VALORIZATION OF *PLEUROTUS GENUS POWDERS* AS POTENTIAL ADDITIVES IN MEAT PRODUCTS

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I. INTRODUCTION

The food industry is constantly looking for natural and healthy alternatives to improve the quality and safety of its products. In this context, food additives play a crucial role in offering physicochemical, techno-functional, and functional properties. A food additive is defined as any substance intentionally added to food for the purpose of improving its characteristics during production, processing, storage, or packaging [1]. Pleurotus mushrooms, commonly known as oyster mushroom, are widely recognized for their nutritional and functional properties which can offer a natural and sustainable alternative [2,3]. In this study, the potential of powders derived from the genus Pleurotus as a meat product additive was explored.

II. MATERIALS AND METHODS

Two Pleurotus strains (*P. citrinopileautos* and *P. djamor*) were grown using wheat straw as substrate (photoperiod 12 h light-12 darkness/28 °C/80-90% relative humidity/<1,200 ppm CO_2) until fruiting bodies were obtained. Both mushrooms were dried at 60 °C for 12 h and then pulverized at 20 mesh of particle size. Pleurotus powders and texturized soy (control) were tested for physicochemical (pH and Hex color), and techno-functional properties, including water and oil holding capacities (WHC and OHC), swelling capacity (SWC), and gel-formation capacity (GFC). In addition, total phenolic, total flavonoids, and total tannins contents (TPHC, TFC, and TTC) were determined. Concerning antioxidant activity, free-radical scavenging activity (FRSA), ferric-reducing antioxidant power (FRAP), and thiobarbituric-acid reactive substances (TBARS) assays were used [4]. Data (n=6) were subjected to ANOVA and Tukey-Kramer's multiple comparison tests at $P<0.05$ (NCSS v11).

III. RESULTS AND DISCUSSION

Pleurotus powders showed higher ($P<0.05$) pH values than texturized soy (Table 1), and Hex color codes indicate the color for all treatments was tan. With respect to techno-functional properties, the highest WHC and GFC values were respectively reached by *P. djamor* and texturized soy. *P. djamor* showed the highest OHC values while the highest SWC values were shown by texturized soy ($P<0.05$).

As depicted in Table 2, no significant differences were found in TTC and TPHC between Pleurotus powders, while TFC was not detected (N.D.) ($P>0.05$). Also, the highest FRSA and FRAP values were displayed by BHT (control) ($P<0.05$). In addition, the lowest lipid oxidation levels of pork meat subjected to 65 °C for 1 h were observed in samples treated with the Pleurotus powder ($P<0.05$).

Table 1 – Physicochemical and techno-functional characterization of edible mushroom powders.

Item	pH	HEX Color	WHC	OHC	SWC	GFC
P. citrinopileatus	7.09±0.01b	#c3a278	49.00±0.89a	38.33±0.52a	24.00±0.89a	27.83±0.68a
P. djamor	7.09±0.02b	#d5b692	71.27±1.27b	54.67±0.52c	37.50±0.45b	57.38±0.48b
Texturized soy	6.49±0.02a	#d7c4a1	70.17±1.13b	48.00±0.89b	84.83±0.68v	57.17±0.26b

Table 2 – Polyphenol's content and antioxidant activity of edible mushroom powders.

Item	TTC	TPHC	TFC	FRSA	FRAP	TBARS
P. citrinopileatus	18.83±1.33a	15.25±0.61a	N.D.	28.83±1.13a	0.28±0.01a	0.35±0.01a
P. djamor	18.33±0.82a	15.33±0.52a	N.D.	28.87±1.54a	0.28±0.02a	0.35±0.02a
BHT	-	-	-	79.96±0.68b	2.00±0.09b	0.39±0.01b

In agreement with our results, it has been reported that powders from *P. ostreatus* and *P. pulmonarious* exhibit significantly higher pH values than texturized soy, with a color described as tan. Both mushroom powders featured the highest OHC values, with no differences in SWC whereas texturized soy showed the highest GFC [4]. Also, phenolic compounds have been found in mushroom powders, which are associated with their antioxidant activity [4,5]. Concerning lipid oxidation, it has been demonstrated that incorporation of mushroom powders to beef patties reduces the TBARS values [5].

IV. CONCLUSION

Pleurotus powders show pH values near neutrality and a tan color. The evidence shows that techno-functional properties of these mushroom powders include WHC, OHC, SWC, and GFC. The presence of phenolic compounds was demonstrated in the samples, as well as their antioxidant activity. In addition, Pleurotus powders showed the highest effect against lipid oxidation of pork meat. Based on the above, edible mushroom powders can be proposed as natural additives for meat products.

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