Comparison of chemical compositions and rheological characteristics of husked and naked oat flakes

In order to comprehend the differences of quality within husked and naked oat flakes, 15 categories of domestic naked oat flakes and 42 categories of husked ones abroad bought from supermarket have been used as materials including the protein content, fat content, ash content, β-glucan content & energy, and the rheological characteristics including gelatinization temperature, peak viscosity, breakdown value and setback have been determined in the paper. The results indicated that naked oat flakes were considerably different with the husked ones on chemical compositions and rheological characteristics. Compared with the husked flakes, the naked oat flakes had a statistically significantly (P<0.05) higher level of fat (almost double), energy while a lower value of ash, β-glucan, peak viscosity, breakdown value, setback. Further, the contents of protein and gelatinization temperature of naked oat flakes were higher than those of husked flakes, but the difference was not significant [Che, T.*, Zheng, J. and Hu, X. (College of Food Science & Engineering, Northwest A & F University, Yangling, China), Journal of the Chinese Cereals and Oils Association, 2015, 30 (12), 33-37].

Fermented beverage emulsion based on donkey milk with sunflower oil

Sunflower oil was added to donkey milk to increase the low energetic intake and improve both texture and healthy characteristics. This milk-based emulsion was fermented using a binary association of two strains of *Streptococcus thermophilus* showing distinctive abilities. One strain (St 907) produced rropy exopolysaccharide (EPS), whereas the other strain (St 563) produced folic acid. Fermentation was stopped at pH 5.0 to prevent whey separation. The refrigerated product was stable at least for 20 days and showed improved viscoelastic properties due to the EPS combined with the oil droplets. The volatile profile was constituted of ketones, aldehydes, alcohols and fatty acids, mainly originated from microbial fermentation, whereas few other compounds suggested the presence of oxidative processes. The folic acid content in the fermented beverage was increased by more than 10 times (2.03 ± 0.17 µg/100 mL) with respect to that found in donkey milk (0.16 ± 0.03 µg/100 mL). An emulsion based on donkey milk and sunflower oil (1.6% v/v) was fermented by two strains of *Streptococcus thermophilus* showing distinctive abilities, i.e. the production of exopolysaccharides (EPS) and folates. A controlled fermentation was carried out to obtain a stable product for 20 days, showing improved viscoelastic properties and an increased folic acid content [Tidona, F.*, Charfi, I., Povolo, M., Pelizzola, V., Carminati, D., Contarini, G. and Giraffa, G. (Consiglio per la ricerca in agricoltura e l'analisi dell'economia agraria, Centro di Ricerca per le Produzioni Foraggere e Lattiero-Casearie (CREA-FLC), Via Antonio Lombardo 11, Lodi, Italy), International Journal of Food Science and Technology, 2015, 50 (12), 2644-2652].

Rheological, antioxidative and sensory properties of dough and Mantou (steamed bread) enriched with lemon fiber

Consumption of natural bioactive compounds such as polyphenols and dietary fiber offers health benefits. Lemon pomace, a by-product during processing of lemon juice, is discarded which contributes to environmental pollution. In the present study, lemon fiber (LF) was extracted from lemon pomace and incorporated into dough and Mantou. Results showed that the substitution of wheat flour by LF resulted in stiffer and less extensible dough with...
or without fermentation. Both Peleg-Normand and Wiechert models fitted well to the stress relaxation data of Mantou ($R^2$ 0.99). The parameters of two models were significantly affected by the amount of LF. The hardness of Mantou increased with the increasing of the LF substitution (0-9g/100g flour), but the cohesiveness, specific volume and elasticity decreased with the fiber substitution. Steaming led to significant decrease in free phenolics and increase in bound form of proofed dough. These results suggest that the substitution of 3 or 6g LF per 100g flour can produce healthy and acceptable Mantou with higher free total phenolic content and antioxidant capacity [Fu, J.-T.*, Chang, Y.-H. and Shiau, S.-Y. (Department of Food Science and Technology, Tajen University, Pingtung, Taiwan), LWT-Food Science and Technology, 2015, 61 (1), 56-62].

NPARR, 7(1), 2016-45 Effect of different packaging methods on the quality of stuffed and sliced mozzarella cheese during storage

Mozzarella produced with high moisture curd method was filled into a fibrous casing and was stored at 4C and 85% relative humidity for 5 days. Sliced cheese was packed in aerobic packaging (AP), vacuum packaging (VP) and modified atmosphere packaging (MAP) and was stored at 4C for 21 days. L* (lightness) value of the AP sample decreased, while an increased in other two treatments was detected. The a* (redness) values of VP and MAP samples decreased, while the values of AP samples increased. Mesophilic aerobic bacteria, yeast and mold counts increased in the AP samples, while that of the VP and MAP samples counts decreased. Lactic acid bacterial count decreased in all three samples and the greatest decrease with a value of 3.90 log cfu/g was detected in samples packed in aerobic conditions. Samples with MAP had significantly better sensory score (P<0.05) than any other samples. Mozzarella cheese is a popular processed dairy product. Mozzarella cheese is primarily produced with water buffalo milk and cow milk. Mozzarella is produced using two different methods, which are based on dry matter ratio and shelf life. Mozzarella with low moisture is used in the pizza industry and has a longer shelf life. The other mozzarella has higher humidity content and a limited shelf life. Modified atmosphere packaging (MAP) is becoming more common and is successfully applied to different processed dairy products for extending the shelf life. To sum up, this study proves the efficacy of using different packaging methods (AP, VP or MAP) on the microbiological, chemical and sensory properties of sliced mozzarella [Akarca, G.*, Tomar, O. and Gök, V. (Department of Food Engineering, Engineering Faculty, Afyon Kocatepe University, Ahmet Necdet Sezer Camp., Gazligöl Street, Afyonkarahisar, Turkey), Journal of Food Processing and Preservation, 2015, 39 (6), 2912-2918].

NPARR, 7(1), 2016-46 Effect of pineapple waste powder on probiotic growth, antioxidant and antimutagenic activities of yogurt

Although many fruit by-products are good sources of nutrients, little is known about their prebiotic potential. This research was aimed at establishing the prebiotic effect of pineapple wastes on probiotics including Lactobacillus (L.) acidophilus (ATCC® 4356™), L. casei (ATCC® 393™) and L. paracasei spp. paracasei (ATCC® BAA52™) and the subsequent release of antioxidant and antimutagenic peptides in yogurt during their growth. Oven- and freeze-dried peel and pomace were milled separately into powders and tested for prebiotic activities. The net probiotic growth (1.28–2.14 log cfu/g) in customized MRS broth containing the pineapple powders as a direct carbohydrate source was comparable to MRS broth containing glucose. The powders were also separately added to milk and pomace were milled separately into powders and tested for prebiotic activities. The net probiotic growth (1.28–2.14 log cycle) in probiotic populations was observed in
the yogurts as a consequence of pineapple powder supplementation. Crude water-soluble peptide extracts, prepared by high-speed centrifugation of the yogurts, displayed remarkable antioxidant activities assessed through in vitro assays, namely scavenging activity of 1,1-diphenyl-2-picrylhydrazyl radicals (IC$_{50}$ = 0.37–0.19 mg/ml) and hydroxyl radicals (58.52–73.55 %). The peptide extracts also exhibited antimutagenic activities (18.60–32.72 %) as sodium azide inhibitor in the Salmonella mutagenicity test. Together, these results suggest that pineapple by-products exhibited prebiotic properties and could possibly be commercially applied in new functional food formulations [Sah, B.N.P.*, Vasiljevic, T., McKechnie, S. and Donkor, O.N. (Advanced Food Systems Research Unit, College of Health and Biomedicine, Victoria University, Werribee Campus, PO Box 14428, Melbourne, VIC, Australia), Journal of Food Science and Technology, 2015, 52, 1-11].

NPARR, 7(1), 2016-47 Quantitative descriptive analysis and principal component analysis for sensory characterization of Indian milk product cham-cham

Promising development and expansion in the market of cham-cham, a traditional Indian dairy product is expected in the coming future with the organized production of this milk product by some large dairies. The objective of this study was to document the extent of variation in sensory properties of market samples of cham-cham collected from four different locations known for their excellence in cham-cham production and to find out the attributes that govern much of variation in sensory scores of this product using quantitative descriptive analysis (QDA) and principal component analysis (PCA). QDA revealed significant (p < 0.05) difference in sensory attributes of cham-cham among the market samples. PCA identified four significant principal components that accounted for 72.4 % of the variation in the sensory data. Factor scores of each of the four principal components which primarily correspond to sweetness/shape/dryness of interior, surface appearance/surface dryness, rancid and firmness attributes specify the location of each market sample along each of the axes in 3-D graphs. These findings demonstrate the utility of quantitative descriptive analysis for identifying and measuring attributes of cham-cham that contribute most to its sensory acceptability [Puri, R.*, Khamrui, K., Khetra, Y., Malhotra, R. and Devraja, H.C. (Dairy Technology Division, National Dairy Research Institute, Karnal, Haryana, India ), Journal of Food Science and Technology , 2015, 52, 1-11].

NPARR, 7(1), 2016-48 Effect of calcium, phosphate and pH on goat milk coagulation and rheological properties

In this study, different concentrations of calcium (0%~0.06%), phosphate (0%~0.06%) were added and pH value were adjusted to study goats' milk rennet coagulation properties by rheometer and texture analyzer. From dynamic perspective, rennet curd rate (CFRmax/Pa·min$^{-1}$), coagulation time (GT/s), Greatest degree of hardness (GS/Pa) and rate of syneresis (k/min$^{-1}$) were analyzed with the three factors change. From static perspective, hardness, adhesiveness, cohesiveness, springiness and relative whey ratio were studied. The correlations of these indices were also done and regression models were build by Design expert. The results showed goats' milk rennet coagulation properties were affected by three factors significantly, presented certain tendency and indices had some correlations. The regression models of GT, GS and springiness were valuable to predict the goats' milk rennet coagulation properties [Zhao, L*, Zhang, S., Liu, L., Lu, J., Xue, H., Li, H., and Lv, J. (Key Laboratory of Agricultural Product Processing and Quality Control, Ministry of Agriculture, Institute of Agro-Product Science and Technology, Chinese Academy of Agricultural Sciences, Beijing, China), Journal of Chinese Institute of Food Science and Technology , 2015, 15 (9), 61-68]
Food production is among the highest human environmental impacting activities. Agriculture itself accounts for 70–85% of the water footprint and 30% of world greenhouse gas emissions (2.5 times more than global transport). Food production’s projected increase in 70% by 2050 highlights the importance of environmental impacts connected with meat production. The production of various meat substitutes (plant-based, mycoprotein-based, dairy-based, and animal-based substitutes) aims to reduce the environmental impact caused by livestock. This article outlined the comparative analysis of meat substitutes’ environmental performance in order to estimate the most promising options. The study considered “cradle-to-plate” meal life cycle with the application of ReCiPe and IMPACT 2002+ methods. Inventory was based on literature and field data. Functional unit (FU) was 1 kg of a ready-to-eat meal at a consumer. The study evaluated alternative FU (the equivalent of 3.75 MJ energy content of fried chicken lean meat and 0.3 kg of digested dry matter protein content) as a part of sensitivity analysis. Results showed the highest impacts for lab-grown meat and mycoprotein-based analogues (high demand for energy for medium cultivation), medium impacts for chicken (local feed), and dairy-based and gluten-based meat substitutes, and the lowest impact for insect-based and soy meal-based substitutes (by-products allocated). Alternative FU confirmed the worst performance of lab-grown and mycoprotein-based analogues. The best performing products were insect-based and soy meal-based substitutes and chicken. The other substitutes had medium level impacts. The results were very sensitive to the changes of FU. Midpoint impact category results were the same order of magnitude as a previously published work, although wide ranges of possible results and system boundaries made the comparison with literature data not reliable. Conclusions and recommendations: The results of the comparison were highly dependable on selected FU. Therefore, the proposed comparison with different integrative FU indicated the lowest impact of soy meal-based and insect-based substitutes (with given technology level development). Insect-based meat substitute has a potential to be more sustainable with the use of more advanced cultivation and processing techniques. The same is applicable to lab-grown meat and in a minor degree to gluten, dairy, and mycoprotein-based substitutes [Smetana, S.*, Mathys, A., Knoch, A. and Heinz, V. (German Institute of Food Technologies (DIL-e.V., Quakenbrück, Germany), International Journal of Life Cycle Assessment, 2015, 20 (9), 1254-1267]