

**Novel polylactic acid (PLA)-based active packaging with incorporation of nanoparticles and its performance throughout shelf-life of fresh-cut fruit**

[O3/05]

João M. Rocha<sup>1,2</sup>, Gabriela S. Lorite<sup>3</sup>, Noora Miilumäki<sup>3,4</sup>, Paula Saavalainen<sup>5</sup>, Tuula Selkälä<sup>3</sup>, Gabriel Morales-Cid<sup>6</sup>, M. Pilar Gonçalves<sup>2</sup>, Eva Pongrácz<sup>4</sup>, Geza Toth<sup>3</sup>, Cristina M. R. Rocha<sup>2,7</sup>

<sup>1</sup> Centre of Molecular and Environmental Biology (CBMA), University of Minho, Campus de Gualtar, Braga, Portugal

<sup>2</sup> REQUIMTE, LAQV, Department of Chemical Engineering, Faculty of Engineering, University of Porto, Porto, Portugal

<sup>3</sup> Microelectronics Research Unit, P.O. Box 4500, FIN-90014, University of Oulu, Finland.

<sup>4</sup> Energy and Environmental Engineering Research Unit, P.O. Box 4300, FI 90014, University of Oulu, Finland.


<sup>5</sup> Environmental and Chemical Engineering Research Unit, P.O. Box 4300, FI-90014, University of Oulu, Finland.

<sup>6</sup> ANDALTEC, Centro Tecnológico del Plástico, Pol. Ind. Cañada de la Fuente, Calle Vilchez, s/n, 23600, Martos, Jaén, Spain.

<sup>7</sup> Present Address. Centre of Biological Engineering (CEB), University of Minho, Campus de Gualtar, Braga, Portugal.

This study aimed at developing innovative and environmentally friendly packages for fresh-cut fruits and at a better understanding their effect on physicochemical, mechanical and microbiological characteristics during shelf-life. Packages were developed under the scope of EU project SusFoFlex (7th framework programme) – thought to incorporate materials in final packaging formulations complying environmental and sustainability concerns and valorisation of agri-food by-products. Polylactic acid (PLA)-based active packaging formulations differed in nanoclays used and presence/absence of a surfactant. PLA-nanocomposite packaging performance was evaluated and compared with pristine-PLA and conventional polyethylene terephthalate (PET). Polyone was used as plasticizer in PLA packages. PET formulation did not include any nanoclay. Fresh-cut melon was selected as food model to assess PLA packaging formulations performance on quality changes taking place throughout 7-d storage under controlled conditions. Physicochemical and textural analysis over time encompassed weight loss, colour, visual appearance, pH, soluble solids and firmness, whereas microbial enumeration covered vegetative mesophilics and psychrotrophs, Gram- rods, nonsporing Gram+ rods and cocci, yeasts and moulds. Environmental impact of PLA-based packaging was evaluated via life cycle assessment (LCA) and compared with PET. Under limit storage conditions, all microbial groups exhibited maximum viable counts,

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their performance, thus contributing to bring together the characteristics of both biopolymers (PLA and PET). Finally, LCA impact assessment indicated that PLA packaging with nanoclays had the highest environmental performance.

*Keywords: Packaging, polylactic acid (PLA), ready-to-eat fresh-cut fruit, physicochemical/microbial properties, life cycle assessment (LCA)*



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Departamento de Biologia  
Campus de Gualtar  
4710 - 057 Braga, Portugal

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