P033

The effect of accelerated temperatures on the shelf life limiting factors in apple juice concentrate

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The quality of apple juice concentrate deteriorates during storage due to Maillard browning and growth of yeasts and moulds and this poses a problem for the fruit juice industry as it leads to economic losses. Knowledge on the rate of deteriorative reactions is important because when it is known, the storage and processing conditions can be optimized. The objective of this study was to determine if accelerated storage studies can be used to estimate the rate of change in the shelf life limiting factors in apple juice concentrate over time. This was done by assessing the rate of deterioration at a normal storage temperature of 10ºC and accelerated storage temperatures of 25ºC and 35ºC over a period of 12 weeks. The colometric parameters (L*, a*, b*, hue, chroma and total colour difference), absorbance at 420nm (A_{420nm}) and 5- hydroxymethylfurfural content were evaluated. The change in A_{420nm} and b* were best described by the zero order kinetics while the change in L* could be adequately described by the zero, first and parabolic kinetic models. The predicted rate constants (k) from the accelerated storage temperatures were 1.06, 1.70 and 1.63 times more than the actual rate constant from the normal storage temperature for L*, b* and A_{420nm} respectively. These results suggest that the predicted rate constant is comparable to the actual rate constant. The Arrhenius model and Q_{10} coefficients were used to describe the temperature dependence of the reaction rate constants of the Maillard browning parameters. The Q_{10} coefficients which can be used to estimate the change at lower storage temperatures were calculated to be 1.53, 1.20, 1.81 and 5.25 for L*, b*, A_{420nm} and HMF respectively and the activation energies were 8.17, 7.70 and 14.80 kcal mol^{-1} for L*, b* and A_{420nm} respectively.

P034

Characterization of traditional processing of Kitoza, a salted/dried/ smoked meat product from Madagascar

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Kitoza is a traditional salted and dried and/or smoked meat product of Madagascar. It is made from beef or pork strips and is produced at artisanal and familial levels. In a previous study, the analyses of 60 end-products showed that smoked Kitoza contained approximately 50 g/100g of water, 3g/100g of salt and showed a water activity of 0.93 on average. They are thus classified mainly in food with high moisture content while the most dried products are in the zone of intermediate humidity food (Leistner and Rödel, 1976). Smoking the product however led to Benzo (a) Pyrene (B(a)P) content (indicator of carcinogenic compounds contamination of cooked and smoked meat products) above the norm of 5 ppb in 10 samples. Moreover, if the final pH values (of the order of 5.8) indicated that Kitoza is not a fermented food, 11 samples had some D-lactic acid content as described in sausage, a well-known fermented product.
This study describes the traditional process for making smoked Kitoza. This process has not been the focus of any other scientific study to date. It has been characterized in terms of mass transfers during salting and smoking (salt gain, water loss) and evolution of biochemical (water, salt, Aw, pH, titrable acidity, D andLl-lactic acid , phenol and B(a)P contents) and microbiological (lactic acid bacteria and total flora) characteristics during the process. Measurements were performed on the raw material, the product after salting, and the product after smoking. This kinetic study allows defining better the unit operations involved in the process and their impact on product quality.

P035

Effects of carrot powder on physicochemical, microbiological properties and sensory properties of yoghurt

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Yogurt is considered a healthy food and incorporating carrot powder will make it even healthier. Carrot powder, is a good source of beta carotene, a provitamin A. Plain and carrot yoghurt were prepared in the laboratory scale production from low fat milk. Carrot yoghurt was prepared by blending milk with 1 %, 2 % and 3 % carrot powder before fermentation. The physicochemical, microbiological and sensory quality of yoghurt samples were investigated after production. Physicochemical analysis revealed decrease in pH and an increase in titratable acidity, viscosity and total soluble solids with increase in carrot powder. On the other hand, protein content decreases with increase in carrot powder. The lightness (L*) decreased with increase in carrot powder while the redness (a*) increased with increase in carrot powder with 3 % giving higher values of redness and lower values of lightness. Microbial count increased with increase in carrot powder with a significant difference between the 3 % carrot yoghurt and 1 % and 2 % carrot yoghurt. There was a significant difference on the sensory scores of colour and aroma of carrot yoghurt and plain yoghurt as the carrot yoghurt got higher scores than plain yoghurt. There was no significant difference ($P<0.05$), between the acceptability of the plain yoghurt, 1 % and 2 % a carrot yoghurt and a significant difference was there between 3 %. Thus, fortifying yogurt with 1 % and 2 % carrot powder produced an acceptable yogurt with beneficial health effects.

P036

Modelling the effect of temperature on respiration rates of pomegranate ('Cv. Bhagwa') whole fruit arils and aril-sac for modified atmosphere packaging

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Temperature is one of the extrinsic factors that influence physiological response of fresh produce. For optimal postharvest handling and design of modified atmosphere packaging (MAP), it is important to understand the influence of storage temperature on respiration rate (RR) of fresh or fresh-cut produce. This requires a robust mathematical model, capable of predicting RR as a function of temperature. In this study, the RR of pomegranate whole fruit, aril-sac and arils were quantified and a mathematical model was developed to predict RR as a function of temperature. RR (RO_2 and RCO_2) of whole fruit, aril-sacs and arils was measured at 5, 10, 15 and 22°C for storage duration of 5 day, using a closed system. Aril-sac had the highest RR at all storage temperatures RO_2 of whole fruit, aril-sacs and arils ranged from approximately 3.7 to 33.3, 5.5 to 48.4 and 3.2 to 28.9 mg kg^{-1} h^{-1}, and RCO_2 ranged from 2.7 to 23.0, 2.9 to 27.7 and 1.96 to 18.6 mg kg^{-1} h^{-1}, respectively. Temperature had a significant effect on RR of whole fruit and fruit fractions. Overall, RR declined by 74.5% when storage temperature was reduced from 22°C to 5°C. The dependence of RR of pomegranate whole fruit, aril-sac and arils on temperature was adequately predicted by an Arrhenius type model ($R^2 > 97.1\%$). The model was validated at 22°C and good agreement was found between experimental and predicted data.