Development of Spicy-Snack Incorporated with Palmyrah (*Borassus Flabellifer*) Tuber Flour

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Palmyrah tuber flour has the similar properties of gluten which can be used in bakery industry. However, it is still underutilized and the feasibility of applying the flour in bakery products is not deeply studied so far. This study analysed the possibility of using unboiled Palmyrah raw tuber flour as a partial replacement of wheat flour and formulate a spicy-snacks (SN). Two trials were done, one was to select the suitable flour ratio and another was to select the suitable baking temperature for SN. In the first trial three treatments were done by changing Palmyrah tuber flour and wheat flour ratio as, T1; 3:1, T2; 1:1 and T3; 1:3 respectively. Second trial was done by changing baking temperature as 150 °C, 160 °C and 170 °C while keeping the baking time constant as 10 minutes. The 5 point hedonic scale sensory test was used and attributes such as crispiness, texture, appearance and aroma were evaluated by thirty semi trained panellists. Results revealed the treatment T3; 1:3 as best mixtures and 160 °C as suitable baking temperature. Triplicates of formulated SN were Proximate analysed for using AOAC 2000 procedures. Moisture content, water activity and acid insoluble fat were found 2.8±0.03%, 0.296±0.06% and 0.2±0.04% respectively and these values were within the limits indicated in SLS 256: 210. Developed spicy-snacks were stored in low density polyethylene (LDPE), high density polyethylene (HDPE) and metalized polypropylene (MP) bags and parameters such as moisture, water activity and TPC test were monitored in 14 days interval for the shelf life studies. Moisture, water activity and TPC of SN inside the MP bags showed lower value as 3.23%, 0.42 and 3.36×10^3 CFU/g respectively after 28 days. Results revealed that SN was more stable in MP bags. Further studies can be done to increase the utilization of Palmyrah tuber flour in the baking industry.

Keywords: Bakery, Metalized polypropylene, Palmyrah tuber flour, Spicy-snacks

Formulation of Palmyrah Wattalappam from Palmyrah Fruit Pulp and Palmyrah Jaggery

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Palmyrah (*Borassus flabellifer*) fruit pulp has bioactive compounds with more health benefits, but due to its bitterness it has less consumer preference. The sap of Palmyrah palm is very rich in simple sugar and used to manufacture jaggery which is used as substitutes for sugar and sweetness. This study was designed as a value addition to Palmyrah Fruit Pulp (PFP) and traditionally prepared Palmyrah Jaggary (PJ) through formulation of Palmyrah Wattalappam (PW). The ingredients PFP, PJ, eggs, coconut milk and spices (garlic powder, tamarind, salt, nutmeg, ginger, pepper) are used as ingredient. Two trials were carried out, one was to select the suitable PFP and coconut milk ratio and another trial was to select the suitable PJ ratio for PW. In the first trial three treatments were done by changing PFP and coconut milk ratio as, T1; 1:1 , T2; 3:1 and T3; 1:3 respectively. Treatment T2; 3:1 ratio was selected among them for second trial. The PW mixed with 37% (m/m) PFP, 12% (m/m) coconut milk, 50% (m/m) PJ, two eggs and <1% (m/m) of spices was found to be best formulation. Triplicates of formulated PW were analyzed for moisture content, water activity, calories, ash, acidity, fat, salt, sugar and pH of using AOAC 2000 procedures. PW was stored in a transparent polypropylene cup No 5 at refrigerator condition of 4°C for one month for shelf life study and moisture content, ash content, acidity and microbial growth were monitored in seven days intervals up to one month. Results revealed that PW consist of moisture content 51.99±0.52%, water activity 0.79±0.001%, calories (energy) 0.86±0.001 kcal, ash 1.96±0.31%, acidity 0.21±0.01%, fat 0.39±0.45%, salt 0.08±0.001%, sugar 37.58±0.36% and pH value of 7.65 at the significant difference ($p>0.05$). PW was more stable in transparent polypropylene and there was no any significant different in moisture, ash content, acidity, yeast & mold and *E. coli* & coliform growth throughout the study period. PW developed with the incorporation of PFP and PJ has good texture flavor, aroma and shelf life of one month. It can be further developed as a successful value added desert product of PFP and PJ to the market by analyzing its antioxidant properties.

Keywords: Coconut Milk, Palmyrah fruit pulp, Palmyrah jaggary, Shelf life

Enhancement of Palmyrah Fruit Leather (*Panattu*) Mouth Feel by Developing *Panattu* Choco Bar

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Palmyrah fruit leather (*Panattu*) is a product obtained by drying the Palmyrah fruit pulp. It has a soft, rubbery texture and a sweet taste with organoleptically acceptable characteristics. Even though, it contains high medicinal and anti-hypoglycemic properties, consumer acceptability is low due to its bitter taste. Mouth feel of the fruit pulp can be enhanced by reducing the bitterness. Therefore, the aim of this study is to increase the mouth feel of the Palmyrah fruit leather by adding different food flavor compounds and develop *Panattu* Choco Bar. Preserved Palmyrah pulp was used to prepare fruit leather with the addition of three different flavorings such as salt, sugar and citric acid in different ratios. Fruit leather treated with salt 0.4% (w/v) and citric acid 0.2% (w/v) was selected as best based on sensory evaluation results. Citric acid treated fruit leather showed low bitterness, good chewiness and mouth feel The overall acceptability of these fruit leathers were significantly different ($p<0.05$) from others. Choco bar was developed with the addition of chocolate, condensed milk and desiccated coconut to selected salt (0.4%), citric acid (0.2%) treated and control Palmyrah fruit leather. Best Choco Bar was selected using sensory evaluation. The overall acceptability of citric acid treated choco bar was significantly different ($p< 0.05$) from others. Chosen Choco Bar was analyzed for sugar, salt, fat and energy content and results were 45.54%, 1.6%, 21.75% and 526.93 kcal respectively. *Panattu* Choco Bar was stored at room temperature for three weeks and TPC, yeast and mold growth, acidity and moisture content were tested at seven days interval. The microbial counts were in the limit according to the SLS standard (SLS: 516 Part 1: 1991) but acidity and the moisture content of the product were increased with storage at room temperature. The newly developed Choco bar has enhanced the mouth feel of *panattu*, thus it would be a value added product of traditionally available Palmyrah leather.

Keywords: *Panattu*, Choco bar, Mouth feel, Palmyrah, Bitterness