NIR spectroscopy as a tool for obtaining resilient and high-quality strawberry cultivars

Manuela Mancini1\*, Elena Leoni1, Luca Mazzoni1, Rohullah Qaderi1, Giuseppe Toscano1, Franco Capocasa1, Bruno Mezzetti1

1 Department of Agriculture, Food and Environment Sciences, Polytechnic University of Marche, Via Brecce Bianche 2-8, I-60131, Ancona, Italy

\*m.mancini@pm.univpm.it

Strawberry is a small fruit crop with high economic and nutritive value. It is widely produced and consumed because of its characteristic flavour, appearance and richness in nutrients, but its cultivation is highly resource intensive (Li et al., 2019). Food sector is nowadays facing several challenges, among them the environmental impact and food loss along the chain from production to consumers. New resilient cultivars could make the difference, as they can ensure nutritious products, a more sustainable agriculture and limit food wastes (Li et al., 2019).

The main aim of this study is to evaluate the possibility to use Near Infrared (NIR) spectroscopy as a tool for supporting the selection of resilient and high-quality strawberries. In detail, the study set two specific objectives. The former is the early detection of *Botrytis cinerea*, one of the most devastating disease, as it can avoid the large-scale spread of disease as well as food loss. The latter deals with the rapid identification of desired fruit quality traits for the selection of new cultivars, speeding up the process of genetic improvement. Strawberry fruits of five different cultivars were harvested and immediately shipped to the lab. After sterilization, half of the fruits were contaminated by *B. cinerea*, while the other half was used as control. All samples were daily analysed by means of NIR spectrophotometer and the degree of infection visually stated. As last, soluble solid and acidity contents were analysed. Principal Component Analysis (PCA) was applied i) to investigate the possibility to early detect *B. cinerea* and ii) to search for groupings among the samples according to the fruit quality characteristics.

The results demonstrated as NIR spectroscopy could be used as a tool for selecting new cultivars with characteristics of resilience and consumer-desirable fresh-fruit cultivars with high nutritional quality.

**Keywords:** breeding, cultivars, food loss, early detection, PCA, spectroscopy

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