Effect of processing stages of apple juice concentrate on patulin levels

Apple juices are the most important source of patulin in human diet. The juice production requires the use of ripened fruit, which is normally stored at low temperature prior to processing. Even at temperatures below 5°C some species of Penicillium are able to grow and produce patulin. The effects of different stages of apple juice concentrate production on patulin levels were investigated by researchers at Brazil. The objective of their study was to determine the effect that some stages of apple juice concentrate processing (milling, pasteurization, enzymatic treatment, microfiltration and evaporation) have on patulin levels. Patulin was detected in all samples analyzed in concentrations ranging from 56 to 653 µg/l. Apple paste resulted from milling process had high levels of patulin. The results indicated that it is possible to reduce patulin level in apple juices. After pasteurization, enzymatic treatment, microfiltration and evaporation processes, the mean loss of patulin was 39.6, 28.3, 20.1 and 28.4%, respectively. When apple juices concentrate were diluted from 69 to 12°Brix to consume, patulin content ranged from 15 to 46 µg/l. Patulin content in all juice samples was lower than the limit of 50 µg/l considered acceptable by the Codex Alimentarius Commission. But if consider the maximum permitted concentration established for apple products intended for infants and young children by The Commission of the European Communities all samples were found to exceed patulin concentration of 10 µg/l. Apple selection is a preventive measure to control safety hazards and good manufacturing practices in apple juice production can effectively reduce contamination [Welke Juliane Elisa, Hoeltz Michele, Dottori Horacio Alberto and Noll Isa Beatriz, Effect of processing stages of apple juice concentrate on patulin levels, Food Control, 2009, 20 (1), 48-52].

Growth of acid-adapted Listeria monocytogenes in orange juice and in minimally processed orange slices

Contamination of minimally processed fruits with Listeria monocytogenes is a major concern that needs to be taken into account in order to increase the safety of these products. The aim of the work done by researchers at Italy was to study the growth/survival of acid-adapted cells of L. monocytogenes, in orange juice and in minimally processed orange slices. The L. monocytogenes OML 45 behaviour into TSB (Tryptic Soy Broth) medium was evaluated at different pH values (between 3.7 and 6.7). The acid-adapted cells were obtained maintaining L. monocytogenes in TSB at pH 5.7 for 3 hours. The obtained cells were then inoculated into a diluted orange juice with a pH of 2.6. Moreover, the acid-adapted cells were inoculated into minimally processed orange slices. The growth was evaluated during storage at different temperatures. The study confirms that orange juice and minimally processed orange slices can support the acid-adapted pathogen growth. Adequate processing sanitation, quality control and HACCP practices are necessary to prevent contamination of minimally processed orange slices during processing [Caggia Cinzia, Scifo Giovanna Ombretta, Restuccia Cristina and Randazzo Cinzia Lucia, Growth of acid-adapted Listeria monocytogenes in orange juice and in minimally processed orange slices, Food Control, 2009, 20 (1), 59-66].
**Effects of fat, casein and lactose on high-pressure destruction of* Escherichia coli* in milk**

High-pressure (HP) destruction of* Escherichia coli* K12 suspended in commercial pasteurized milk (0, 3.25 and 5% fat), peptone water (0.1%), and phosphate buffer (0.2 mol/l Na₂HPO₄ and 0.2 mol/l NaH₂PO₄) supplemented with different amounts of casein or lactose (1-4%) was investigated by researchers at Department of Food Science and Agricultural Chemistry, Quebec, Canada. HP treatment resulted in the highest level of* E. coli* destruction in the buffer (possibly because it contained no nutrients), followed by those in peptone water and least in milk. Therefore, milk and peptone provided some baro-protection to the destruction of* E. coli* during the HP treatment. Fat content in milk between 0, 3.25 and 5% had no significant\(^{(P > 0.05)}\) influence on the HP destruction of* E. coli*. The supplement of either casein or lactose to milk did not influence the level of HP destruction of* E. coli*. However, the baro-protection became significant during HP treatment when casein or lactose was added the buffer. The buffer solution supplemented with 1-4% casein showed a baro-protective effect equivalent to that in milk. Lactose supplement to buffer also caused baro-protection, though the effect was relatively less pronounced. However, no significant difference in the baro-protection effect was observed among the buffer samples supplemented with different levels (1, 2 and 4%) of lactose or casein. Therefore, the major contributors for baro-protection of* E. coli* in milk during HP treatment appear to be casein and lactose, rather than the fat content. Overall, whole milk has baro-protective effects on HP destruction of* E. coli* K12, and the components contributing to the protection are likely to be casein and lactose [Ramaswamy Hosahalli S, Jin Hong and Zhu Songming, Effects of fat, casein and lactose on high-pressure destruction of* Escherichia coli* K12 (ATCC-29055) in milk, *Food Bioprod Process*, 2009, 87 (1), 1-6].

**Influence of simulated industrial thermal treatments on the volatile fractions of different varieties of Honey**

Appearance plays a key role in the commercial success of honey, as consumers demand a fluid, non-crystallized product. Recently harvested raw honey is in a liquid state, but it crystallizes with greater or lesser speed depending on numerous factors such as origin (botanical and geographical), temperature, moisture content and sugar content. To slow down the natural crystallization process and ensure stability during its commercial life, raw honey is normally pasteurized prior to being packaged in order to dissolve sugar crystals and destroy yeasts. Before it can be pasteurized, however, the honey must be heated at a moderate temperature between 45 and 50°C. This treatment is applied to the honey in the drums received from beekeepers. The heat liquefies the honey to facilitate the emptying of the drums and favour the subsequent filtration and blending stages required to produce a particular production batch.

Thus, aim of the study done by Institute of Food Engineering for Development, Food Technology Department, Universidad Politécnica de Valencia, Valencia, Spain was to determine if the volatile fraction of honey is affected by the application of standard industrial thermal treatment processes. Four types of Spanish honey were studied: three of floral origin (citrus, rosemary and polyfloral) and the fourth from honeydew. Each sample of honey was divided into three parts: one was left untreated, one was liquefied (at 45°C for 48 h) and the other was both liquefied and pasteurized (at 80°C for 4 min). All
the samples analyzed were characterized to determine their melissopapynological, physicochemical (pH, moisture, total acidity, conductivity, hydroxymethylfurfural and diastase activity) and volatile profiles. Type of honey had a greater impact on volatile fraction variations than did heat treatment. The overall volatile profile of each kind of honey permitted the classification of the honeys by botanical origin, revealing that there were practically no differences between the raw, liquefied and pasteurized samples of each honey. These findings suggest that industrial processes conducted under controlled conditions should not significantly alter the intrinsic aroma of honey. This finding is especially relevant for honey with greater commercial value as is the case of certain monofloral and honeydew honeys [Escriche I, Visquert M, Juan-Borrás M and Fito P, Influence of simulated industrial thermal treatments on the volatile fractions of different varieties of honey, Food Chem, 2009, 112 (2), 329-338].

Effect of water quality on the nutritional components and antioxidant activity of green tea extracts

Tea is a worldwide beverage. Water quality affects tea taste aroma, as well as health conditions pointed out that, using purified water rather than tap water or natural water, could improve the quality of tea infusion owing to different elements and mineral matter contents. Tea polyphenols, amino acids, saccharides and caffeine are the main factors which influence the quality of tea infusion. So there may be certain relationships between water quality and the extractions of tea polyphenols, amino acids, saccharides, caffeine and other components. Thus, objective of a study conducted by scientists at China was to investigate the influence of grape on biogenic amines content of the wine.

The evolution of biogenic amines from must to wine has been studied in seven different grape cultivars before and after malolactic fermentation by scientists at Italy. Alcoholic and malolactic fermentations have been carried out using selected yeasts and bacteria that, in a previous study, were unable to produce biogenic amines. The study has been performed under aseptic conditions to exclude possible interferences due to uncontrolled contaminating microorganisms present in grapes and/or in the environment. The goal of their work was to investigate the influence of grape variety on the production of biogenic amines in wine.

The results obtained showed that grape variety is related to the presence of some biogenic amines in wines and that, climatic conditions also affect the accumulation of these compounds in grapes [Del Prete V, Costantini A, Cecchini F, Morassut M and Garcia-Moruno E, Occurrence of biogenic amines in wine: The role of grapes, Food Chem, 2009, 112 (2), 474-481].
Effect of catechins, caffeine, and other components might be more important than any single component in free radical-scavenging [Danrong Zhou, Yuqiong Chen and Dejiang Ni, Effect of water quality on the nutritional components and antioxidant activity of green tea extracts, Food Chem, 2009, 113 (1), 110-114].

Effects of different drying methods on the antioxidant properties of leaves and Tea of Ginger species

Effects of five different drying methods on the antioxidant properties (AOP) of leaves of Alpinia zerumbet (Pers.) Burtt & R M Smith, Etingerera elatior (Jack) R M Smith, Curcuma longa Linn. and Kaempferia galanga Linn. were assessed by researchers working at School of Science, Monash University Sunway Campus, Bandar Sunway, Petaling Jaya, Selangor, Malaysia. The study was aimed at developing protocols for producing herbal products with AOP comparable or superior to those of commercial ones, this study is probably the first to report that freeze-drying enhances the AOP of ginger leaves and tea. All methods of thermal drying (microwave-, oven-, and sun-drying) resulted in drastic declines in total phenolic content (TPC), ascorbic acid equivalent antioxidant capacity (AEAC), and ferric-reducing power (FRP), with minimal effects on ferrous ion-chelating ability and lipid peroxidation inhibition activity. Of the non-thermal drying methods, significant losses were observed in air-dried leaves. Freeze-drying resulted in significant gains in TPC, AEAC, and FRP for A. zerumbet and E. elatior leaves. After one week storage, AOP of freeze-dried E. elatior leaves remained significantly higher than those of fresh control leaves. Freeze-dried tea of A. zerumbet was superior to the commercial tea for all AOP studied. Freeze-drying appears to be a sound method for producing tea and other herbal products from ginger species. Due to its high operation cost, freeze-drying can be applied to produce high-value speciality tea or spice powder from ginger leaves [Chan EWC, Lim YY, Wong SK, Lim KK, Tan SP, F.S. Lianto FS and Yong MY, Effects of different drying methods on the antioxidant properties of leaves and tea of ginger species, Food Chem, 2009, 113 (1), 166-172].

Survival of Listeria innocua in thermally processed orange juice as affected by vanillin addition

Presence of Listeria monocytogenes could seriously affect the safety of fruit juices. Addition of natural antimicrobials may be an alternative to enhance microbial inactivation in fruit juice thermal preservation. Vanillin, a natural antimicrobial, represents a useful tool to increase thermal susceptibility of L. innocua (as surrogate for L. monocytogenes), increasing safety of minimally processed orange juice. The response of L. innocua to combined treatments involving moderate temperatures (57-61°C) and addition of different levels of vanillin (0-1100 ppm) was assessed by scientists at Argentina to find the most effective inactivation treatment in orange juice. The presence of vanillin greatly increased the bactericidal effect of the mild heat treatment. This effect considerably depended on the amount of added vanillin when working at the lowest temperature (57°C), while at higher temperatures (60 or 61°C) the increase in vanillin concentration did not produce a clear change in the response. Nonlinear semilogarithmic survival curves were successfully fitted using a modified version of Gompertz model and by the Weibullian model.

Further investigation is necessary to properly identify the conditions that maximize their activity, lowering the impact on the flavour and other organoleptic properties of the product. Extensive further work on applications of these combined treatments taking into account other strains and type of oranges would be required before making these results more generally extended [Char Cielo, Guerrero Sandra and Alzamora Stella Maris, Survival of Listeria innocua in thermally processed orange juice as affected by vanillin addition, Food Control, 2009, 20 (1), 67-74].
Use of carrot juice and tomato juice as natural precursors for enhanced production of ubiquinone-10 by *Pseudomonas diminuta* NCIM 2865

Ubiquinone-10 (CoQ10) plays an essential role in the electron transport system, and has been extensively used in food and pharmaceutical industries. Researchers working at Food Engineering and Technology Department, Institute of Chemical Technology, University of Mumbai, Mumbai, India reports on the use of statistical approach and natural precursors for enhanced production of CoQ10 using *Pseudomonas diminuta* NCIM 2865. Primarily, significance of each medium component with respect to CoQ10 production was identified by Plackett–Burman design. In the second step, concentration of most significant factors and their interaction was studied with response surface methodology (RSM). CoQ10 production increased considerably from 6.68 to 15.58 mg/l when the fermentation was carried out in the RSM optimised medium. Carrot juice and tomato juice acted as natural precursors, and enhanced the yield of CoQ10 from 15.58 to 29.22 mg/l and 24.35 mg/l, respectively.

Thus, an integrated approach of using statistical techniques and natural precursors could enhance the yield of CoQ10 by *P. diminuta* NCIM 2865. The study indicated both carrot juice and tomato juice to act as natural precursors for CoQ10 production, although the results were higher with carrot juice [Bule Mahesh V and Singhal Rekha S, Use of carrot juice and tomato juice as natural precursors for enhanced production of ubiquinone-10 by *Pseudomonas diminuta* NCIM 2865, Food Chem, 2009, 116 (1), 302-305].

Dye

Simultaneous analysis of anthocyanins and flavonols in petals of lotus (*Nelumbo*) cultivars

Lotus, also known as *Nelumbo*, is a perennial aquatic herb, which consists of two species, *N. nucifera Gaertn.* and *N. lutea* (Willd.) Pers. based on the morphological characters. It is one of the most important ornamental and economic plants grown widely in Asia, Australia and North America. A fast and reliable HPLC method for the simultaneous separation of anthocyanins and flavonols in lotus petals was developed by scientists at China based on the study of four candidate solvent systems. Fifteen flavonoids were identified by high-performance liquid chromatography with photodiode array detection/mass spectrometry. Among them, two anthocyanins and nine flavonols were discovered in lotus petals for the first time. This work is valuable for both the hybrid breeding on lotus oriented to flower colour and the utilization of lotus petals as functional food materials.

This work is indispensable for investigating the composition of anthocyanins and flavonols in hundreds of lotus cultivars. The feature of high sample throughput significantly reduces the workload as well as procedure cost of analyzing flower pigments from different lotus cultivars. With the anthocyanins and flavonols composition data, we could develop a HPLC fingerprinting database of lotus cultivars to solve headachy problems about synonyms and homonyms. Meanwhile, we could select species or cultivars rich in delphinidin, cyanidin, malvidin or quercetin derivatives for functional food materials, such as lotus liquor and lotus tea. It is also a contribution to our understanding of flavonoid biosynthesis, which could obviously help the hybrid breeding of lotus oriented to flower colour by providing guidelines on selecting appropriate parents for breeding new cultivars with novel