

A Short Review on Application and Comparison of Novel Active Packaging and MPA in Meat Packaging and Meat Products

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Abstract

Food process technology has been improved different packaging methods in improving shelf life of perishable foods such as meat and meat products. Regarding that improving of contamination have caused to develop and enhancement of active packaging in recent years, thus active packaging has been changed condition of inner parts of packaging and progressing of sensory properties. Active packaging is one of the antimicrobial and antibacterial packaging. CO₂ considers as one of the MPA ingredients and N₂ also uses as neutral filler.

Keywords: *Meat, active, modified atmosphere, shelf life*

Introduction

Microbial spoilage, color destruction has been always as one of the most important issues in keeping of foodstuffs. Developing of food packaging technologies has been caused to increase shelf life of perishable foods like meat and meat products. Recently, widely researches on the field of active packaging have performed (Lee, 2010). Active packaging not only improves shelf life, security properties, organoleptic properties and supplying of foodstuffs, but having preservative in them can widen their shelf life. Modified atmosphere packaging (MAP) with special affection on meat shelf life contains Carbone dioxide as one of the important part of MAP ingredient and Nitrogen as a neutral filler (Coma, 2008 and McMillin, 2008).

Active packaging

Active packaging is a type of packaging at which changes packaged foodstuff conditions and leads to increase shelf life, organoleptic properties and foodstuff qualities. Active packaging includes application of food additives aiming at increasing of preservative affection of package materials. Different active packages include oxygen scavenger, moisture absorbent, and Carbon dioxide generator,

Antimicrobial systems or Active agents (Coma2008, , Kerry et al,2006., Cornforth and Hunt,2008).

Benefits of active packaging in meat and meat products

Active packaging keeps extraction of fresh meat in plastic containers and causes to reduce lipid oxidation, therefore retardation of color changes and myoglobin oxidation decrease. On the other side, spoilage rate diminishes due to reduction of microorganisms in converted meats thus shelf life increases (Eilert, 2005, Lee, 2010, Rubio et al.,2008).

Active packaging

Active packaging include different systems such as placing small bags in package, distribution of active compounds inside of package, covering active on material surface, application of anti-bacterial macromolecules like bacterosins (Pediosin, Nicin, etc). Therefore demanding of active packaging in emat industry has researched (Coma, 2008, Cutter, 2006). Figure 1 depicts immigration of active compounds.

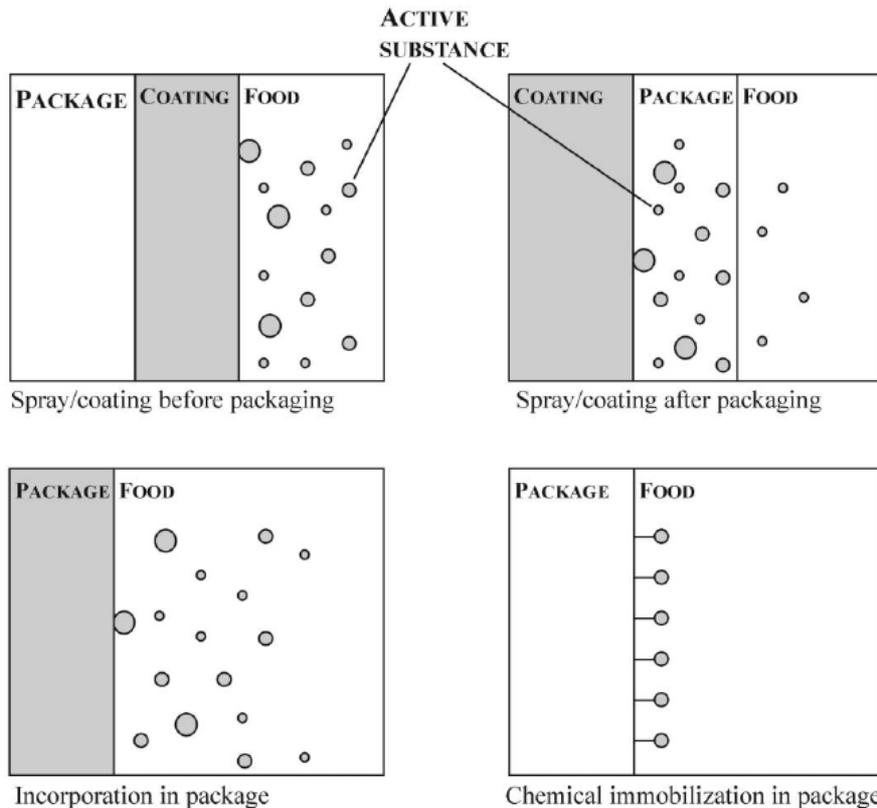


Figure 1: Immigration of active compounds in different anti-microbial packaging systems

Modified atmosphere packaging

MAP refers to entrapment of foodstuff in a packaging including modified gases in order to increase shelf life (McMillin, 2008).

MAP benefits

MAP technology can increase obviously shelf life, reduction of spoilage as well (Lee, 2010; McMillin, 2008).

Defects of MAP application

The amount of any constituent of formulation must determine accurately. Moreover special equipment and trained personnel are required which creates extra costs which along with losing MAP conditions after opening packages are considering as MAP restrictions.

Application of MPA with Cool Air

This method introduces as cooling retards microbial growth in metabolic and chemical disruptive reactions of foodstuffs thus MPA along with cool air exhibits a synergistic effects (Kerry et al., 2006).

Gas composition of air and MAP

Air composition includes %20.95 oxygen, %0.03 Carbone dioxides, %78.08 Nitrogen, %0.93 Ar, while MAP is composed of oxygen, Carbone dioxide, Nitrogen and a little CO (McMillin, 2008).

Reasons of instability of gas composition in package within storage time

Reactions of gases and products, microorganism's activities, metabolic activities, physical and chemical reactions in products, gas penetrate ability are instability reasons of gas composition in package (Lee, 2010).

The affections of consumed CO₂ in MAP technology

CO₂ defines as the main important gas in MAP cause prevent microorganism growth and fat solubility, and increasing the solubility in low temperatures, but it must be noted that applying CO₂ in food packaging of food including high amount of fat can create collapse in foodstuffs (McMillin, 2008).

Affections of O₂ and N₂

Oxygen facilitates disruptive reactions such as fat oxidation, browning reactions, pigment oxidation and meet the regular fungal and bacterial spoilage. Nitrogen in MPA technology can consume as an appropriate filler and preventing collapse phenomenon (McMillin, 2008).

Conclusion

Application of active packaging in aforementioned products omit the moisture loss, reduction of oxidation reaction rate, color changes and myogloboline oxidation. In this novel technology, by diminishing of contamination creating pathogens on covered meat, the lost of volatile compounds minimizes. Regular atmosphere in MPA technology is O₂, CO₂ and N₂ or slightly amount of CO which widen shelf life. Results revealed that CO prevent contamination and bacterial count reduced. Applying active packaging in meat and meat products during storing leads to elimination of moisture lost, reduction of oxidation, color changes and reduction of contamination creating microorganisms

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