

Sorption behavior of polylactic acid/poly(butylene adipate-co-terephthalate) mulching film towards active substances

G. De Tommasi¹, G. Scarascia Mugnozza², V. Gallo², P. Mastrorilli², M.M. Dell'Anna^{2,*}

¹Università degli Studi di Bari "Aldo Moro", DISSPA, via Orabona 4 – 70125 Bari, Italy,

gianluigi.detommasi@uniba.it

²Politecnico di Bari, DICATECh, via Orabona, 4 – 70125 Bari, Italy, giacomo.scarasciamugnozza@poliba.it,

vito.gallo@poliba.it, p.mastrorilli@poliba.it, mariamichela.dellanna@poliba.it

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Abstract.

Plastic mulching films are often used in agriculture for contributing to reduce water evaporation from the soil, to decrease weed growth and the consequent use of chemicals, and to increase soil temperature at the root level. Recently, petrol derived polymers, such as low-density polyethylene (LPDE), have been replaced with biodegradable (bio)polymers in mulching activities, since after crop harvest biodegradable polymers do not need to be removed, but they are very often buried under the soil, thus allowing the farmers to economize on their disposal. A kind of biodegradable mulching film is constituted of polylactic acid/poly(butylene adipate-co-terephthalate) blend, which is known to be subjected to both enzymatic and photooxidative degradation under aerobic conditions. However, during degradation processes, the mulching films can give raise to microplastic debris, which in turn could act as microvectors of organic and inorganic pollutants [1]. Understanding the adsorption capability of agricultural mulching films towards active substances commonly used in agricultural activities to enhance crop harvesting, could help farmers in choosing the appropriate plastic trying to avoid environmental pollution. Herein, the adsorption behavior of a commercial polylactic acid/poly(butylene adipate-co-terephthalate) film is investigated, considering as active substances azoxystrobin and copper hydroxide, that are widespread utilized as organic and inorganic fungicides, respectively.

[1] N. Beriot, P. Zomer, R. Zornoza, V. Geissen, *PeerJ* (2020) 8:e9876 DOI 10.7717/peerj.9876