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Multifunctional Edible Nutraceutical Coating

The short shelf life of fresh produce, due in large part to microbial induced spoilage, is a serious problem that is costing the food industry billions a year. Many plants have natural phytochemicals which help confer resistance to microbial infections. Phytochemicals also have health benefits for humans, making them attractive candidates for coating compositions. However, phytochemicals, in free form, are easily degraded during storage and metabolized in the GI tract, reducing their bioavailability after consumption.

Researchers at Arizona State University have designed novel multifunctional nanoencapsulation-based edible coating compositions which have antimicrobial as well as nutraceutical properties. These compositions actively protect fresh-cut fruits and vegetables, and other foods, as part of the package function to significantly extend their shelf life. Further, because they are nanoencapsulated, degradation is reduced and body absorption is enhanced. Strawberries coated with these compositions had not only prolonged shelf life, demonstrating antifungal/antibacterial and protective effects, but also preserved nutrition values, especially high levels of vitamin C and total antioxidant capacity. Mice were given the nanoparticles via oral gavage and bioavailability was increased as determined by blood concentrations of the phytochemical.

These novel coating compositions address food spoilage at the preconsumer level and as such may provide not only a competitive market advantage but also the potential for increased profit margins.

Potential Applications

- Active food packaging including but not limited to:
  - Fresh-cut fruits and vegetables
  - Meat
  - Dairy
  - Chocolate
  - More

Benefits and Advantages

- The compositions improve stability/shelf life, bioavailability and bioactivities
- These compositions have nutraceutical properties and leverage popular foods or fruits as a carrier to increase consumption
- Enhances food safety
- Reduces food waste
- Option incorporation of other natural flavors to enhance or modify the taste of the protected food

For more information about this opportunity, please see

Zhou et al - Curr Dev Nutr - 2022

For more information about the inventor(s) and their research, please see

Dr. Wang's departmental webpage

Dr. Fan’s departmental webpage

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