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FORMULATION, SENSORY, NUTRITIONAL AND PHYSICOCHEMICAL CHARACTERIZATION OF A NOVEL, PLANT-BASED KIMBAP FORTIFIED WITH *HERICIUM ERINACEUS* POWDER

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Abstract:

Kimbap is an emblematic culinary component of Korean gastronomy, consisting of cooked rice and various fillings meticulously rolled in dried seaweed sheets and then sliced into small segments. While traditional kimbap incorporates meat and/or other animal-derived ingredients, this study develops a vegan kimbap variant that offers an innovative and nutritious culinary solution, aligning with current trends of increasing concern for health and sustainability. This kimbap formulation (KLM) substitutes the traditional meat component with *Pleurotus* mushroom, leveraging its recognized nutritional profile and textural similarity. Furthermore, Lion's Mane powder (*Hericium erinaceus*) was integrated into the accompanying dressing—a blend of vegan mayonnaise and gochujang (Korean chili paste)—to enhance the functional value of the final product. Fresh cucumber and carrot, along with Korean pickled yellow radish (*danmuji*), were also incorporated into the composition to optimize texture and flavor, while providing an augmentation of valuable bioactive compounds. Simultaneously, a control batch of vegan kimbap was prepared, which was identical in composition but lacked the incorporated *Hericium erinaceus* powder (K0). The raw materials and the final products were subjected to analysis for total polyphenol content and DPPH free radical scavenging activity. Additionally, the innovative product was characterized by its proximate composition and sensory attributes. Of the raw materials utilized, *Hericium erinaceus* (Lion's Mane) powder exhibited the highest total polyphenol content and superior antioxidant capacity, followed by Nori seaweed. This compositional difference resulted in the final product (KLM) demonstrating a distinct advantage over the control (K0) in terms of both polyphenol concentration and antiradical activity. The KLM product exhibited a high moisture level and was characterized by a low lipid profile. Its macronutrient composition was dominated by total carbohydrates, followed by protein, with a significant representation of dietary fiber. Organoleptic assessment, performed using a 5-point hedonic scale, indicated highly favorable results, as the product achieved very high scores for all evaluated sensory attributes.

• Results and discussions

Sample	Total polyphenol content (mg GAE/g)
Nori seaweed	22.68±0.18
Boiled rice	1.18±0.04
Carrot (raw)	2.74±0.06
Pleurotus mushrooms	4.26±0.08
Raw cucumber	1.08±0.04
Vegan mayonnaise	0.68±0.02
Gochujang sauce	5.72±0.11
Lion's Mane Powder	40.28±0.21
KLM	6.17±0.08
K0	3.02±0.04



• Conclusions

KLM is a predominantly innovative product due to the integration of Lion's Mane powder, a modern functional ingredient, into a traditional kimbap recipe. This approach provides the product with additional health benefits, particularly in terms of cognitive support, thereby exceeding the concept of traditional kimbap. KLM offers a healthy and sustainable alternative while maintaining a similar taste to the traditional version. It is rich in vegetable protein, vitamins, and antioxidants thanks to the fresh vegetables and oyster mushroom (*pleurotus*). The special sauce with Lion's Mane and Gochujang gives it additional functional properties, such as antioxidant and anti-inflammatory action, contributing to a balanced lifestyle and overall well-being.

Sample	RSA (%)
Nori seaweed	95.62±0.24
Boiled rice	38.18±0.04
Carrot (raw)	91.21±0.32
Pleurotus mushrooms	91.63±0.18
Raw cucumber	71.08±0.14
Vegan mayonnaise	4.24±0.04
Gochujang sauce	94.11±0.21
Lion's Mane Powder	96.18±0.20
KLM	63.93±0.18
K0	43.12±0.15

