

# 1 配方與加工交互作用對植物肉品質特性之影響

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## 4 大綱

5 一、前言

6 二、原料與配方設計

7 三、製程

8 四、品質與功能性分析

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## 10 摘要

11 植物肉因永續及健康風潮逐漸受到消費者青睞，但口感、風味及脂質氧化等問題尚  
12 待突破。本報告目的為探討添加不同油脂、抗氧化物以及利用低水分烘烤或高水分擠壓  
13 製程對於植物肉產品之理化及感官特性影響。將豌豆蛋白、大豆蛋白與鷹嘴豆粉、或榛  
14 果粕等混合，分別添加菜籽油（OO）、橄欖油（CO）、巴西莓油（AO）、橙皮油、棕櫚  
15 油、蓖麻油、人造奶油與酥油，部分樣品額外添加蜂蜜（H）、蜂膠（P）或辣椒素（JE）  
16 等抗氧化物，再分別以低水分烘烤或高水分擠壓（HME）製程加工植物肉，並評估其  
17 pH 值、質地、烹煮損失率、持水力、色差、抗氧化力、感官評價與體外蛋白質消化率  
18 等。結果顯示，橙皮油能顯著改善大豆植物肉含水量（67.3%）、硬度（41.4 N）、抗氧化  
19 力（36.9%）與感官表現（多汁性 5.38 分、豆腥味最低 1.38 分）。豌豆蛋白產品中，  
20 蜂蜜組硬度最高（16.9 N）並具最佳抗氧化力（DPPH>80%），而菜籽油＋辣椒萃取物組  
21 最受品評員喜愛，外觀則以巴西莓果油組最佳。在製程方面，烘烤突顯配方差異但結構  
22 均質；高水分擠壓於 120 °C 下能形成纖維化結構，使質地更接近真肉；混合榛果粕使  
23 蛋白質消化率達 86.8%並提升抗氧化力。綜上，整合油脂種類、功能性成分與加工條件  
24 開發植物肉，以提升質地、風味、保存性與營養價值，從而增進消費者接受度並鞏固市  
25 場競爭力。

# Formulation and Processing Interactions Governing the Quality Attributes of Plant-Based Meat Analogues

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## Outline

1. Introduction
2. Raw materials and formula design
3. Process
4. Quality and functionality analysis
5. Conclusion

## Abstract

Plant-based meat has gradually gained favor among consumers due to the trends of sustainability and health; however, challenges remain in the areas of texture, flavor, and lipid oxidation. The purpose of this report is to explore the effects of different oils, antioxidants, and processing methods—namely low-moisture baking and high-moisture extrusion—on the physicochemical and sensory properties of plant-based meat products. Pea protein, soy protein, chickpea flour, and hazelnut meal were blended as bases, with various oils added including canola oil (OO), olive oil (CO), açai oil (AO), orange peel oil, palm oil, castor oil, margarine, and ghee. Selected samples were further supplemented with antioxidants such as honey (H), propolis (P), and capsaicin extract (JE). Plant-based meat samples were processed via low-moisture baking or high-moisture extrusion (HME), followed by evaluation of pH, texture, cooking loss rate, water holding capacity, color difference, antioxidant capacity, sensory attributes, and in vitro protein digestibility. Results showed that orange peel oil significantly improved water content (67.3%), hardness (41.4 N), antioxidant capacity (36.9%), and sensory performance (juiciness 5.38 points; lowest beany flavor 1.38 points) in soy-based plant meat. For pea protein products, the honey group had the highest hardness (16.9 N) and best antioxidant capacity (DPPH >80%), while the canola oil plus capsaicin group was most favored by panelists, and appearance was best in the açai oil group. Regarding processing, baking accentuated formulation differences but resulted in homogeneous structure; high-moisture extrusion at 120°C enabled the formation of a fibrous structure, making the texture closer to real meat. Incorporating hazelnut meal raised protein digestibility to 86.8% and improved antioxidant capacity. In summary, optimizing oil type, functional ingredients, and processing conditions is key to developing plant-based meat with enhanced texture, flavor, shelf-life, and nutritional value, thereby improving consumer acceptance and strengthening market competitiveness.

## 參考文獻

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