



Effect of different biodegradable mulch materials on fruit quality in a sweet bell pepper crop in Central Spain

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Mulching is a technique widely used worldwide, mainly in horticultural crops. For this purpose, the use of no-degradable petrochemical plastics, mainly polyethylene (PE), is highly extended for the important advantages it provides (optimum weed control, high irrigation water use efficiency, yield precocity, excellent mechanical properties, and relatively low prices in recent years). Nevertheless, the use of these materials is causing very serious environmental problems derived from their extremely low degradation rate, and for this reason efficient eco-friendly alternatives, mainly biopolymers and papers, are continuously appearing in the markets. However, these degradable material have to be sufficiently tested in different crops, environment and crop aspects (growth, quantitative and qualitative yield, etc.) before replacing PE, especially for organic farming. Therefore, the main goal of this work was to study the effect of different biodegradable mulch materials on fruit quality in an organic sweet bell pepper crop (cv. Infantes) in Central Spain during four consecutive spring-summer seasons. The mulch materials used were: 1) black polyethylene control (15 μm); black biopolymers (15 μm): 2) maize starch-based, 3) potato starch-based, 4) polylactic acid-based (PLA); 5) black paper (85 g/m^2); two unmulched controls: 6) manual weeding, 7) no weed control. A randomized complete block design with four replications was adopted. The crop was daily drip irrigated to satisfy the water requirements of each treatment. In each season, fruits were harvested four or five times, mainly in the red state. In each harvest, 10 representative fruits were randomly sampled per treatment for quality evaluation: weight, length, width, fruit shape index (ratio of maximum length to width), flesh thickness, firmness, dry matter content and flesh colour (Hunter Lab scale, Minolta colorimeter).

In summary, the results indicate that mulching treatment had a scarce effect on the fruit shape, with the exception of the no weed control, where fruits were significantly longer and thinner than the other treatments, probably as result of the lower solar radiation incidence because of the weeds competence. In general, the highest flesh thickness and fruit weight were obtained in the manual weeding control, although this last parameter was also high in the PLA treatments. Fruit firmness behaved differently depending on the season, but in general the no weed control treatment produced the least firm fruits, with the lowest dry matter content, the highest luminosity (L) and a low a/b color index. Few differences have been found among the remaining mulching treatments.

Acknowledgements: Project RTA2011-00104-C04-03 - INIA (Spanish Ministry of Economy and Competitiveness).