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Editorial: Sustainability and efficiency of food packaging: from food preservation to sale

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Editorial on the Research Topic

Sustainability and efficiency of food packaging: from food preservation to sale

Food packaging has played an important role in the food industry. Besides providing a way to protect the food product during transportation, it can be used as an effective communication tool to deliver information about the product to the consumer. The design and development of attractive packaging is imperative for the effective marketing of the product. Overall, food packaging contributes to food protection and preservation, containment, communication, and marketing. Synthetic polymers used for the development of packaging material caused serious environmental problems worldwide.

Therefore, recent research reports mainly focused on the use of biodegradable and renewable materials from lignocellulosic agro waste (such as paddy straw, sugarcane bagasse, wheat bran, rice husk, banana fiber, and pineapple waste) are gaining more importance. The process to ban single-use plastics paves the way for sustainable and environmentally friendly alternatives as lignocellulosic materials which adds economic value to the underutilized crops and agricultural waste. Currently, production of biodegradable packaging is based on the biochemical profile and/or cellulose content and thermal behavior of the raw material. Disposable biodegradable plates and cutlery are produced using the hot compression/hydraulic technique (temperature: 150–200°C; Pressure: 170–200 bar; Pressing time: 3 to 5 min). The selection of natural resins and gums based coatings could enhance the water resistance behavior of the biodegradable products. However, it is important to evaluate biodegradable products' degradation capacity, water absorption/hygroscopicity behavior, microbial spoilage/growth during their storage, presence of allergens, components migration behavior, and mechanical proprieties before placing them into commercial use. Thus, future research in this field needs to address the pilot-scale production of biodegradable packaging materials. Also, innovations in biodegradable product development require an interdisciplinary approach from food scientists/chemical engineering's/material science to achieve the goals of environmental sustainability and commercial success.

This Research Topic integrates these aspects by exploring innovative materials from agri-biomass coupled with their efficiency in food safety and their environmental impact while investigating the cultural and social drivers that affect consumers' choices in different geographical areas. The integration of this information would offer an environmentally safe solution to industries and policy makers, to encourage industries to move forward with a

sustainable food packaging production system. The information covered in this Research Topic is summarized below.

Ren et al. prepared an alkali-soluble polysaccharide from wampee [*Clausenalanisium* (Lour.) Skeels] and evaluated its effect on chitosan-based composite film. They found that the developed polysaccharide can improve mechanical, optical, thermal stability and barrier and antioxidant properties of edible chitosan film. Considering polylactic acid and lignocellulosic waste material from cassava bran and coffee husk as backbone material, Muñoz-Pabon et al. prepared and characterized a packaging material for fresh meat products. The addition of oregano essential oil and nisin was useful in increasing the shelf life of the meat products, although affected their appearance.

Young et al. critically reviewed the consumers' perceptions about the use of smart packaging material. They highlighted that understanding consumers' attitudes toward active and intelligent packaging technologies is a key to ensuring commercial success. Young et al. concluded that consumer acceptance of smart packaging is not a well-researched area, and more focus should be taken on brand name, geographical spread, longitudinal studies, and ethical values. Researchers from Argentina (Salgado et al.) analyzed the recent applications of biodegradable polymers on smart packaging. The outcome of this study is "Biobased materials are a potential option to replace synthetic polymers." González-López et al. identified the gaps between knowledge on technologies and market behavior that hamper the configuration of the food packaging industry with global environmental policies.

Mai et al. conducted the survey on purchase behavior of organic food. They have collected the data from 420 consumers in Da Nang city, Vietnam. The results indicate that attitudes and trust have a direct and positive correlation with the intention to purchase organic products.

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