RESEARCH ARTICLE | OCTOBER 29 2019

Influence of nanocellulose addition on the film properties of the bionanocomposite edible films prepared from maize, rice, wheat, and potato starches

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AIP Conf. Proc. 2162, 020073 (2019)

https://doi.org/10.1063/1.5130283

The starch based edible films have attracted much attention as the alternative food packaging materials to synthetic plastics due to their properties, such as, high transparency, odorless, biodegradability, tasteless, and semi-permeability to gases and food additives. However, the starch based edible films produced from native starch exhibit poor water resistance and poor mechanical strength. Incorporation of nanomaterials in starch films is considered as an effective method in recent times in order to improve the mechanical and barrier properties. Present investigation focused on the effects of nanocellulose on the film properties of edible films produced from different starch sources, such as, maize starch, rice starch, wheat starch and potato starch. The starch edible films were solution cast by adding 5g/100 ml water, 30 wt% of solution and varying concentrations of nanocellulose (0%, 2%, 5%, 10% & 15% of solution). Water vapor transmission rate (WVTR), mechanical strength (tensile strength, Young's modulus and percentage of elongation) and film color were determined for the films. The results showed that the addition of nanocellulose had improved the film properties in all the cases, and it could be used as a promising choice for food packaging applications. Among the four starch types, the nanocellulose incorporated edible films produced from potato starch and rice starch showed better film properties compared to those produced from maize starch and wheat starch.

Topics

Hygrometry, **Materials properties**, **Mechanical properties**, **Nanomaterials**, **Chemical compounds**, **Carbohydrates**, **Food**

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