

Shelf Life Extension of Tomatoes through Nanoemulsions[†]

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Abstract: Food spoilage has been the major reason to use chemical preservatives for increasing the shelf life of fruits and vegetables. Increased consumption of these chemical preservatives like sodium benzoate causes the risk of inflammation, oxidative stress, obesity, allergies, anxiety, and pancreatitis and may also be carcinogenic to humans. This project was carried out to study and investigate the efficiency of nanoemulsion as an edible coating on Tomatoes. The post-harvest shelf life of these tomatoes is only a few weeks, and they face a lot of challenges in transportation and export. The edible coatings of nanoemulsions (vegetable oil with water) have been promising and considered an alternative in increasing the quality and shelf life, thus preventing spoilage caused by microorganisms in tomatoes. Synthesis of nanoemulsions (NEs) using oils (sunflower, castor, and olive) in water (O/W) was prepared through Micro fluidizer LM10. The mixture was repeatedly circulated to obtain uniform droplet sizes. The particle size distribution of the nanoemulsion was measured through DLS, and the Zeta potential was measured by (Malvern Zetasizer) instrument. The Minimum Fungal Concentration (MFC) was determined by a good diffusion method to determine the antifungal activities of NEs against *Rhizopus stolonifer* and *Aspergillus niger*. The identification of fungal strains was made using lactophenol cotton blue stain. Other characterizations such as pH, viscosity, stability, and dispersibility studies of the nanoemulsions were also performed. Thus, these Nanoemulsions are highly expected to increase food stability, thereby building a promising and safe preservation technology in the food industry. The futuristic aspect of this methodology is to gain extended shelf life of tomatoes, which would favor transportation and storage, resulting in reduced wastage of tomatoes during post-harvest.

Keywords: nanoemulsions; tomato; spoilage; *Rhizopus stolonifer*; *Aspergillus niger*; Zeta potential; preservation.

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Conflicts of Interest

The authors declare no conflict of interest.