Zein Extract Tea Solution: Eco-Friendly and Cost Effective Delayed Ripening Solution for Bananas

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Banana, Musa paradisiaca spp. (Musaceae) is widely cultivated, with a production of more than 50 million tons per year worldwide. Concurrently, an approximate of 1.4 million bananas are dumped daily in general since they are traded in ambient conditions. Due to the short shelf-life of bananas, plastic wrappers that pose a threat to the environment are commercially used to prolong it. Meanwhile, India generates 0.015 million tons of tea waste each year. Therefore, we propose Z.E.T.S (Zein Extract Tea Solution), a combination of tea waste extract and zein extracted from Corn Gluten Meal as an environmental friendly solution to increase shelf-life of bananas. Z.E.T.S containing tannins and zein, is an effective, eco-friendly, and safe solution-based coating for fruits. The effect of Z.E.T.S on the shelf life of bananas was studied and compared to plastic wrapper and salicylic acid solution. The experiments consisted of Z.E.T.S with concentrations from 5% to 40%, at 5%-interval on 75 bananas using dip-coating method. We have invented the world's first 3D banana ripening process color chart to monitor the ripening process of Musa paradisiaca spp. at room temperature for 18 days and average relative humidity of 76%. The optimum concentration of tea waste extract to prolong the shelf-life of Musa paradisiaca spp. for 4 days from the color chart developed is 30% while control bananas fully ripen at Day 7. It is found that applying treatment on banana stalk is 25% more effective than the whole fruit with a prolonged shelf-life of 2 days. Therefore, Z.E.T.S is proven to be able to act as an effective physical barrier around the fruit and is an organic and cost-effective delaying agent that could be widely used in fruit preservation, thus eradicating the global food waste problem.

Awards Won:
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