

# Title: Evaluating quality and shelf life of silicon enriched fresh salad leaves using alternative plastic packaging solutions



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## Abstract:

This project examines ways to extend the shelf life of fresh salad, in particular spinach and micro greens. Research is being carried out into fortifying crops with silicon during growth which will help reduce drought stress, loss of chlorophyll, moisture and maintain fresh weight at harvest stage contributing to better shelf life of the packaged product.

Silicon compounds are classified as biostimulants within EU regulations. Silicon is a nutrient which accumulates in plant tissue and acts as a protective barrier in the epidermis. This characteristic is mostly associated with monocots, in particular rice, however there is some research to indicate it has varied effects on eudicots. Research has shown that it slows the rate of expiry of harvested leaves. For example, lamb's lettuce supplemented with silicon can delay leaf senescence by reducing the rate of chlorophyll degradation in harvested leaves. This crop fortification also appears to reduce the use of agrochemical inputs during production.

While traditionally shelf life interventions primarily focused on the post-harvest management of the product, they overlooked the importance of interventions taken in the field as well as during production.

In addition, the research will assess the shelf life of silicon-treated and untreated leaves contained within compostable packaging. Different packaging materials and interventions such as Modified Atmospheric Packaging (MAP) will be assessed for their effect on the shelf life of the treated and untreated spinach leaves and other crops. This will be novel as it addresses concerns raised by growers of loss in product quality when shifting to degradable or compostable packaging types, and creates a bench mark for compostable packaging quality.

With plant-based foods making up one-third of the population's dietary intake in Ireland, horticulture enterprises, like other sectors of agriculture, is facing pressure to adopt sustainable business practices. In other qualitative research carried out in the Horticulture Development Department interviewing both organic and non-organic growers, similar challenges regarding high costs and low product prices, as well as limited opportunities for diversification were highlighted. These challenges appear to be slowing adoption of sustainable practices and hindering investment, innovation, wages and growth. Research that helps growers deliver a better quality product in more sustainable packaging, at a lower cost and with a lower environmental footprint of production is hugely beneficial in supporting responsible consumption and production (SDG 12).