

PHOSPHOLIPID FATTY ACID (PLFAS) ANALYSIS AND ITS APPLICATIONS IN THE STUDY OF PESTICIDES EFFECTS ON SOIL MICROBIAL DIVERSITY

Urania Menkissoglu-Spiroudi¹, Evagelia S. Papadopoulou^{1,2}, Dimitrios G. Karpouzas²

¹*Aristotle University of Thessaloniki, School of Agriculture, Pesticide Science Laboratory, Thessaloniki 54124, Greece. email: rmenkis@agro.auth.gr*

²*University of Thessaly, Department of Biochemistry-Biotechnology, Ploutonos 26 & Aioulou Str., Larisa, Greece. email: dkarpouzas@bio.uth.gr*

Phospholipid fatty acids (PLFAs) analysis is a robust method for characterizing the composition of soil microbial communities. This method has been used as a reliable measure of the soil microbial biomass and also for assessing the impact of agronomic practices, pesticide applications and heavy metal pollution on the structure of the soil microbial community. The variation of phospholipids between eukaryotes and prokaryotes and among many prokaryotic groups as well as their rapid degradation after cell death, make PLFAs very useful indicators of the living microbial community. An optimized protocol for the extraction of PLFAs has been developed and validated, considering the types of extraction solvent and buffer, the extraction time and soil pH, on the quantity and the type of the PLFAs extracted from soils.

We report on PLFA analysis used from our research group in various studies to provide a thorough insight into the unknown impact of pesticides applied for different purposes, on the structure and function of the soil microbial community. Briefly we present results from studies i) to assess the impact of pesticides found in wastewaters of Fruit Packaging Plants and disposed in agricultural land, on soil microorganisms. ii) to assess the soil microbial ecotoxicity of selected bio-pesticides, comparatively with synthetic pesticides, and iii) to evaluate side effects of bioactive plant extracts or soil incorporated plants used as bio-nematicides, on the overall soil microbial community.