

Extra Virgin Olive Oil: Microbial Ecology of the Extractive Processes and its Effect on the Aromatic Composition of the Final Products.

Serena Trapani¹, Simona Guerrini¹, Eleonora Mari¹, Marzia Migliorini², Chiara Cherubini², Giacomo Gianni², Bruno Zaroni¹, Massimo Vincenzini^{1,1} Dipartimento di Biotecnologie Agrarie, Università di Firenze, Italy² Metropoli -Azienda Speciale della Camera di Commercio di Firenze, Italy

Newly produced olive oils might harbor viable microbial cells which could affect, according to their metabolic capability, the oil quality. Indeed, β -glucosidase and esterase capabilities can improve the taste and the antioxidant capability of the oil, while the lipase capability can worsen the oil quality by hydrolyzing triglycerides. Usually, microbial contamination of oils originates from raw material (olives) and/or from the oil-mill. However, information on the microbial occurrence in the different steps of the extra virgin olive oil production and their influence on the aromatic composition of the final product are lacking. Therefore, a study was carried out to investigate on the presence of microorganisms in the pastes after crushing, in the oil after centrifugation in a two phase decanter, in the oil after filtration, and in the oil after three months of conservation in dark-green bottles. A total of 16 extraction processes, carried out in the same manufacture located in Tuscany, were considered. The microbial populations were mainly constituted by yeasts and moulds, while in most cases bacteria occurred at very low concentrations. The yeast and mould densities in the pastes and in the oil before the filtration step ranged between values below 1 and of about 10^4 CFU/g, while in the filtrated oil below 10^2 CFU/100 mL. The 16 oils after filtration were also analyzed for their aromatic composition. Correlation studies showed some positive or negative correlations between microbial densities in the different productive steps and some aromatic compounds in the oil. In any case, principal component analysis, carried out on the microbiological and chemical data, demonstrated that all the productive processes showing the highest microbial contaminations were positively associated with the same aromatic compounds. This work may be considered a preliminary study to understand the microbial ecology of the extra virgin olive oil and its effective impact on the aromatic composition of this product.