

3rd International Conference and Exhibition on FOOD PROCESSING & Technology July 21-23, 2014 Hampton Inn Tropicana, Las Vegas, USA

The less oil uptake strategies in deep fat frying

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ue to their unique, delicious flavor and sensory characteristics, fried foods remain very popular world-wide; frying is effective way to cook and rapid preparation. The reduction of the fat content in fried food is desirable, mainly owing to its relationship with obesity and coronary diseases. Frying is the cause of much fat absorption into food. Fats can reach much higher temperatures than water at normal atmospheric pressure. Through frying, one can sear or even carbonize the surface of foods while caramelizing sugars. The oil uptake increase with increasing removal of water from the food during frying. However, slimness trend and acrylamide scare, the market of fried products is still developing. There has been great interest to control fat uptake in food processing, based upon pre and post frying treatments, modifications of the frying method, and edible barrier techniques. One such strategy is in the replacement of fatty ingredients with possible alternatives that can duplicate the functionality of traditional ingredients without loss of other properties. As replacement ingredients, starches, proteins, celluloses, emulsifiers and antioxidant aids are now widely available and are incorporated into many commercial frying oils. For frying quality, food type (composition and nature of food, fried food quantity (kg/h), continuous OR intermittent frying); fryer quality (capacity and surface fryer temperature, heat transfer mode, metal type in contact with fat); oil type (nature thermo stability, fresh oil addition); other applications (protective gas, antifoams additives, antioxidants additives, emulsifier additives and using filter aids) can be effective. It is stated that the optimization of frying by alteration of frying temperature, substitution by healthy oils, filtration of using oils and adsorbent treatments, new frying oils with various additives, give healthier fatty acid profiles and higher heat stability to frying oils.

The aim of this work was to investigate the effect of innovative fortification system consist of selected adsorbent, emulsifiers, antifoam and selected antioxidants on some frying characteristics and less oil uptake of fried foods. The special sunflower oil was used for deep fat frying and innovative frying oils were fortified with emulsifiers, anti-polymerizing agents, with natural and synthetic antioxidants; selected foods were fried at 180°C for 6 min in control sunflower oil and in new developed CBUFry1, CBUFry2, CBUFry3 frying oils. The overall quality, the physicochemical properties, [moisture, oil content, total polar compounds, fatty acids (FAs), color analyses], the Trolox equivalent antioxidant capacity (TEAC) analyses, sensory properties of fortified deep fat frying oils and deep fried foods including potato, eggplant-pepper, sardines, coating crisped chicken meat and also rolls (phyllo dough) with cheese filling were performed.

The innovative CBUFry1, CBUFry2, CBUFry3 formulations improved the fried food quality. The reduction of oil content accomplished as about 55wt% with three formulations ($p \le 0.05$) and total polar compounds level decreased above 72% ($p \le 0.05$). Color L and b values increased at the fried potato slices and eggplant. These ascorbic acid (AA) levels were higher than that of normal frying. It was concluded that our innovation formulation provided the additional intake of monounsaturated fat (MUFA). The best results for less oil uptake were in deep fat fried potato > rolls (phyllo dough) > eggplant-pepper > sardine > coated chicken meat, respectively. It was concluded that this proposed innovative fortification system can be used for frying oils and can be adaptable to industrial frying oil technology.

Biography

Ozlem Tokusoglu has completed her PhD at Ege University Engineering Faculty, Department of Food Engineering at 2001. She worked as a research fellow/ doctor assistant/ assistant professor/associate professor at Ege University and Celal Bayar University during 1993 to now. She is currently working as Associate Professor faculty member in Celal Bayar University Engineering Faculty Department of Food Engineering. She performed a visiting scholar at the Food Science and Nutrition Department /University of Florida, Gainesville-Florida-USA during 1999-2000 and as visiting Professor at the School of Food Science, Washington State University, and Pullman, Washington, USA during April-May 2010. She organized and directed as Conference Chair the International Congress entitled ANPFT2012 (Advanced Non-thermal Processing in Food Technology: Effects on Quality and Shelf-Life of Food and Beverages in May, 2012 at Turkey. She served as organizing committee member at 2nd International Conference and Exhibition on Nutritional Science & Therapy Conference in July 2013 at Philadelphia, USA. She has published many papers in peer reviewed journals and serving as an editorial board member of International Journal of Food Science and Technology (IJFST) by Wiley Publisher, USA and Polish Journal of Food and Nutrition Sciences (PJFNS) in Thomson Reuters. She published the scientific edited two book entitled Fruit and Cereal Bio-actives: Chemistry, Sources and Applications by CRC Press, Taylor & Francis, USA Publisher and entitled Improved Food Quality with Novel Food Processing by CRC Press, third book Food By-Product Based Functional Food Powders is also in progress.

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