2.2 Proximate analysis

The proximate compositions of the pinattu, boiledodiyal flour, odiyal flour were determined using standard analytical methods. All measurements were done in duplicates and values presented in percentage.

2.3 Determination of Ash content (AOAC 2000)

Sample preparation

Sample was prepared and 5g of sample was weighed in porcelain crucible. It was kept in muffle furnace at 550^{o}C for 5 hours. Then it was transferred in to desiccator for the cooling. The sample was weighed after cooling.

2.4 Determination of Moisture Content (AOAC 2004)

Dried petri dishes were taken and weighed (M_0) by using the analytical balance. Then 5g of sample from each were weighed in petri dishes (M_1). Samples with Petri dishes were placed in the hot air oven at 105^{0} c for 3hours. After that dishes were taken and were transferred in to the desiccator and weighed (M_2). This procedure was repeated until get the constant weight. Then moisture contend was determined.

2.5 Determination of Protein Content (AOAC 2000)

1g of samples from each were taken and transferred in to kjeldhal digestion flask carefully. 1g of catalyst mixture and 10ml of con.$H_2SO_4$was added in to each kjeldhal flask. Then flasks were placed kjeldhal digester at 250^{o}C for 90 minutes and then 410^{o}C for 90 minutes. After completion of digestion flask were allowed to cool to room temperature. 50 ml of distilled water was added in to each digestion flask. Contents were distilled with addition of 40% of NaOH. Distillate was collected in conical flask containing 4% of 15 ml boric acid with mixed indicator. Contents in conical flask were titrated against 0.05N HCl until colour changes from pink to blue.

Protein percentage = Percentage of Nitrogen × 6.25

2.6 Fat content determination

Fat was determined using soxhlet fat extraction method [AOAC 1995].

Sample (5.0g) with filter paper was transferred into pre-weighed thimble and pre-weighed syntax crucible and thimble was attached to the extractor. Fat was extracted with petroleum ether (Boling point 40-60°C, 70mL) in solvent extractor.

Programmed was set as Heating plate temperature (110°C), Immersion (60min), Washing (60 min), Recovery(5 min). The concentrated extract with few milliliters of petroleum ether was transferred into clean dried weighed crucible and placed in an oven at 100°C for about 30 minutes and it was cooled and weighed. Residual was kept for crude fiber determination.

2.7 Estimation of Crude fiber

Crude fiber was determined by Weende method as described in U.S AOAC (1995)

Method

Fat free sample (1g) was in a pre-weighed Crucible.1.25% (w/v) of H_2SO_4 was adds up to the 150 ml notch after pre heating by the hotplate in order to reduce the time required for boiling.5 drops of n-octanol was added as antifoaming agent, it was boiled for 30 minutes exactly from the onset of boiling, after that connected to vacuum for draining H_2SO_4 and washed three times with 30 mL (crucible filled up to top) of hot demonized water, connecting each time to compressed air for stirring the content of crucible. After draining the last wash 150mL of preheated KOH (1.25%w/v)) was added and 5 drops of antifoam also. Then it was boiled 30 minutes, filtered and washed, last washing with cold deionized water to cool, the crucible and then crucible content was washed three times with 25 ml of acetone, stirring each time by compressed air. Finally the crucible was removed and the dry weight was determined after drying in an oven at 105^{0}C for an hour or up to constant weight then cooled in desiccators. This weight represents the crude fiber + ash content in comparison to initial weight. The crucible with insoluble matter was placed in a muffle at 550^{0}C for three hours and reweighed after cooling in desiccators. The crude fiber contents in 100g sample were calculated. Three replicates were done.

Calculation

W_1g = Weight of crucible, Fiber and ash

W_2g = Weight of crucible and ash

W_3g = Weight of fresh sample

Fiber % = $(W_1-W_2)/ W_3$x100

2.8 Carbohydrate determination

The carbohydrate content of the test sample was determined by estimation using the arithmetic difference method [D.A. Pearson 1976].

$$\%CHO = 100 - (\%\ fat. + \%\ ash + \%\ fiber + \%\ protein)$$

2.9 Statistical analysis

The results obtained from products with three replicate were subjected to analysis of variance by complete randomized design (CRD). The significant difference among the extracts was tested in Least Significant Difference (LSD) at 5 % level of significance using SAS software.

III. RESULTS AND DISSECTION

Measurement of nutritional status is one of the key indicators for monitoring the overall health of inhabitants and measuring the impact of change in factors that affect the safety of population. Pinattu, boiled odiyal flour and odiyal flour were showed significant different ($p<0.05$) for all nutritional parameters except moisture content. Pinattu showed highest moisture content than flours while there were no significant different between odiyal and boiled odiyal flours. Odiyal flour has highest protein, fat and carbohydrate content when compared with boiled odiyal flour because during the processing of boiled odiyal flour water soluble compound was washed out. Whereas ash and crude fiber content of boiled odiyal flour was significantly higher than odiyal flour. Crude fiber content of pinattu, boiled odiyal flour and odiyal flour were 5.0612(±0.01), 7.1338(±0.18) and 4.4965(±0.15) respectively.

TABLE 1
PROXIMATE COMPOSITION OF PINATTU, BOILEDODIYAL FLOUR AND ODIYAL FLOUR (g/100g)

sample	Pinattu	Boiled odiyal flour	Odiyal flour
Moisture	16.6667(±0.008)^{a}	11.6667(±0.001)^{b}	10.6667(±0.001)^{b}
Protein	2.23127(±0.062)^{c}	6.5188(±0.062)^{b}	6.7813(±0.062)^{a}
Fat	0.0810(±0.001)^{c}	0.2840(±0.008)^{b}	0.4349(±0.013)^{a}
Ash	0.0428(±0.001)^{a}	0.0213(±0.0003)^{c}	0.0203(±0.0002)^{b}
Crude Fiber	5.0612(±0.01)^{b}	7.1338(±0.18)^{a}	4.4965(±0.15)^{c}
Carbohydrate	75.9171(±0.61)^{b}	74.3765(±0.65)^{c}	77.5994(±0.52)^{a}

Each value in the table is represented as mean ± SD (n = 3). Values in the same rows followed by a different letter (a-c) are significantly different (p< 0.05).

Sahniet al., 2014 stated that the nutritional analysis of the palmyrah dried roots has shown 8.54% protein content, 23.53% carbohydrates, 7.29% crude fiber and negligible fat content.

IV. CONCLUSION

Findings from this research work have revealed great potential food uses of palmyrah based products. These products have appropriate amount of protein content as well as those were very good source of fiber therefore which could be used in various food applications.

RECOMMENDATIONS

It is hereby recommended, based on the findings of this research work that increased efforts would be made to encourage the utilization of palmyrah based food products and further studies need to evaluate the antioxidant activity of these palmyrah based products.

Conclusion section must be included and should indicate clearly the advantages, limitations, and possible applications of the paper. Although a conclusion may review the main points of the paper, do not replicate the abstract as the conclusion. A conclusion might elaborate on the importance of the work or suggest applications and extensions.

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An acknowledgement section may be presented after the conclusion, if desired.

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