Wrapping Revolution: Pioneering study on edible films may change how we think about packaging

Plastic packaging has become an all-too-common sight in modern supermarket aisles and can seem particularly out of place around fresh produce. Although this versatile material does have its place for certain uses such as protecting delicate berries or dispensing medication, its overwhelming presence does raise concerns about its environmental impact and necessity. Is the wrapping of individual cucumbers or aubergines really necessary to preserve quality?

This is one of the questions that a group of students at Lund University seeks to answer, and their findings suggest that algae-based coatings may constitute an alternative to plastic in the future.

Their project focused on the development of a novel packaging material that is not only protective and environmentally friendly but also edible. To preserve the quality of fresh produce and prolong its shelf-life, the students explored the use of ingredients from algal and plant origin to form coatings with special protective properties. Although they did successfully create and characterise several formulations, their findings showed that more work is needed to form truly performant coatings. Carrageenan coatings especially showed some promise as a basis for future edible formulations, and additional ingredients which were investigated to prevent oxidation such as plant extracts may help retain quality in produce, although more research is needed there too.

The study itself focused on the formulation process and measuring the effectiveness of these edible coatings, investigating the compatibility of various edible ingredients and their ability to effectively protect and preserve fresh produce. Regular cucumbers such as you would find in the supermarket were used for the study, and quality was assessed by looking at how much weight (or water) the samples lost over a period of 14 days. Additionally, the level of “stress” of samples was assessed by measurements in the peel and flesh, and the colour of samples over time was measured.

The results indicated that the coatings did not significantly extend the shelf-life of coated cucumbers compared to unwrapped and plastic film-wrapped samples: rates of weight loss were similar between coated and uncoated cucumbers, while those wrapped in plastic experienced lost significantly less weight. Further analysis showed inconclusive results for stress and colour related measurements, suggesting the need for modifications in experimental design, as well as additional experiments. Indeed, it seems that part of the reason why results were inconclusive may come down to issues with the methods used, and resource constraints. Although disappointing perhaps, this lack of answers highlights the importance of not drawing conclusions too quickly, and continued research should be done to optimise the formulation of these coatings. With a few tweaks, it may be possible to ensure produce may be protected against oxidation and weight loss by more sustainable options than plastic.

To evaluate how samples responded to the algae coatings, cucumbers were observed over a 14-day period, together with unwrapped and wrapped samples. Some of the algae coatings contained extracts from selected plants, with the aim to provide extra protection against oxidation, among

other factors. The coatings were characterised by themselves, before being applied to the cucumbers for the shelf-life study.

Although no clear answers could be obtained this time around, other studies have shown that edible packaging may still have the power to revolutionise the food industry by reducing plastic waste and enhance food quality. With the successful formulation and characterisation of novel edible packaging, this research project paves the way for a more sustainable future, where fresh produce remains fresher for longer, all while reducing our ecological footprint.