# Edible coating for enhancing the shelf life of horticulture products

Preserving food, especially horticulture products, is one of the most difficult farm work. The global community has highlighted this problem and set a target of halving per-capita food waste by 2030. Post-harvest losses are one of the ways in that food is lost, whether during manufacturing or within supply networks. The global contribution of these waste horticultural crops is between 44-55 percent, which is exceptionally large compared to other crops. Many conventional food preservation methods are used to prevent food from spoiling; here is a summary of some of these techniques and their drawbacks. *(1) Canning*: it is time-consuming, glass jars can break, and food might deteriorate if the lid isn't well closed; *(2) Freezing*: The process of freezing causes the loss of vitamins B and C; *(3) Drying*: Due to drying, food becomes stiff and changed in flavour; *(4) Vacuum*: Pricey and out of reach for small-town people *(5) Waxing*: This process is used for fruits and vegetables; however, wax is combined with cancer-causing chemicals to create the thin, homogeneous coating, which is terrible for human health.

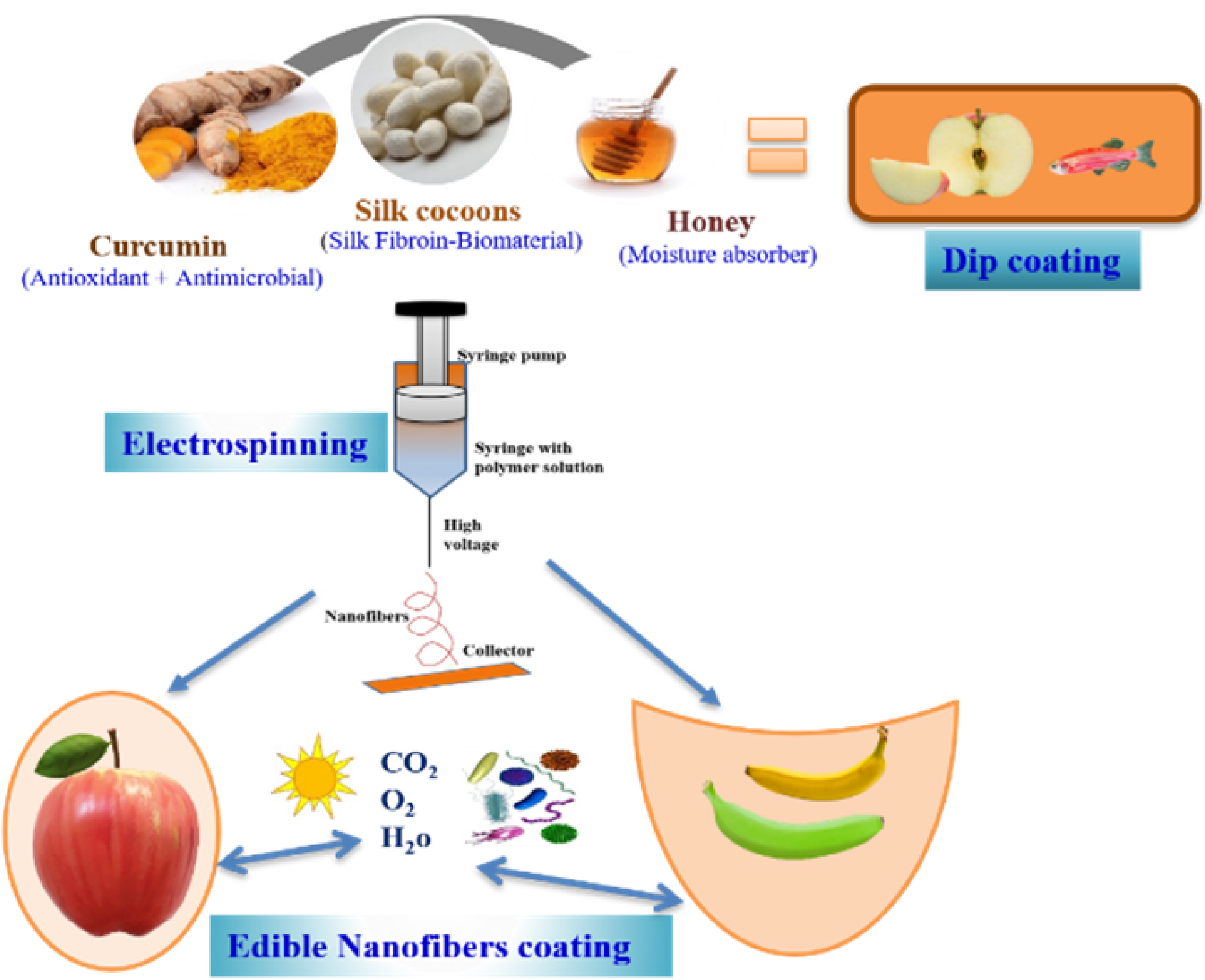

Fig. 1. Graphical abstract

However, preserving techniques such as a thin-film edible coating are offered to expand the shelf-life of horticulture products. These eatable coatings have mechanical, physicochemical, and barrier properties against ambient gases. Edible coatings can be produced by combining proteins, lipids, polysaccharides, or any combination of these, e.g., chitosan, starch, silk-fibroin, and cellulose. These edible coatings reduce food respiration and oxidation rates by acting as a barrier against various ambient gases, such as oxygen, carbon dioxide, and microorganisms. Coating materials often combine with plasticizers and active agents to provide additional properties of edible films. For instance, plasticizers (glycerol, honey) provide strength and elasticity and increase water and gas permeation resistance. Similarly, curcumin and ascorbic acid work as antioxidants and antimicrobials. Food preservation and packaging are now achievable with no negative impacts on human health or the environment. Perishable food can be coated with an edible coating using electrospun nanofibers, dip coating, and spray coating techniques.

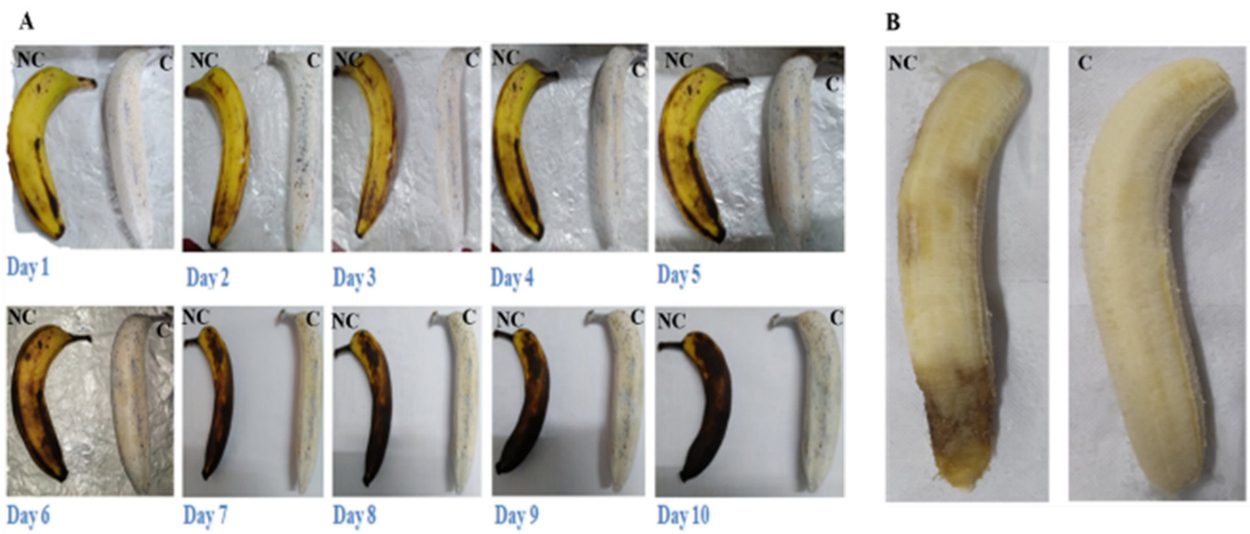


Fig. 2. (A) Morphological studies performed by capturing photographs (every day) of silk fibroin composite nanofiber coated banana with uncoated banana (B) Banana devoid of peel ( 6th day study); Mention: NC- non-coated, C- coated (total time for coating using electrospinning is 150 minutes)

The researchers have coated perishable items using the electrospinning technique for industrial use and dip coating for local farmers. The silk fibroin protein was utilised as the core biomaterial, as it possesses mechanical strength and biocompatibility with no toxicity; polyvinyl alcohol served as the supporting polymer for the electrospun covering, as the active ingredients, honey and curcumin were added. Fruits were topically coated with a thin layer of electrospun nanofibers by placing them over a collector plate, and fruits were dip-coated with a silk-fibroin composite solution containing active ingredients. Each ingredient used in edible coating synthesis is of FDA standard.

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## Publication

Biopolymer based edible coating for enhancing the shelf life of horticulture products
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*Food Chem (Oxf). 2022 Feb 7*