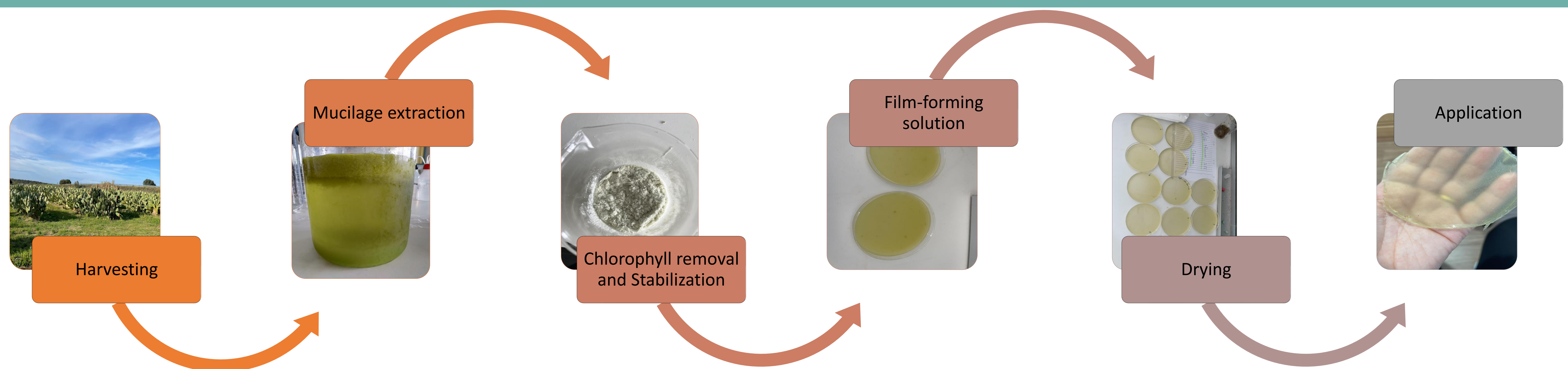


Background

Opuntia ficus-indica (L.) Mill cactus is a xerophyte plant widespread worldwide. It can thrive in very diverse places with high temperatures, with low water availability. This cactus is characterized by the production of a hydrocolloid commonly known as **mucilage**, with a very complex polymeric structure, containing L-arabinose, D-galactose, L-rhamnose, D-xylose units and D-galacturonic acid.

Cactus mucilage has previously been employed as a flocculating agent, a wound-healing and skin-repairing agent or a drug delivery system. Some researchers have demonstrated the ability of mucilage, an eco-friendly and renewable substance, to form **edible films** and **coatings**. This material **can replace** the artificial, non-biodegradable and petroleum-based plastic that is nowadays employed in the food industry. Plastic has an annual production of **348 million tons** in the world and according to estimations, the 79% of all generated plastic is accumulated in the natural environment. The development of new biomaterials from agricultural by-products and wastes is an **emerging global trend**, and one of the new millennium key challenges which aims the promotion of environmental protection.

Methodology and results *



The above methodology shows both the process of creating the edible coating but also the film. The edible coating is the film-forming solution and can be applied into fruits using different methods such as dipping the fruit or brushing the coating on the products.

The transparency of the edible coating and films is based on the removal of the chlorophyll, if the removal is not done correctly the coatings and films will have a greenish appearance.

The edible coatings and films done with mucilage don't have a scent, the films showcase good levels of manipulation, and the edible coatings appear to have good levels of viscosity.

* The detailed production of the biopolymers is under patent process.

Conclusion

Considering nowadays circumstances, where plastic waste is a huge concern in terms of pollution, the use of sustainable raw materials to make biodegradable plastics is key to ensuring the existence of eco-friendly packaging. These preliminary tests show that cladodes' mucilage have a great potential to be used as edible coatings and films, guaranteeing that products have a longer shelf-life. This creates an interesting alternative to traditional packing options, and a way for producers of *Opuntia* to use a by-product that exists in abundance and needs to be removed from the crop every year.

Future Studies

Futures studies include conservation studies using local produced fruits.

It's also necessary to keep analyzing the characteristics of the edible coatings and films, with antioxidant analysis, viscosity and permeability tests.

It's also vital to conduct sensorial tests to ensure that there is no change to the quality of the products when the edible coating is applied or when products are storage with the edible film.

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