ISSN: 2644-2981

DOI: 10.33552/GJNFS.2019.02.000541

Global Journal of Nutrition & Food Science

Iris Publishers

Mini Review

Eco-Friendly Bio-Based Plastic Films as an Alternative to Petroplastic: A Review

Asia Neelam* and Omme Hany

Insitute of Environmnetal studies, University of Karachi, Pakistan

***Corresponding author:** Asia Neelam, Insitute of Environmnetal studies, University of Karachi, Pakistan.

Received Date: September 06, 2019

Published Date: September 27, 2019

Abstract

Over the increasing concern on environmental issues raised due to petroplastic scientist are moving towards environmentally friendly material, i.e. Bio-based plastic which received considerable attention due to their use in edible and biodegradable packaging materials. This review paper is intended to provide information about the bio-based material and their advantages.

Introduction

Packaging resources form a vital part of the economy and our everyday life. They are dominant because of their mechanical, barrier property as well their safe distribution of products from producer to the consumer [1-3]. In spite to the numerous advantages the disposal off of plastic material is hard or sometime impossible. The huge amount of plastic waste is disposed of in landfill sites which lead to the production of greenhouse gases and leachate as they are not degraded naturally by microorganisms and causing other environmental issues [4-6]. Based on the facts, it is necessary to established the plastic material alternative that is cheaper or provide the same strength as plastic.

Research is now moving towards Bio-based plastic i.e. plastic that are biodegradable and derived from natural resources or biomass [7]. New bio-based constituents have been exploited to develop edible and biodegradable films in an effort to extend shelf-life and increase quality of food while reducing packaging waste [8,9]. From the last decades, there has been an exponential increase in the use of natural polymer-based film materials and coatings in packaging for the food industry, which protect the food from external contamination, microbial deterioration and extent their shelf life [10,11].

Plasticizer also has dominant market in plastic industries. The current market proposed wide range of plasticizer, however in the early 1980s, there have been alarming situation regarding phthalates as a plasticizer and their effects on human health [12]. This fact makes the scientist to introduce or developed natural based plasticizers that have a property of low toxicity and low migration across the material. In biopolymer-based films and coatings production, plasticizers are also essential additives since they can develop elasticity of the film by avoiding pores and cracks in the polymeric matrix [13].

Polysaccharide-based films

In recent advancement of materials studies and biodegradable films or coating polysaccharides such as chitosan, pectin, starch and cellulose a great material to enhance shelf- life of ready-to-eat food [14]. They structural morphology of these polysaccharides makes its flexible, transparent and resistible to oil and fats. These films also have efficiency to barrier of gas transference [9]. In edible polymers starch considered as the most promising material use in biodegradable plastic. Althrough these films has poor water vapour permeability.

Protein, lipid-based films

Protein based edible films are generally diffusions to the protein as the solvent/carrier vaporizes. Protein based films have an excellent carbon dioxide and oxygen barrier properties. However, it has a limited moisture barrier. Gelatin is unique among protein film having a unique sequence of amino acid. However, they're less watery barrier property limits its application in industries. Use of Zein coating extracted from zein corn are relatively good water

barriers and moisture barrier property. They are also effective in delaying the color change in fruits as food coating.

Conclusion

Eco-friendly edible films gaining more interest in today's society, Since the new generation bio-based plastic is produced from renewable resources such as waste of crop and other food items. Therefore, research in this area has development of efficient food coating and edible films which are easily biodegraded. Protein-based films show impressive gas barriers, hence will be more suitable for food packaging material. Further work is currently underway that replace the conventional synthetic and non-biodegradable ones as packaging materials.

Acknowledgments

None.

Conflict of interest

No conflict of interest.

References

1. Ahvenainen R (2003) Novel Food Packaging Techniques, Woodhead Publishing, Boca Raton, USA.
2. Bauer EJ (2009) Pharmaceutical Packaging Handbook, Informa Healthcare USA, Inc., New York, London, USA.
3. Realini CE, Marcos B (2014) Active and intelligent packaging systems for a modern society, Meat Sci 98(3): 404-419.
4. Prasad P, Kochhar A (2014) Active Packaging in Food Industry: A Review, IOSR J Environ Sci Toxicol Food Technol 8: 1-7.
5. Gómez Guillen MC, Pérez Mateos M, Gómez Estaca J, López E (2009) Caballero Trends Food Sci. Tech. 20: 3.
6. Tongnuanchan P, Benjakul S, Prodpran T (2012) Properties and antioxidant activity of fish skin gelatin film incorporated with citrus essential oils. Food Chemistry 134: 1571-1579.
7. Kershaw DPJ (2015) Biodegradable plastic and marine litter misconceptions, corcerns and impacts on marine environments, Nirobi, UNEP, Kenya, East Africa.
8. Coma V (2008) Bioactive packaging technologies for extended shelf life of meat-based products. Meat Sci 78(1-2): 90-103.
9. Tharanathan RN (2003) Biodegradable films and composite coatings: past,present and future. Trends Food Sci Technol 14(3): 71-78.
10. Ramos M, Valdés A, Beltrán A, Garrigós MC (2016) Gelatin-Based Films and Coatings for Food Packaging Applications. Coatings 6(41): 1-20.
11. Ahmad M, Benjakul S, Prodpran T, Agustini TW (2012) Physico-mechanical and antimicrobial properties of gelatin film from the skin of unicorn leatherjacket incorporated with essential oils. Food Hydrocolloids 28(1): 189-199.
12. Tongnuanchan P, Benjakul S, Prodpran T, Pisuchpen S, Osako K (2016) Mechanical, thermal and heat-sealing properties of fish skin gelatin film containing palm oil and basil essential oil with different surfactants. Food Hydrocolloids 56: 93-107.
13. Garcia MA, Martino MN, Zaritzki NE (2000) Barrier properties of ediblestarch-based films and coatings. J Food Sci 65(6): 941-947.
14. Cazón P, Gonzalo Velazquez, José A Ramírez, Manuel Vázquez (2017) Polysaccharide-based films and coatings for food packaging: A review, Food Hydrocolloids 68: 136-148.