Edible Oil Quality: It is (not) all about Contaminants Mitigation and Valuable Minor Components

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Edible oil quality can be expressed by different parameters. Excellent organoleptic properties together with a good oxidative stability and functionality are an absolute requirement. In addition, high quality food oils need to contain very low levels of harmful contaminants (food safety) and highest amount of valuable minor components (nutritional quality). Increased awareness of consumers about the quality and the safety of oils and fats in their diets - all or not based on scientifically correct information obtained from consumer organisations and social media groups- together with new international regulations that impose stricter limits for several contaminants are forcing edible oil refiners to continuously adjust their refining processes.

Over the last decades, more sensitive and accurate analytical methods were developed that revealed the presence of 'new' contaminants such as polycyclic aromatic hydrocarbons (2000's), 3-MCPD and GE (2010's-) while today's focus is mainly on mineral oils (MOSH/MOAH). A good understanding of the mechanisms of formation (process contaminants) or contamination sources (environmental contaminants) is essential for the development of directed and (cost-) efficient mitigation processes. Innovations in bleaching (use of active carbon and other special clays) and deodorization (more powerful vacuum systems and more efficient packed column strippers) are implemented by oil processors and result in a successful (process) contaminant mitigation.

For the mitigation of environmental contaminants such as MOSH/MOAH, the most efficient mitigation strategy is to minimize/avoid contamination which can be achieved by a systematic analysis of the critical contamination points. However, oil refiner's focus should not only be on contaminant mitigation. Refining process modifications have to be adopted in a smart way to ensure that the refined oil still has a good 'standard' quality (light color, correct organoleptic properties and good shelf life) and also that the valuable minor components (tocopherols, tocotrienols, phytosterols, oryzanol,…) are retained in the refined oil. In conclusion, optimizing the refining process conditions is such a way that all quality parameters can be met at the same time is a real challenge and requires a very good understanding of the impact of the various process parameters on the individual quality parameters.