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Perspective

Application in Food Packaging and Micronutrient Fortification of Bioaerogels

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DESCRIPTION

Bio aerogels are typically synthetic porous, light-weight materials that are derived from hydrogels by substituting gas for the liquid in the gel structure. They are more porous, have a high pore volume, are less dense, and have a higher mechanical strength. Bio aerogels are fabricated into different shapes and sizes and are commonly used as carriers, catalysts, and supporting materials. Using polysaccharides, proteins, and seed mucilages as aerogel matrix provides additional advantages since they are biobased, biodegradable, and regarded as safe for food-related applications. Starch, cellulose, alginate, pectin, carrageenan, konjac glucomannan, whey protein, egg white protein, seed mucus, and other biopolymers are frequently utilised in the creation of bio aerogels. These biopolymers can be used as gelling agents, carrier matrices, emulsifiers, thickeners, and stabilizers in food items. When in contact with water or another suitable solvent, di-cations, the presence of co-polymers, and crosslinking agents, they have excellent gelation ability and form a hydrogel. Additionally, the hydrogel used to create the bio aerogels is dried appropriately, usually using supercritical CO_2. The ultra-low density, higher porosity, and higher specific surface area of the dried bio aerogels in a variety of sizes and shapes define their broad application potential as novel food materials. The fortification of micronutrients and the development of new food packaging materials provide ongoing technological difficulties for the food research community and industry. The improvement of bioactive capabilities and the nutritional profile of packaged foods and beverages depend heavily on micronutrient fortification. Even though much study is being done, there are still technological requirements to maintain delicate micronutrients. The idea of creating bio aerogels and injecting them with delicate micronutrients is one such new technical innovation. Additionally, bio aerogels are viewed as a cutting-edge, cost-effective strategy to take over the food packaging industry.

In light of this, the current work was divided into five main sections: the state of the art on fabrication processes of bio aerogels with a focus on hydrogel formation, alcogel formation, and drying methods; evaluation of the frequently used precursors of bio aerogels; and methods to characterize key physicochemical properties of bio aerogels suitable for food applications. However, its potential use in food product packaging that is active and micronutrient fortified is highlighted. Application of bio aerogels in food packaging that is active and vitamin fortified.

Evaluation of bioaerogels

Before trying to apply bioaerogels for the fortification of micronutrients and food packaging, it is necessary to assess the desired properties of the material, including bulk density, specific surface area, volumetric shrinkage, mechanical property, moisture absorption isotherm, surface morphology, and thermal behaviour. These techniques can be used to describe the structural and physicochemical characteristics of bioaerogels intended for use in food. Nevertheless, it's critical to note that these methods.

Application of bioaerogels in food micronutrient fortification

Micronutrient fortification has found a place in the food business as one of the important strategies used to treat the micronutrient shortage in all age groups. In order to improve the nutritional profile and quality of a product, micronutrient fortification entails adding micronutrients (vitamins and minerals) to that product. The typical difficulties that food scientists have during micronutrient fortification.

Application of bioaerogels in food packaging

Extended storage or long-distance transit might expose fresh fruit or packaged meals to different dangers including microbial deterioration, softening, and ripening. Food packages are vital materials that provide physical and barrier protection and act as basic storage containers to assure food safety and quality. Innovative methods for creating food packaging materials that are active or intelligent, have good oil and water absorption properties, and are thermally stable.

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