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PTFS17-06-26 Nutritional Transformation and Gastronomic Functionality of Karaman Divle Cave-Aged Cheese in Culinary Applications

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Objectives: The study aims to evaluate the nutritional profile and biochemical transformations of Karaman Divle Obruğu Tulum Peyniri (KDOTP) across standardized culinary techniques. It was hypothesized that specific techniques such as basting and mantecatura optimize lipid diffusion and improve the protein biological value of plant-based matrices.

Methods: Macro-nutrient analysis was conducted on a total of 43 standardized recipes, categorized into soups, meat-based mains, traditional pastries, and desserts. Culinary techniques including basting, mantecatura, and controlled gratin were analyzed for their impact on protein bioavailability. Nutritional values were calculated per serving based on ingredient weights and cooking-induced nutrient retention factors.

Results: Meat-based recipes demonstrated high protein density, ranging from 38.4g to 48.5g per serving. Peynir (cheese) provided significant amino acid complementarity when combined with ancient grains like Siyez, compensating for limiting amino acids in the cereal matrix. The natural high sodium content (~3–4g/100g) of KDOTP served as an effective "salt substitute," eliminating the need for added refined salt in 90% of analyzed recipes. Basting techniques at controlled temperatures improved lipid diffusion and inhibited oxidation in animal proteins, while mantecatura in risottos ensured a homogeneous lipid distribution. Energy values ranged significantly across categories, with traditional pastries reaching up to 620 kcal per serving.

Conclusions: KDOTP functions as a key nutritional identity component rather than a simple garnish. Its application in standardized recipes supports high-quality protein intake and effective sodium management for healthy adults. Standardizing these recipes is essential for preserving culinary heritage while meeting modern nutritional standards.

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PTFS17-07-26 Maleic Anhydride Esterified Starch Damages the Liver via the Gut-Liver Axis

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Objectives: Starch illegally adulterated with maleic acid (anhydride), also known as "toxic starch," was illegally used in the 2013 Taiwan food safety incident, posing potential health risks, although its toxicological mechanism remains unclear.

Methods: Maleic anhydride-esterified corn starch (MAECS) was prepared and characterized using X-ray diffraction (XRD), Fourier transform infrared spectroscopy (FTIR), and scanning electron microscopy (SEM). An 8-week in vivo experiment was conducted in mice, during which MAECS was administered orally. Liver injury was assessed through histological examination and measurement of hepatic pro-inflammatory cytokine expression (TNF-α, IL-1β, IL-6). Colonic barrier integrity was evaluated by analyzing tight junction protein expression (ZO-1, occludin). To determine the causal role of gut microbiota, fecal microbiota from MAECS-exposed donors was transplanted into antibiotic-treated recipient mice, followed by phenotypic assessment of liver damage.

Results: Oral administration of MAECS for 8 weeks induced significant liver injury in mice, as evidenced by histological alterations and upregulated expression of TNF-α, IL-1β, and IL-6 in liver tissue. Concurrently, decreased expression of ZO-1 and occludin indicated compromised colonic barrier function. Fecal microbiota transplantation from MAECS-exposed donors into antibiotic-treated recipients successfully recapitulated the liver injury phenotype, confirming that MAECS-induced dysbiosis plays a causal role in hepatotoxicity.

Conclusions: MAECS disrupts intestinal barrier integrity and alters gut microbiota composition, leading to systemic inflammation and subsequent liver injury. These findings provide mechanistic insights supporting the regulatory oversight of modified starches within food safety frameworks.

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