PAPER 218 – ENHANCING FOOD SAFETY AND QUALITY WITH EDIBLE COATINGS: A REVIEW

Y. Sayuti[1], S. E Adebayo[1] and B.O Atteh[1]

[1]Department of Agricultural and Bioresource Engineering, Federal University of Technology Minna, Minna 920101, Nigeria
*Email:engnryasman@gmail.com

ABSTRACT
The edible coating is utilized to prolong the post-harvest lifespan of fresh food while simultaneously enhancing the visual appeal property and ensuring food safety. These coatings can be derived from both animal and plant sources. Edible coatings come in various forms such as proteins, lipids, polysaccharides, resins, or combinations thereof. Edible coatings act as a protective barrier which effectively prevents moisture and gas exchange whenever food is processed, handled or stored. They effectively mitigate food spoilage and promote protection by either their inherent properties or the inclusion of antimicrobial compounds. In addition to their protective qualities, edible coatings offer several other advantages such as minimizing packaging material wastage, prolonging the lifespan of fresh and slightly treated products, and shielding fresh foods against detrimental atmospheric factors. By facilitating the controlled spread of gas, water, aroma, and taste components within the food structure, these coatings play a vital role in preserving product quality.

KEYWORDS: Edible coating, Fruits, Vegetables, shelf life

1.0 INTRODUCTION
The role of edible coatings is vital in food protection by forming a thin consumable layer that acts as a protective barrier against oxygen, external microbes, moisture, and solutes (Baldwin et al., 1996). These coatings create a semi-permeable barrier, with the primary objective of lengthening the lifespan of food products. By minimizing moisture and solute migration, gas exchange, oxidative reactions, and respiration, edible coatings help maintain the freshness of fruits and reduce physiological disorders (Park, 1999). Edible coatings offer an alternative approach to prolonging the postharvest lifespan of fresh fruits, whether stored at low temperatures or not. They mimic the effects of improved atmosphere storage by modifying the inner gas configuration surrounding the food (Park, 1999). Acting as semi-permeable barriers, Arvanitoyannis and Gorris, (1999) noted that edible coatings effectively reduce the respiration level, moisture loss, and oxidation reactions, thus maintaining the inner value and features of the food. In recent years, the usage of edible coatings has garnered significant consideration due to several factors. There is an increasing awareness of decreasing ecological degradation resulting from plastics, driving the exploration of edible coatings as a more sustainable option. Additionally, the necessity to prolong the shelf life of food products and meet the mandate for better and ecologically friendly diets has further emphasized the importance of edible coatings (Espino-Diaz et al., 2010)

1.1 Edible coating history
When consumers purchase fruits and vegetables, they often assess the freshness and quality based on appearance (Kader, 2002). One of the commonly experienced and challenging issues in the fresh-cut food sector is preserving and managing the freshness of produce while preventing the development of putrefaction and pathogenic microbes. Edible coatings provide an extra defensive layer for fresh food and can even replicate the effects of improved atmosphere storage by altering the centre gas configuration (Rojas-Grau et al., 2007). Various edible coatings have been successfully used in preserving several varieties of fruits and vegetables, including oranges, apples, grapefruits, cherries, cucumbers, strawberries, tomatoes, and capsicums. The achievement of edible coatings in preserving fruits and vegetables is largely influenced by controlling the centre gas structure of the food (Salleh, 2013).

1.2 Application of edible coating
The advancement of polysaccharide edible coatings has had a significant impact on the utilization of edible coatings in the food production sector. Among these polysaccharide materials, carrageenan and carboxymethylcellulose (CMC) have gained particular attention for their ability to form a continuous network and