



TECHNOLOGY BLUEPRINT OF MEAT SMART SENSOR (MSS) PACKAGING

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Group Name	: Smart Tech. Sdn. Bhd. (Meat Smart Sensor (MSS) packaging)
Group Members	: <ol style="list-style-type: none">1) Nur Haznina Binti Haron (2019728193)2) Nur Farhana Nabela Binti Rosmi (2019943135)3) Khalimatul Saadiah Binti Jamsari (2019544963)4) Nur Syafiqah Idzreen Binti Mohd. Azam (2019314817)5) Fatin Fatanah Binti Ruslan (2019728125)

Submitted to

Madam Nabilah Abdul Shukur

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1.0 EXECUTIVE SUMMARY

Food safety is a central factor affecting public health and the well-being of society. A potential way to manage food-borne illness is by real-time monitoring of food safety in the food supply chain. Fortunately, with the advent of emerging technology and a lot of non-linear thought, innovators are discovering new ways to adapt to both customer trends and the health of the earth. The need for safe and high quality foods, as well as shifts in customer preferences, has recently led to the development of innovative and novel approaches in the field of food packaging technology. The development of new technologies, such as active and smart packaging, has been significantly accelerated in recent years, with an emphasis on educating consumers about food quality. Advances in the field of sensors and biosensors have allowed the innovation of new materials, devices and multi-functional sensing systems to track food quality (Yousefi et al., 2019).

Intelligent packaging innovations are increasingly gaining popularity in the agricultural and food industries. Intelligent packaging for agricultural and food products has a great potential to enhance the shelf life and protection of agricultural and food products, apart from the essential functions of keeping products clean and protecting against unnecessary physical and chemical changes (Meng et al., 2014). In this project, we concentrate on in-depth the overview of recent technical developments that have the potential to be integrated into food packaging in order to ensure food quality, protection and the monitoring spoilage of the meat product. These advanced sensing systems typically target the monitoring of gas production, pH and growth of microorganisms in packaged foods

Innovation of Meat smart sensor (MSS) packaging in Malaysia focusing on packaging of meat products as meat is one of the most perishable foods in the food industry. The packaging sensor alerts consumers by gas sensor when meat is about to go off to maintain safety and freshness of the meat, and can educate society to practice not to simply throw up due to uncertainty of the condition of the meat product. This packaging also assists the consumer to implement a healthy lifestyle through four (4) partitions in the packaging of meat in exact calorie intake.

2.0 PRODUCT DESCRIPTION

2.1 Details of The Product

The product of our company, Smart Tech. Sdn. Bhd. is Meat Smart Sensor (MSS) packaging, which is a packaging for raw meat products and this smart packaging is a new trend to the market in the food packaging industry in Malaysia for a healthy lifestyle with exact calorie intake that is packed in four (4) partitions in one packaging.

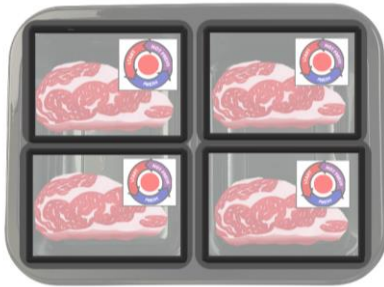


Figure 2.1.1 Upper view of MSS packaging

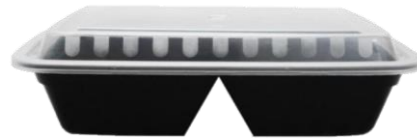


Figure 2.1.2 Side view of MSS packaging



Figure 2.1.3 Back view of meat smart sensor

Besides that, the application of smart sensor technology on the packaging provides the consumer with a new experience with novel packaging of raw meat products that has gas sensor technology. The MSS packaging also ensures the food safety by providing a spoilage indicator (gas sensor).

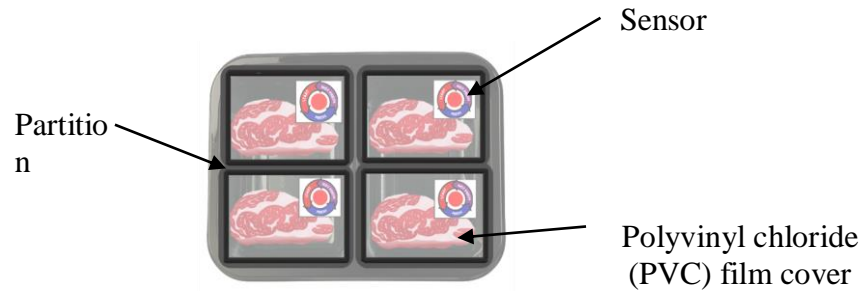


Figure 2.1.4 Location of sensor on the packaging

Figure 2.4 shows the gas sensor is located on the inner surface of the polyvinyl chloride (PVC) film that covers the meat directly. The size of the square shaped film (gas sensor) on-package is 4 cm x 4 cm. The gas sensor is incorporated with dye pH-sensitive (anthocyanin) functioned to indicate the meat freshness/spoilage due to the presence of ammonia gas (NH_3). There are three levels of color changes on the gas sensor, which are: (1)Start: red, (2)Fresh: blue, (3)Not fresh: purple. Thus, the MSS packaging has the potential to be in market through other company food packaging industries and raw meat suppliers. Hence, the quality of raw meat products can be monitored during storage, distribution, and retailing.

2.2 Product Application

Nowadays, people are starting to practice a healthier lifestyle due to the rise in various forms of illnesses. There are many aspects that contribute to a healthier lifestyle, such as food consumption, exercise and social activities. (Ridzuan et al., 2018). The main key to a healthy lifestyle started with consuming healthy food. Healthy food means people need to take three meals a day in the right portion besides consuming fruit, vegetables and fat-free products. Eating in larger portions can contribute to over intake and can cause other diseases such as diabetes, heart disease and many other associated diseases. Hence, the partitioning meat per serving can prevent people from taking excess calories in a day which this privilege provided by Meat Smart Sensor packaging.