



OFI Technical and Scientific Meeting Abstracts

New approaches for improving edible oil quality
Prof Dr Selma Türkay, Istanbul Technical University,
Chemical Engineering
Department; YABITED board member

In recent years, consumer interest in non-refined virgin oils has increased around the world. This is mainly based on the results of studies conducted on the health effects of the minor bioactive components of oils and fats. Consumers now believe that these kinds of oils have much more nutritional and health benefits compared to refined oils, and that fewer processed foods in the diet is the healthier option. Almost all bioactive components are removed during conventional edible oil refining and processing methods. The 'minimal refining method' is a new approach to remove undesirable components from crude canola oils while preserving healthier minor components. Another way to preserve bioactive components in edible oils is to produce the oils by mechanical extraction. In order to increase the quality of pressed oils, ultrasound-assisted alcoholic pre-treatment of seeds before pressing is another new approach. This process helps to decrease the undesirable components of oils and to increase the quality, as well as the yield, of pressed oils. This presentation will focus on these subjects.

Developments in sunflower production and research in Turkey and globally and future trends in sunflower oil composition and applications

Assoc Prof Dr Yalçın Kaya, Trakya University, Edirne, Turkey; President, International Sunflower Association, France

Sunflower is the most consumed and preferred oil in Turkey. The planted area is mainly located in the Trakya region, which is in the European part of Turkey. However, due to higher crop prices, planted areas have expanded to the Middle Anatolia and Cukurova regions as well. The broomrape parasite and weeds are the main factors limiting sunflower production in Turkey. Therefore, sunflower growers prefer two types of seeds genetically resistant to broomrape hybrids or the Imidazolinone (IMI) herbicide resistant hybrid, which is non-GM. The Clearfield system is a genetic IMI type sunflower hybrid with post planting application. IMI herbicide is primarily effective both to control main weeds and the broomrape parasite and is used effectively both in Turkey and around the world. Downy mildew disease is also a major problem, so hybrids addressing these three factors are popular both in Turkey and other producing countries. Domestic sunflower production is insufficient to meet consumption in Turkey and the country is one of the main sunflower importers in the world. Sunflower oil is mainly consumed in Turkey. However, sunflower researchers are modifying sunflower oil to high and mid-oleic types, which are suitable for frying and present as healthy oils. Oleic-type sunflower pro-

duction is almost 80%-85% in the USA and covers more than half of production in Argentina, France and Spain. However, it is just in its initial phase in Turkey and other Black Sea countries, which account for over 50% of world sunflower production. Nowadays, almost all types of sunflower hybrids are oleic types, which produce healthy oils, usable and safe for frying and other purposes.

Sunflowerseed dehulling technology
Carsten Petry, Product Manager Oil Milling & Biomass;

Dirk Heinrich, Technology & Business Development Manager, Oil Milling & Biomass, Bühler AG, Switzerland

World sunflower production has experienced steady growth resulting from high demand for animal feed and vegetable oil. The markets require high value products with high yields of oil and protein in meal. Efficient dehulling systems assure a proper reduction of fibre content in meal and a reduction of oil losses. Bühler is able to provide different process technologies that can meet the requirement of the vegetable oil industry. An introduction to the various dehulling and separation systems will be presented. A comparison shows the expected product qualities.

Improving the yield of the soyabean oil extraction process by use of a microwave system
M Ghazvehi, School of Chemical, Gas and Petroleum Engineering, Semnan University, Semnan, Iran

The increasing use of soyabeans, as the century's strategic plant, makes the economy necessary in energy consumption for separating oil from this valuable seed. Soyabeans are a rich source of proteins, lecithins and isoflavones. In addition to having high nourishing properties, they prevent some diseases, including cancer. Due to the high expense of extractors and their high energy consumption, the active specialists have always tried to make the defects of this process (high expense of extractors and high energy consumption) to the least, with the invention of new methods, such as pressure extraction, and by using CO₂, and Soxhlet extraction and extraction by compound extractors. Using the microwave process is one of the modern methods in oil extraction from soyabeans by solution, that leads to considerable decrease of energy consumption. In this article, microwave wave performance with determined intensity in the process of oil extraction from soyabeans by hexane solution is being studied. In the direction of extracting by solution, hexane is added to soya flakes that affected by microwave waves with the same intensity and different times. The range and compounds of extracted oil are determined after it is extracted. The most range of microwave affection separating is defined in 30 minutes. After all, it is defined that extraction by solu-



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tion and microwave influence leads to shorter time and also decrease of hexane consumption. The electron microscopic pictures have shown microwave influence on the surfaces of soya flakes. After all, the extraction of soya oil from its bean by solution and by using microwave can cause high output and decrease of the process duration. According to the desirous influence of the sound waves on the oil extraction process, it is recommended that more research be done in designing and making microwave extractors in industrial measures.

Thin film evaporation and drying - An advanced technology for treatment of edible oils, fats and related products

Dr Matthias Kaufmann, Sales Manager, Buss-SMS-Canzler GmbH, Germany

The processing of edible oils, fats and related products undergoes several steps in distillation and drying. Several technologies or apparatus are used for this purpose. As all products are of biological origin and mainly used for food and feed purposes, high quality demands are applicable for any treatment. Thin film evaporators and dryers have shown their advantage for treatment of sensitive and/or critical products. The technology will be introduced with examples of process and design for some applications.

Alternative techniques for edible oil refining Prof. Dr. Aytac Saygin Gumuskesen; Assistant Prof. Dr. Fahri Yemiscioglu, Res. Assoc. Onur Özdikicierler, Ege Üniversitesi, Turkey

Crude oils contain considerable amounts of undesirable substances such as phospholipids, waxes, free fatty acids, oxidative products etc., which decrease their quality attributes and sensory characteristics. Moreover, crude oils are also contaminated with miscellaneous toxic substances including PAHs, insecticides and pesticides. A combination of various separation techniques are applied to produce refined edible oils. These separation techniques include miscelle formation, neutralisation, centrifugal separation, adsorption and steam distillation. These conventional techniques are criticised as disadvantageous in terms of high energy and water consumption, usage of high thermal energy, loss of nutritional value, formation of undesirable constituents such as *trans* fatty acids and producing high amount of waste. Hence, alternative techniques for refining technologies are future promising areas for further studies. Among these techniques, enzymatic approaches, membrane technologies and nano application are worth a mention. Enzymatic techniques are mostly studied for degumming and decolourisation; whereas membrane technologies seem to have a widespread future for complete refining. Application of nano technology also seems to be advantageous for alkali refining. Besides from alternatives for refining technologies new techniques such as molecular distillation, supercritical fluid extraction are also applicable to refining waste treatment as a new concept.