

Development of gluten-free cakes

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Celiac (coeliac) disease, also known as celiac sprue and gluten-sensitive enteropathy, is one of the most frequent food intolerances in the world. It is an autoimmune disorder prevalent in 1:133 of the US population and 1:266 of the population worldwide. Celiac disease is characterized by the inflammation of the upper small intestine. When exposed to gluten, *villi*, tiny hair-like projections in the small intestine are damaged, leading to mal-absorption of essential nutrients such as iron, folic acid, calcium, and fat-soluble vitamins. Currently, the only treatment available for celiac disease is to adopt a gluten-free diet. Gluten is a complex composed of the proteins glutenin and gliadin, and can be found in wheat, barley, rye, triticale and possibly oat cereals. The immune response may actually be focused on a limited portion of the gliadin region. When hydrated and mixed or kneaded, gluten forms strands that facilitate texture development and provide structure to baked goods. Most previous research on gluten-free baked products has focused on breads. However, the development of other high-quality gluten-free baked goods with sensory and textural properties similar to those baked goods containing gluten remains a challenge. The goals of this study were to determine the consumer acceptance, and physical and chemical properties including texture, weight, volume and water activity of cakes formulated with soy flour and corn starch using standard laboratory methods. A response surface methodology was used to assist with formula optimization and data analysis. Preliminary results from this study will be presented. The data generated during this study will be useful to the gluten-free baked goods industry.

Low temperature low relative humidity drying of rough rice

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With the increase in harvesting capacity by rice farmers, coupled by the increase in drying costs, the rice industry must find more efficient and economical ways of drying rough rice without adversely affecting product quality. The potential of using air at low temperature (26–34°C) and low relative humidity (RH) (19–68%) to dry rough rice was investigated. Drying rates and durations of four rice cultivars were measured. Head rice yield (HRY) and color were used as indicators to determine the effects on product quality. Changes in RH were found to have greater influence on drying rates and durations at 26°C than at 30 and 34°C. Head rice yields and color of the dried samples were not significantly different from those of control samples. High peak and final viscosities were found for all the drying conditions.

Effect of spray drying conditions on the resistant starch content of unripe banana (*Musa sp.*) flour

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The pulp of unripe banana is rich in resistant starch (RS), which behaves in the body such as fiber. Brazil is one of the world largest producers of bananas; however, the loss of the fruit in the post-harvest phase is high. This project aimed to assess the technological feasibility of obtaining unripe banana flour in spray dryer. After peeled and treated with antioxidant agents, unripe bananas from cultivar *Nanicão Jangada* (RS between 55.6 and 65.0%) were crushed in blender with water in the proportion of 1:1½ (banana/water). The pulp was passed through a brush finisher and dried in the Mobile Minor Spray Dryer. The evaluation of process parameters was performed according to a 2³ complete factorial design, with 18 experiments. The independent variables were the temperature of the drying air (from 140 to 180°C), the air pressure (from 4.0 to 5.6 kgf/cm²) and the rotation of the feeding pump (from 11 to 17 rpm). The variables were the moisture and the resistant starch contents, the water activity and instrumental color. ANOVA indicated low percentages of explained variation and calculated F values were not significant, indicating that there was not a good fit of experimental values to the models. The low variability of responses indicates that the range of study used in the experimental design did not significantly change the variables. All the flours processed in spray dryer presented high levels of resistant starch (32.3 to 49.4%), indicating that this kind of process preserves the functional characteristics of unripe banana starch, possibly because of the low gelatinization rate. All treatments resulted in flours with moisture content (7.57 to 12.58%) and water activity (0.282 to 0.566) suitable for a farinaceous product storage, with clear color (L* between 74.3 and 80.2) and with low

intense red and yellow tones (a* between 3.7 and 6.9; b* between 14.1 and 17.9).

The effect of using Doum fruit on lipid profile in experimental rats and its effect on quality characteristics of some bakery products

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Egyptian consumers may consume types of food despite the insufficient information about its chemicals composition or its beneficial effects against some diseases. Therefore, the present investigation was under taken to determine the beneficial effect of doum (D) (*Hyphene thebaica*) on lipid profile in rats and its effect on characteristics (objective and sensory) of some bakery products (BP). The study was divided into 2 parts: The 1st part was the biological study: carried on 30 male Sprague Dawley strain rats (weight 110 ± 10 g). Rats were divided into 5 groups 6/group; 3 of them fed on different % of (D) (5, 10 and 15%) for 4 weeks. After this period blood samples were collected for determination of lipid profile and liver function. The 2nd part of the study included the preparation of some (BP). Doum flour (DF) was used to fortify 2 types of the (BP) [chocolate cake (CC) and Anise biscuits (AB)] with different % (5, 10, and 15% of (DF) weight). Fortified products (FP) were subjected to different objective measurements. Sensory evaluation was carried on by panelist using score sheet. The biological results showed significant decrease (SD) (P < 0.05) in blood (cholesterol, TG, LDL, VLDL, AI I, AI II) of the groups fed on 10 and 15% (D). The results of objective characteristics of (FP) showed that (CC) with 15% of (DF) maintained significantly higher (P < 0.05) height, volume and index to volume as compared to (UF) product. Sensory evaluation results of (CC) indicated that, there was significant decrease in the score given for product fortified with 10% and 15%. It can be concluded that feeding diet contained (10 and 15%) (DF) had greater effects on rats' lipid parameters. However, products fortified with 5% (DF) maintained better characteristics. Flavor enhancers can be added to improved product odor and overall quality. Further study should be carried on to confirm the health benefits of doum over along period of consumption.

Carotenoids of biological importance in Brazilian corn cultivars

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This present study aimed at characterize maize commercial cultivars produced in Brazil for carotenoids profile. Selected Brazilian maize hybrids and open pollinated varieties were selected based on both color of kernels and agronomic performance. The material was planted and harvested under controlled conditions and resulting samples were analyzed for total carotenoids, xanthophylls and carotenes using both spectrophotometric and chromatographic methods. Significant differences were found in carotenoids profiles among maize cultivars within each group (hybrids and OPVs) but not among groups. Total carotenoids in the Brazilian maize cultivars averaged 19.8 µg/g dwb and varied from 13.4 to 24.2 µg/g dwb. Zeaxanthin and lutein were identified as major carotenoids in maize. Total pro-vitamin A carotenoids content was found to be similar among commercial maize hybrids and averaged 4 µg/g dwb. However, the overall mean for total carotenes was significantly higher in the hybrids (4.2 µg/g) compared to OPVs (2.8 µg/g). Correlation coefficients were obtained for carotenoids profile data of all samples analyzed for carotenoids. Total carotenoids content was highly correlated to xanthophylls (0.906) and also to beta-cryptoxanthin (0.645) and carotenes (0.637), but carotenes were not well correlated to xanthophylls (0.314). Therefore, selection for high pro-vitamin A maize genetic resources cannot be based only on either total carotenoids or xanthophylls contents.

Characteristics of cous cous samples prepared with different semolina and processing parameters

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The cous cous, one the most famous dishes of the Arabian cooking, is prepared by a long mixing of semolina and water in order to obtain agglomerates of 1–2 mm size. The artisan process requires considerable preparation time for its cooking, consisting of hydration and steam treatments. In the current industrial process, the pre-cooking of the agglomerates with a steam treatment allows to reduce the domestic cooking time to few minutes. The main disadvantage of the industrial process is related to a shorter shelf-life of the product as a consequence of rancidity development during shelf-life. The role of semolina particle size (3 granulations) and drying conditions on several characteristics of the pre-cooked products have been investigated. All samples dried with the low temperature (LT) diagram were more susceptible to rancidity than the corresponding high temperature (HT) dried