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PST001 - GAMMAGLOW DUCK: READY-TO-COOK SMOKED DUCK MEAT PRESERVED VIA GAMMA TECHNOLOGY

Mohamad Shahrini Hashim^{1,3*}, Salma Mohamad Yusop¹, Irman Abdul Rahman², and Mohamad Saiful Nizam Jahaluddin⁴

¹Department of Food Sciences, Faculty of Science and Technology, Universiti Kebangsaan Malaysia, Bangi 43600, Malaysia

²Department of Applied Physics, Faculty of Science and Technology, Universiti Kebangsaan Malaysia, Bangi 43600, Malaysia

³School of Industrial Technology, Faculty of Applied Sciences, Universiti Teknologi MARA Cawangan Negeri Sembilan, Kampus Kuala Pilah, Kuala Pilah 72000, Malaysia
348 Salai Smoke House, No. 48 Kampung Ibol Terachi, Tanjung Ipoh 71500, Malaysia

*Corresponding author: shahrini@uitm.edu.my

ABSTRACT

This innovation presents a ready-to-cook, vacuum-packed, gamma-irradiated smoked duck developed specifically for traditional Negeri Sembilan cuisine. It addresses key challenges faced by Malaysia's food processing micro, small, and medium enterprises (MSMEs), including short shelf life, microbial contamination, and quality degradation during storage. The objective is to produce a smoked duck product that retains its flavour and quality at ambient room temperature (27°C), eliminating the need for cold storage. This is achieved through the integration of three techniques: warm smoking, double-layer vacuum packaging, and gamma irradiation. Warm smoking reduces carcinogenic compounds typically associated with traditional smoking methods. The double-layer vacuum packaging enhances packaging durability and inhibits microbial growth. Gamma irradiation effectively eliminates microbial contaminants, extending shelf life while preserving the product's authentic taste and texture. This innovation offers a practical, scalable solution tailored for MSMEs in the poultry processing sector.

Keywords – Gamma Irradiation, Smoked Duck, Vacuum Packaging, Shelf Life Extension

INTRODUCTION

Smoked duck is a traditional delicacy in Malaysia, especially in Negeri Sembilan. However, the industry faces several challenges including short shelf life, microbial contamination, reliance on cold storage, and rising production costs. These issues are particularly burdensome for MSMEs. The motivation behind this product's development is to address these pain points by enhancing product safety, extending shelf life, and ensuring quality without cold storage.

OBJECTIVE

The objective of this project is to develop a ready-to-cook smoked duck product that retains its flavour, texture, and safety at room temperature (27°C), thereby enabling safer distribution, prolonged shelf life, and reduced dependency on cold chain logistics.

DESCRIPTION OF THE PROJECT

GammaGlow Duck is a ready-to-cook, vacuum-packed, gamma-irradiated smoked duck that combines warm smoking to impart a distinctive flavour while reducing carcinogenic compounds typically associated with traditional smoking, double-layer vacuum packaging to enhance barrier protection and inhibit microbial growth, and gamma irradiation to eliminate pathogens and extend shelf life without the need for chemical preservatives or cold storage. This product is specifically optimised for MSMEs and supports food sustainability by eliminating the need for cold storage during both storage and transport, while preserving the authentic taste, texture, and safety essential to traditional dishes.



Figure 1: Image of (a) vacuum packed and (b) final product of GammaGlow Duck.

NOVELTY

GammaGlow Duck is the first Malaysian smoked duck product that combines traditional warm smoking with modern gamma irradiation and double-layer vacuum packaging. This innovative tri-technology integration enables room-temperature storage while ensuring food safety and quality, without the need for cold storage or added chemical preservatives. The approach is both scientifically validated and commercially scalable for MSMEs.

CONCLUSION

Gamma irradiation, when combined with warm smoking and advanced vacuum packaging, effectively enhances the shelf life and microbiological safety of smoked duck without compromising its sensory qualities. This innovation offers a sustainable, cost-effective solution for local food processors and has strong commercialization potential.