

# AIRBORNE FUNGI IN A TURKISH OLIVE PROCESSING PLANT

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Studies employing gravity settling culture plates (GSC) were conducted in order to analyse the airborne fungi of an olive processing (ripe pitted, natural calamata pitted and whole olive) plant in Izmir, Turkey, in May 2008. Sampling procedure for airborne fungi was performed 8 times during the processing. Numbers and types of airborne fungi in the air of olive processing areas were investigated by exposing a Petri dish of malt extract and potato dextrose agar medium for 15 min and then counting the number of colonies which develop after incubation at 25°C for 7 d.. Moulds were identified according to Pitt and Hocking (1997) and Samson *et al.* (1996). All the strains were tested for morphological characters. Results revealed a variety of fungal spores belonging to different genera. As a result, 63 mould species belonging to 5 genera were isolated by means of pure culture methods. Environmental assessment of fungal spores by GSC method revealed that the most frequent genera of fungi were *Cladosporium*, *Alternaria*, *Penicillium*, *Aspergillus*, *Rhizopus* and some unidentified fungi. In the microflora of the airborne fungal samples investigated a coexistence of lactic acid bacteria, *Bacillus*, and yeasts was observed, but in all samples the presence of moulds was dominant. Sources of contamination at olive processing plants include personnel activities, ventilation systems, floor drains and water applied under pressure during cleaning and sanitizing procedures. These microbes could contaminate the product via contact with processing surfaces, where they may adhere and form biofilms. Air is only one of the sources that may come into contact with the product during many stages of handling, processing, storage and packaging. GSC is most frequently used for evaluating the microbiological quality of air in plants. According to the American Public Health Association standard the maximum contamination rate from air is 30 CFU·cm<sup>-2</sup>·week<sup>-1</sup> in food processing areas, when evaluated by GSC. In this study the mean log<sub>10</sub> count of mould per plate (duplicated) was between

1.88 and 4.78. Microbiological air quality was not acceptable in the olive processing plant because the concentrations of moulds were higher than 30 CFU·cm<sup>-2</sup> and the predominant genus identified was *Penicillium* (75%). The highest mean counts (> 300 CFU/plate) of airborne fungi were detected in the olive receiving, filling and pitting areas, while the fermentation in tanks, final product filling and storage area showed the lowest mean counts (76–150 CFU/plate) of airborne fungi. The information about the distribution of the biological contaminants in SME food processing plant areas is limited. There is also lack of the techniques of quantification in order to assess exposure and risk characterization. Therefore assessing the impact of airborne fungi is important in respect of toxin producing moulds and their consumer risk. The results of this study demonstrate that the microbiological quality control of air in SME olive processing plants could be improved and optimized using chemical sanitizers and application of good manufacturing practices.