Neurological mechanisms of green tea polyphenols

The lifestyle of modern era has increased tea consumption from a mere intake in the morning and evening. Recent research reports have revealed that the implementation of radical scavengers, transition metal (e.g., iron and copper) chelators and nonvitamin natural antioxidant polyphenols in the clinic are beneficial for certain diseases. These observations are in line with the current view that polyphenolic dietary supplementation may have an impact on cognitive deficits in individuals of advanced age. As a consequence, green tea polyphenols are now being considered as therapeutic agents in well controlled epidemiological studies, aimed to alter brain aging processes and to serve as possible neuroprotective agents in progressive neurodegenerative disorders such as Parkinson’s and Alzheimer’s diseases. In particular, literature on the putative novel neuroprotective mechanism of the major green tea polyphenol, (-)-epigallocatechin-3-gallate, have been examined and discussed by the scientists at Eve Tops and USA National Parkinson Foundation Centers of Excellence for Neurodegenerative Diseases Research and Department of Pharmacology, Rappaport Family Research Institute, Technion-Faculty of Medicine, Haifa, Israel [Weinreb et al., J Nutr Biochem, 2004, 15(9), 506-516].

Impact of thermal treatment on colour and pigment pattern of red beet juice

The scientists at Institute of Food Technology, Hohenheim University, Stuttgart, Germany investigated the impact of heating at 85°C for 8 hours on overall colour and betalain pattern of red beet (Beta vulgaris Linn. ssp. vulgaris) juice. Although the hue angle of 358° in fresh juice was indicative of the typical red-purple appearance, heating for 8 hours induced an unexpected shift to hue angle of 62° resulting in a yellow-orange solution.

To monitor the underlying structural alterations of betalains, a new high-performance liquid chromatography separation compatible with mass spectrometry was developed. Applying this method, 2 novel yellow neobetanin structures and 2 orange-red betanin degradation products were preliminarily identified, and neobetanin formation resulting from heat exposure was proven for the 1st time. These 5 compounds were held responsible for the orange shift of red beet juice during thermal treatment. The relevance of these findings for industrial beet processing was demonstrated by comparison of pigment patterns of heated red beet juice samples and a commercial concentrate [Herbach, J Food Sci, 2004, 69(6), C491-C498].

Utilization of dried apple pomace as a press aid to improve the quality of fruit juices

The scientists at Cornell University, Department of Food Science and Technology, NY State Agricultural Experiment Station, Geneva and Biology Department, William Smith College, Geneva, United States analyzed the effects of press aids on strawberry, raspberry and blueberry juice quality and evaluated the effectiveness of dried apple pomace as an alternative press aid. Juice yields with apple pomace were similar to the yields from using rice hulls and paper. Triangle difference tests showed that there were differences between the berry juices pressed with conventional press aid to the berry juices pressed with apple pomace press aid. The paired comparison preference tests showed that the berry juices pressed with apple pomace were preferred. Flavour analysis using gas chromatography-olfactometry indicated possible off-flavours being extracted from rice hulls, such as indole and 4-vinylguaiacal, and from paper, such as (Z)-2-octenal and 2-nonenal, into the berry juices [Roberts et al, J Food Sci, 2004, 69(4), SNQ181-SNQ190].
Goat milk in human nutrition

The scientists at Department of Animal and Food Science, University of Delaware, Newark, USA analyzed the suitability of goat milk and its products in human nutrition. They observed that goat milk and its products of yoghurt, cheese and powder have three-fold significance in human nutrition: (i) feeding more starving and malnourished people in the developing world than from cow milk; (ii) treating people afflicted with cow milk allergies and gastro-intestinal disorders, which is a significant segment in many populations of developed countries; and (iii) filling the gastronomic needs of connoisseur consumers, which is a growing market share in many developed countries. Concerning (i), very much improvement in milk yield and lactation length of dairy goats, especially in developing countries must be accomplished through better education/extension, feeding and genetics. Concerning (ii), little unbiased medical research to provide evidence and promotional facts has been conducted, but is very much needed to reduce discrimination against goats and substantiate the many anecdotal experiences about the medical benefits from goat milk consumption, which abound in trade publications and the popular press. Goats have many unique differences in anatomy, physiology and product biochemistry from sheep and cattle, which supports the contention of many unique qualities of dairy goat products for human nutrition. Concerning (iii), a few countries like France have pioneered a very well-organized industry of goat milk production, processing, marketing, promotion and research, which has created a strong consumer clientele like in no other country, but deserves very much to be copied for the general benefit to human nutrition and goat milk producers. The physiological and biochemical facts of the unique qualities of goat milk are just barely known and little exploited, especially not the high levels in goat milk of short and medium chain fatty acids, which have recognized medical values for many disorders and diseases of people. The new concept of tailor making foods to better fit human needs has not been applied to goat milk and its products so far, otherwise the enrichment of short and medium chain fatty acids in goat butter, and their greater concentration compared to cow butter, could have become a valued consumer item. Also revisions to human dietary recommendations towards admitting the health benefits of some essential fats supports the idea of promoting goat butter. While goat yoghurt, goats cheeses and goat milk powder are widely appreciated around the world, goat butter need to be produced commercially in significant volume [Haenlein, Small Ruminant Res, 2004, 51(2), 155-163].

Inhibition of LDL oxidation by red orange (Citrus sinensis) extract and its active components

Oxidative modification of low-density lipoprotein (LDL) appears to play a pivotal role in atherosclerosis. The scientists at Department of Biochemistry, Medical Chemistry and Molecular Biology, University of Catania, Italy studied inhibition of LDL oxidation by red orange, Citrus sinensis (Linn.) Osbeck extract and its active components. During experiment the effect of several concentrations of rutin, its aglycon quercetin, cyanidin 3-O-β-D-glucoside, its aglycon cyanidin, hydroxycinnamic acids and a standardized red orange varieties extract (ROE) on LDL oxidation was tested. Lipid peroxidation was monitored by conjugated diene formation and by different electrophoretic mobility of native LDL and oxidized LDL. Results obtained in the present study suggest specific effects of flavonoids tested and, in particular, of ROE on the prevention of LDL oxidation involved in the development of cardiovascular diseases [Sorrenti et al, J Food Sci 2004. 69(6), C480-C484].
Effect of HIPEF and heat treatments on milk

Pulsed electric fields (PEF) treatment involves applying very short electric pulses (μs) at high electric field intensities (typically pulse duration within the interval of 10-1000 μs; electric field strength within 20-80 kV/cm). During the PEF procedure, energy loss due to heating of foods is minimized, thereby reducing nutritional depletion and changes in the physical properties of foods. Researchers at Spain evaluated the effect of high intensity pulsed electric fields and heat treatments on vitamins of milk.

During experiment the effects of high intensity pulsed electric field (HIPEF) treatments at room or moderate temperature on water-soluble (thiamine, riboflavin, ascorbic acid) and fat-soluble vitamins (cholecalciferol and tocopherol) were evaluated and compared with conventional thermal treatments. Vitamin retention was determined in two different substrates, milk and simulated skim milk ultrafiltrate (SMUF). Samples were subjected to HIPEF treatments of up to 400 Ms at field strengths from 18.3 to 27.1 kV/cm and to heat treatments of up to 60 minute at temperatures from 50 to 90°C. No changes in vitamin content were observed after HIPEF or thermal treatments except for ascorbic acid. Milk retained more ascorbic acid after a 400 Ms-treatment at 22.6 kV/cm (93.4%) than after low (63°C-30 minute; 49.7% retained) or high (75°C-15 s; 86.7% retained) heat pasteurisation treatments. Retention of ascorbic acid fitted a first-order kinetic model for both HIPEF and thermal processes. First-order constant values varied from $1.8 \times 10^4$ to $1.27 \times 10^5$ Ms$^{-1}$ for the HIPEF treatments (18.3-27.1 kV/cm) and, for thermal processing ranged from $5 \times 10^3$ to $8 \times 10^2$ minute (50-90°C).

No significant differences were found between the results obtained after applying HIPEF treatments at room or moderate temperature. However, results depended on the treatment media. A beneficial effect of natural skim milk components, mainly proteins, was observed on the preservation of ascorbic acid, since skim milk retained more ascorbic acid than SMUF after HIPEF treatments [Bendicho et al, J Dairy Res, 2002, 69(1), 113-123].

Coriander leaf puree

Coriander (Coriandrum sativum Linn.) leaves are used for flavouring food, snacks and some soft drinks in India since ancient times. The food scientists at Department of Food Sciences, Faculty of Food Systems, United Arab Emirates University, UAE, Department of Chemical Engineering & Technology, Panjab University, Chandigarh and Department of Food Science & Technology, G.N.D. University, Amritsar, India evaluated the colour kinetics and rheology of coriander leaf puree and storage characteristics of the paste for its storage for a longer period.

The colour degradation kinetics of coriander leaf puree was studied using a fraction conversion technique during thermal treatment at 50, 65, 80, 95 and 110°C for up to 60 minutes. Blanched, comminuted coriander leaf puree was subjected to heat treatment at selected temperatures in an oil bath with agitation. Treated samples were removed from the bath at selected time intervals (0-60 minutes after come-up period), cooled immediately and analyzed for colour using a Hunterlab colourimeter. The rheological characteristics of the puree were evaluated using a computer-controlled Haake rotational viscometer at 50, 60, 70 and 80°C and it was found that the Herschel–Bulkley model adequately represented shear stress-shear rate data. Temperature dependency of the consistency index and apparent viscosity at a shear rate of 100 s$^{-1}$ followed the Arrhenius relationship and the flow activation energy ranged between 17.2 and 17.9 kJ/mol. Coriander puree was converted to paste by adding common salt (2%) and the required volume of citric acid to adjust the pH to 4.2. The paste was then filled into glass bottles and stored at selected temperatures (5, 25 and 37 °C) for 6 months and was periodically evaluated for colour, total aerobic plate count and physicochemical properties. Coriander puree/paste colour was expressed in terms of tristimulus colour value $L^*$, $a^*$ and $b^*$.

The first order reaction kinetics adequately described the changes in colour values during both thermal treatment of puree and storage of paste. The process activation energies were 29.3 and 22.1 kJ/mol, respectively, for $a^*$ and $L^*$ during thermal treatment. The corresponding values during storage were 12.7 and 12.2 kJ/mol. The paste was microbiologically stable with no significant changes ($P>0.05$) in physicochemical characteristics during storage [Ahmed et al, Food Chem, 2004, 84(4), 605-611].