Proceedings of the 5th World Congress on New Technologies (NewTech'19)
Lisbon, Portugal – August, 2019
Paper No. ICNFA 156
DOI: 10.11159/icnfa19.156

Application of Silver Nanoparticles on Fresh Fruits Preservation

Marian Butu[1], Steliana Rodino[2], Alina Butu[1,*]
[1] National Institute of Research and Development for Biological Sciences
Splaiul Independentei 296, Bucharest, Romania
marian_butu@yahoo.com, *alina_butu@yahoo.com
[2]The Bucharest University of Economic Studies
Piața Romană 6, Bucharest, Romania
steliana.rodino@yahoo.com

Extended Abstract

Despite the numerous potential applications of nanoparticles and the growing trends in scientific publications and patents, applications on vegetables and fruits shelf life extension are not yet available on the market. The growing demand for fresh vegetables and fruits leads to the constant challenge to develop innovative solutions for vegetables and fruits preservation. Nanoparticles such as gold, silver or copper nanoparticles have increasingly attracted the researcher's interest for antimicrobial products due to their biological properties.

Most harvested fruits and vegetables cannot be stored in natural conditions for a satisfactory shelf life duration due to their perishable nature. Conventional preservation methods have the limitations of high production cost and/or unsatisfactory shelf-life and/or undesirable residue. Due to unique properties, nanotechnology-related shelf life extension strategies have the potential to compensate the shortcomings of traditional preservation methods. At present, the methods for keeping fresh berries mainly include low-temperature refrigeration and fresh-keeping technology, modified atmosphere packaging storage technology UV shortwave ultraviolet radiation technology, chemical preservation etc. However, most of these treatments are expensive, time consuming, and may even damage the appearance of the berries.

The objective of our research was to study the silver nanoparticles by the synthesis mediated with plant extracts and to evaluate their preservation effect on fresh berries.

The vegetal material used for plant extracts was Vaccinium vitis idaea fruits and Petroselinum crispum leaves. The silver nanoparticles were formed by reducing silver nitrate solution with the plant extracts. Various concentrations of silver nanoparticles - plant extracts solutions were investigated for their effect on prolongation of fruits shelf life.

The fruit species used were Vaccinium myrtillus (blueberries) and Rubus fruticosus (blackberry). The influence of the mixtures on fruits preservation was evaluated by monitoring the sensorial and microbiological quality during the storage period. The synthesis of nanoparticles was characterized by the color change of mixture.

The silver nanoparticles produced by green synthesis with both extracts showed the good results on prolongation of tested fruits shelf life. Our study demonstrated both the potential of green silver nanoparticles and the synergistic effect of plant extract and nanoparticles in preservation of fresh fruits.

Acknowledgements

This work was supported by grants of the Ministry of Research and Innovation through Program 1 - Development of the National R&D System, Subprogram 1.2 - Institutional Performance - Projects for Excellence Financing in RDI, Contract no. 22PFE / 2018 and Program NUCLEU 25N-19270104/2019.