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Impact of Blanching and Drying on the Moisture and Ash Content of Auricularia Auricula-judae Mushroom in Cross River State, Nigeria

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Abstract
This study aims to investigate the impact of blanching and drying on the moisture and ash content of the Auricularia auricula-judae mushroom, commonly known as the wood ear mushroom in Cross River State. The specific objectives are to assess the effect of blanching and drying on the moisture content and to determine their impact on the ash content of the mushroom. The methodology involved harvesting fresh A. auricula-judae mushrooms, which were then subjected to blanching and drying processes. The blanching was carried out at 90°C for 2 minutes, followed by drying at 60°C for varying durations (6, 12, and 24 hours) in a hot air oven. The moisture and ash contents were measured before and after the treatments using standard AOAC methods. Moisture content was determined through oven drying at 105°C until a constant weight was achieved, while ash content was measured by incinerating the samples in a muffle furnace at 550°C. The findings indicated that blanching followed by drying significantly reduced the moisture content of A. auricula-judae mushrooms, with the most substantial decrease observed after 24 hours of drying. Blanching alone reduced moisture content by approximately 10%, while the combined effect of blanching and 24-hour drying resulted in a total moisture reduction of about 85%. Regarding ash content, the study found that blanching slightly increased the ash content, while subsequent drying led to a marginal reduction, indicating a complex interaction between blanching, drying, and mineral content retention. In conclusion, the study demonstrates that blanching and drying are effective

methods for significantly reducing the moisture content of A. auricula-judae mushrooms, which is beneficial for prolonging shelf life and enhancing preservation. However, the slight reduction in ash content suggests a need to optimize drying conditions to retain mineral nutrients. Future research should explore different blanching durations and drying temperatures to further refine these post-harvest processing techniques. It is recommended that mushroom processors adopt blanching and drying methods to improve product quality while ensuring minimal nutrient loss.
Keywords: Auricularia auricula-judae, Blanching, Drying, Moisture content, Ash content

Introduction

The tree ear mushroom, scientifically called *"Auricularia auricula-Judae",* is a fungus that grows on dead hard wood, and sometimes as a weak parasite on the trunks of living trees. It can grow both singly or in a group, and it reacts to weather. Moreover, it is edible and can be used for medicinal purposes. *"Auricula*" is a Latin word meaning "ear" and "Judae" means "Judas" – the Jew who is spoken of as the betrayer of Jesus. The fungus is associated with Judas Iscariot because of the belief that he hanged himself on an elder tree after his betrayal of Jesus. Folklore suggests that the ears are Judas's returned spirit and are all that are left to remind us of his suicide, (Kejariwal, 2023).

The tree ear mushroom *A. auricula-Judae* is easy to identify in its raw form. It is distinctively shaped, typically reminiscent of a floppy ear, with fruit bodies covered with tiny hairs, wrinkle, and may have veins making it appear even more ear-like. It is known by many names, like: black fungus, wood ear mushroom, jelly ear, cloud ear, Jew's or Judas' ear or kikurage, "Ntungkpa," by Yakurr people and "Hitoefah", by Bahumono people all of Cross River State, Nigeria and other names (Masiko, 2023) and (Barnett, 2024). Mushroom is also seasonal and scarce when it is out of season, thus, there is need to blanch and dry it so as to retain the quality of the mushroom.

Mushrooms have long been recognized for their nutritional and medicinal value, with various species being cultivated and consumed globally. Among these, Auricularia auricula-judae, commonly known as wood ear or Jew's ear, is particularly notable for its unique texture and health benefits. This mushroom species is rich in essential nutrients, including proteins, fibers, vitamins, and minerals, making it a valuable addition to diets. However, like many perishable foods, mushrooms are highly susceptible to spoilage due to their high moisture content, which necessitates effective preservation methods to extend their shelf life and maintain their nutritional quality. Blanching and drying are commonly employed preservation techniques, yet

their impact on the nutritional composition, particularly moisture and ash content, of A. auricula-judae remains underexplored.

This study aims to assess the effect of blanching and drying on the moisture and ash content of Auricularia auricula-judae. Blanching is a pre-treatment process involving brief exposure to boiling water or steam, which can inactivate enzymes and reduce microbial load, while drying significantly reduces water activity, thus inhibiting microbial growth and enzymatic reactions. Understanding how these processes affect the nutritional properties of A. auricula-judae is crucial for optimizing preservation techniques that ensure both the safety and quality of the mushroom.

Preserving the nutritional quality of mushrooms like Auricularia auricula-judae during processing is challenging due to their high moisture content, which makes them highly perishable and prone to rapid spoilage (Bebartta, Sehrawat, & Gul, 2024). Blanching and drying are common preservation techniques, but they can significantly alter the nutritional and sensory properties of mushrooms (Prabsangob, & Sittiketgorn, 2023). Blanching, although effective in reducing microbial load and enzymatic activity, can lead to nutrient loss, particularly water-soluble vitamins and minerals (Huo, Zhang, Wang, Mujumdar, Bhandari, & Zhang, 2023). Similarly, the drying process, while essential for extending shelf life, can result in considerable changes in texture, color, and nutritional content, including potential reductions in bioactive compounds and antioxidant activity (Espinoza-Ticona, Lozano, Moreano-Alarcon, Calixto-Muñoz, & Chaquilla-Quilca, 2023). Therefore, understanding the specific impacts of these processes on the moisture and ash content of A. auricula-judae is critical for optimizing preservation methods that maintain the mushroom's nutritional integrity and appeal to consumers. This knowledge gap poses a significant problem, as improper processing can lead to diminished health benefits and reduced market value of the preserved mushrooms.

Literature review

The effect of blanching and drying on the moisture content

Blanching is a pre-treatment process often employed before drying to preserve the quality of fruits and vegetables, including mushrooms. It involves briefly boiling the produce in water or steam and is known to inactivate enzymes that cause browning and spoilage, thereby improving the stability of the dried product (Sun, Zhuang, Gu, Zhang, Fan, & Ding, 2024). The effectiveness of blanching in preserving nutritional content has been documented in various studies. For example, Huo, Zhang, Wang, Mujumdar, Bhandari, & Zhang, (2023), found that blanching strawberries before drying helped in retaining more vitamin C compared to unblanched samples. In the context of mushrooms, blanching can also help in reducing microbial load, thus enhancing the safety and shelf-life of the dried product (Boateng, 2023).

The drying process itself is a critical step in mushroom preservation. Mushrooms have a high moisture content, often exceeding 80%, making them highly perishable (Zeng, Song, Cong, Cao, Xu, & Xue, 2024). Drying not only reduces the moisture content but also significantly reduces the weight and volume, facilitating easier storage and transportation (Marçal, Sousa, Taofiq, Antunes, Morais, Freitas, & Pintado, 2021). However, the drying method and conditions, such as temperature and duration, can greatly influence the final quality of the mushrooms. High-temperature drying can lead to the degradation of heat-sensitive nutrients, whereas low-temperature drying might not sufficiently reduce the moisture content, risking spoilage (Saifullah, Stanley, Zare, Juliano, & Hunt, 2023). Studies have shown that optimal drying conditions are necessary to maintain the nutritional and sensory qualities of dried mushrooms (Kumar, Singh, Zalpouri, & Kaur, 2023).

Moisture content is a crucial parameter in the quality assessment of dried mushrooms. High residual moisture can lead to microbial growth and spoilage, while too low moisture content can affect the texture and taste (Nadew, Reshad, & Tedla, 2024). Blanching has been shown to influence the moisture retention properties during drying. For instance, Das, Mayookha, Geetha, Chetana, & Suresh Kumar, (2023), demonstrated that blanched vegetables had better moisture regulation during the drying process compared to unblanched ones. In the case of A. auricula-judae, understanding the interplay between blanching and drying processes is essential for optimizing moisture content, thereby ensuring the preservation of both nutritional quality and consumer acceptability. Therefore, it is imperative to investigate the specific effects of these processes on the moisture content of A. auricula-judae to develop standardized processing protocols that maximize quality and shelf life (Das, Mayookha, Geetha, Chetana, & Suresh Kumar, 2023).

Impact on the ash content of the mushroom

Ash content, representing the total mineral content in food products, is a significant indicator of nutritional quality. In mushrooms, ash content provides insights into the concentration of essential minerals like calcium, magnesium, potassium, and iron (Effiong, Umeokwochi, Afolabi, & Chinedu, 2024). The process of blanching has been found to affect the ash content in various food products, including vegetables and fruits. According to Sayed, Chys, & Sampers, (2023), blanching can cause leaching of minerals into the blanching water, which might lead to a reduction in the ash content. However, this impact varies depending on the type of food and the blanching conditions, such as temperature and duration. In the context of mushrooms, it is crucial to understand how blanching specifically influences the mineral

composition of A. auricula-judae to ensure that essential nutrients are preserved during processing.

Drying, another critical step in the preservation of mushrooms, also affects their ash content. The drying process involves the removal of water, which can concentrate the remaining nutrients, including minerals, thereby potentially increasing the ash content (Ribeiro, Marques, Fernandes, Pintado, Carvalho, & Cunha, 2024). However, the extent of this increase depends on the drying method and conditions. For instance, high-temperature drying might lead to the degradation of some minerals or the formation of insoluble complexes, thereby affecting their bioavailability (Kumar, Gupta, Apu, Abrol, & Tomer, 2023). Research by Das, et al. (2023), suggests that the choice of drying technique, whether it be air drying, freeze-drying, or oven drying, plays a significant role in determining the final nutritional profile of dried mushrooms. Therefore, it is essential to investigate the specific effects of different drying conditions on the ash content of A. auricula-judae to optimize the nutritional quality of the final product.

Several studies have examined the combined effects of blanching and drying on the nutritional composition of various food products. For example, a study by Boateng, (2023), on the drying of blanched vegetables showed that while blanching led to a slight reduction in mineral content due to leaching, the subsequent drying process concentrated the remaining minerals, resulting in a net increase in ash content. Similar trends were observed by Masiko, (2023), in their study on leafy vegetables, where blanching followed by drying resulted in higher ash content compared to unprocessed samples. These findings suggest that the sequence of blanching followed by drying could potentially enhance the mineral content in mushrooms as well. Therefore, assessing the combined impact of blanching and drying on the ash content of A. auricula-judae is crucial for developing processing protocols that maintain or enhance its nutritional value, ensuring that consumers receive a product that is both shelf-stable and nutrient-dense.

Material and methods

Mushroom fruiting bodies of tree ear mushroom (*A. auricula Judae*) weighing 1,000.32 g were bought from farmers who came from Idomi community in Yakurr Local Government Area of Cross River State, Nigeria, where there were evidence of visible logs and dead trees. The mushrooms were collected during the early rainy season because during this period they are found in abundance, thus the choice of the season.

Preparation of Mushroom

The mushroom was properly identified in the Department of Plant and Ecological Sciences University of Calabar based on their macro and micro-morphological features. The collected mushroom samples were sorted out, sample separated for microbial analysis before washing. The sample was then blanched, drain off water, oven dried and stored for analysis.

Optimization of blanching of tree ear Mushroom *A. auricula-Judae*

The method of Okereke (2016) with modification was used to optimize blanching of tree ear mushroom. Blanching was done using distilled water at 100 ºC. One thousand (1,000) g of the sample were divided into twenty (20) runs or groups, thus, each of the runs contained fifty (50 g) of the mushrooms. The blanching time using boiling water was 2, 10, 15, 20, and 28 s, while the drying of sample using hot air (oven) was, at the drying time of 30, 70, 90, 110 and 140 min, at 40, 55, 65, 75 and 90 ºC drying temperature. Each of the sample group was dried out according to the temperature and drying time duration.

Optimization Process of Blanching and Drying of Tree Ear Mushroom *A. auricula-Judae*

Design Expert Software Version 12, Central Composite Design (CCD) of Surface Response Methodology (RSM) was used to optimize the process variables for blanching and drying of mushroom, (Granto 2014).

There were three (3) independent variables as follows:

i. Blanching time X_1 is 2, 10, 15, 20, 28 (s)
ii. Drying time X_2 is 30, 70, 90, 110, 140 min.
iii. Drying temperature X_3 is 40, 55, 65, 75, 90 ^{o}C

These variables were chosen in order to carry out the optimization process. It is worthy to note that without selecting the desired goals or levels, optimization process will not be carried out by the software.

Multiple regression analysis was used as tools of assessment of the effects of two or more independent variables on the dependent variables, (Helmenstine 2022). Numerical optimization technique of the design-expert software (12) was used for simultaneous optimization of the multiple responses. The software takes into consideration every variable as defined according to optimization level, thus generating possible optimal conditions.

The blanching time, drying time and drying temperature were followed according to the design matrix at certain level of RSM in order to obtain an optimum blanching time, drying time and drying temperature of mushroom *A. auricula-Judae.*

The full quadratic equation of the response variables of blanching and drying of the mushroom was derived using RSM as is in Equation 3.1:

$$Y \text{ is } \beta_o + \beta_1 X_1 + \beta_2 X_2 + \beta_3 X_3 + \beta_{11} X_1^2 + \beta_{22} X_2^2 + \beta_{33} X_3^2 + \beta_{12} X_1 X_2 + \beta_{13} X_1 X_3 + \beta_{23} X_2 X_3$$

Equation 3.1

Where Y is responses, β_o is constant, β_1, β_2, β_3 is Linear regression, β_{12}, β_{13}, β_{23} is interaction regression, X_1, X_2, X_3 (Independent variables) and $B_1 X_1 B_2 X_2 B_3 X_3$ is quadratic regression.

Proximate Analysis of Mushroom *A. auricular-Judae*

The moisture content, ash content, crude protein, fat content, crude fibre and carbohydrate of the mushroom *A. auricula-Judae* were determined using standard analytical procedures.

Moisture Content of Mushroom *A. auricula-Judae*

The AOAC (2012) method of analysis was employed. The 2.0 g of the ground sample was accurately weighed into covered crucible dishes previously dried at 98-100 ºC, cooled in a dessicator and weighed soon after attaining room temperature and weight recorded as W_1. The 2.0 g of the sample was measured into a weighing dish and weighed and the weight recorded as W_2. The crucible and the sample were heated at 100 ºC for 5 h to obtain loss in weight or constant weight. The dishes and their contents were cooled in a dessicator containing fused calcium chloride as a drying agent and then weighed, and the weight recorded as W_3. The loss in weight was expressed in percentage (%).

Calculation of Moisture Content (%) is (Equation 3.2):

$$\frac{\text{Loss in weight due to drying}}{\text{Initial sample weight (g)}} \times 100$$

Equation 3.2

$$= \frac{W2 - W3}{W2 - W1} \times 100$$

Where; W_1 is Weight of empty dish, W_2 is Weight of dish plus sample before drying, W_3 is final weight of dish after drying.

Ash Content of Mushroom *A. auricula-Judae*

The ash content of the mushroom *A. auricula-Judae* was determined using AOAC (2012) method of analysis. Empty crucible with a lid was heated in a muffle furnace at 105 ºC for 1 h. It was transfer to a dessicator to cool and weight recorded as W_1. A 2.0 g sample of mushroom was measured into the pre-weighed crucible. The sample was weighed and recorded as W_2. The crucible and its content were charred on a Bunsen Flame in a fume cupboard to drive off most of the smoke (until smoking ceases), it was transferred to a muffle furnace heated at 500-600 ºC to burn off all the organic matter and allowed at this temperature for 2 hours until a white or light gray ash results. The crucible was taken out, immediately covered and placed in a dessicator to cool. After cooling the weight was taken and recorded as W_3.

$$\text{Calculation of Ash \%} = \frac{\text{Weight of Ash}}{\text{Weight of original sample}} \times 100$$

$$= \frac{W3 - W1}{W2 - W1} \times 100 \qquad \text{Equation 3.3}$$

Where; W_1 is Weight of empty crucible, W_2 is Weight of crucible + sample; W_3 is Weight of crucible + dry sample (ash) after drying.

Result and discussion

The results in Table 2 indicated that the experimental data was fitted to response surface linear model. Analysis of variance showed that linear model (F=26.17; P=0.0001) was significant (P<0.05) and effective in describing the moisture content of *A. auricula-Judae.* The results also showed that, blanching time (F=5.57; P=0.0313), drying time (F=53.34; P=0.0001) and drying temperature (F=19.61; P= 0.0004) had significant (P<0.05) effects on the moisture content of *A. auricula –Judae*. There was only a 0.01% chance that an F-value this large could occur due to noise. The goodness-of-fit of the model was also ascertained by the coefficient of determination (R^2). The Coefficient of determination (R^2) of 0.8307 implies that the model fit the data and 83.07% of variations in the observed values of moisture of *A. auricula–Judae* were explained by the response surface linear model. The predicted R^2 of 0.6945 was in agreement with the adjusted R^2 of 0.7990, which illustrates that there were excellent correlations between the independent variables. Furthermore, low Coefficient of Variation (CV) of 7.73% describes the extent to which the data were dispersed as well as the reproducibility and repeatability of the model. This implied that the experiment was precise, reliable and the model considered reproducible. Adequate precision (17.0530) which measures the signal to noise ratio indicated an adequate signal. A ratio greater than 4 is desirable. Therefore, the model can be used to navigate the design space.

Table 2: Modeling of effect of blanching time, drying time and drying temperature on moisture content of mushroom *A. auricula–Judae*

Source	Sum of Squares	D f	Mean Square	F-value	p-value	
Model	842.78	3	280.93	26.17	< 0.0001	Significant
X_1-Blanching Time	59.81	1	59.81	5.57	0.0313	Significant
X_2-Drying Time	572.52	1	572.52	53.34	<0.0001	Significant

X_3-Drying Temp	210.46	1	210.46	19.61	0.0004	Significant
Residual	171.74	16	10.73			
Lack of Fit	171.74	11	15.61			
Pure Error	0.0000	5	0.0000			
Cor. Total	1014.52	19				
Std. Dev.	3.28			R^2	0.8307	
Mean	42.41			Adjusted R^2	0.7990	
C.V. %	7.73			Predicted R^2	0.6945	
				Adequate-Precision	17.0530	

Source: Field data (2023)

The estimated regression coefficient for moisture content of *A. auricula–Judae* is presented in Table 3.

Table 3: Estimated regression coefficients for moisture content of mushroom *A. auricula–Judae*

Factor	Coefficient Estimate	D f	Standard Error	95% CI Low	95% CI High	VIF
Intercept	42.41	1	0.7326	40.85	43.96	
X_1-Blanching Time	-2.09	1	0.8865	-3.97	-0.2132	1.0000
X_2-Drying Time	-6.47	1	0.8865	-8.35	-4.60	1.0000
X_3-Drying Temp	-3.93	1	0.8865	-5.81	-2.05	1.0000

Source: Field data (2023)

The coded regression equation in Table 4.3 is given by Equation (4.1).

$$\text{Moisture } (Y_1) = +42.41 - 2.09X_1 - 6.47X_2 - 3.93X_3 \quad \text{Equation 4.1}$$

Where X_1, X_2 and X_3 are coded independent variables of blanching time, drying time and drying temperature respectively and Y_1 is moisture.

The coefficient of estimate represents the expected change in response per unit change in factor value when all remaining factor are held constant. The coded equation is useful for identifying the relative impact of the factors by comparing the factor coefficients.

The 3-dimensional plots of response surface of the combined effects of independent variables on the moisture content of *A. auricula–Judae* are presented in Figures 4.1(a-c).

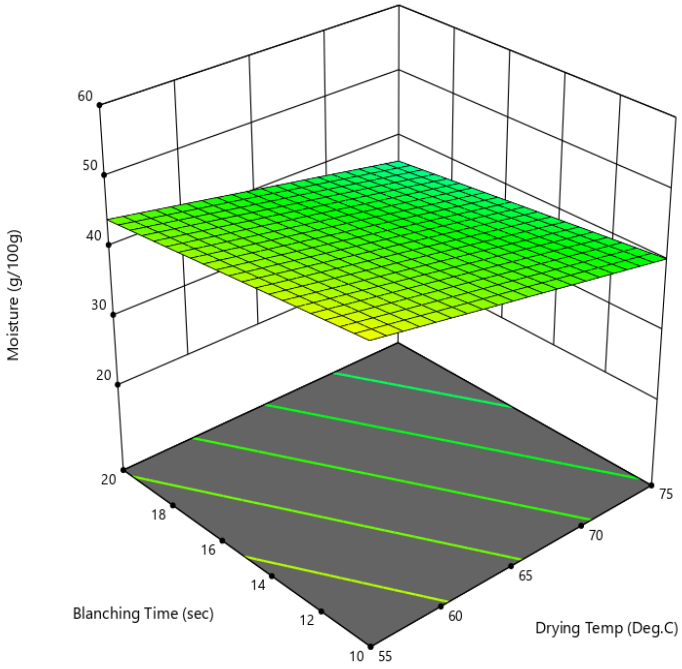

Figure 4.1(a): Response surface plot of the effect of blanching time and drying temperature on moisture content of mushroom *A. auricula–Judae*
Source: Field data (2022)

Figure 4.1(a): Indicated that increase in blanching time resulted in decreased moisture content of *A. auricula–Judae.*

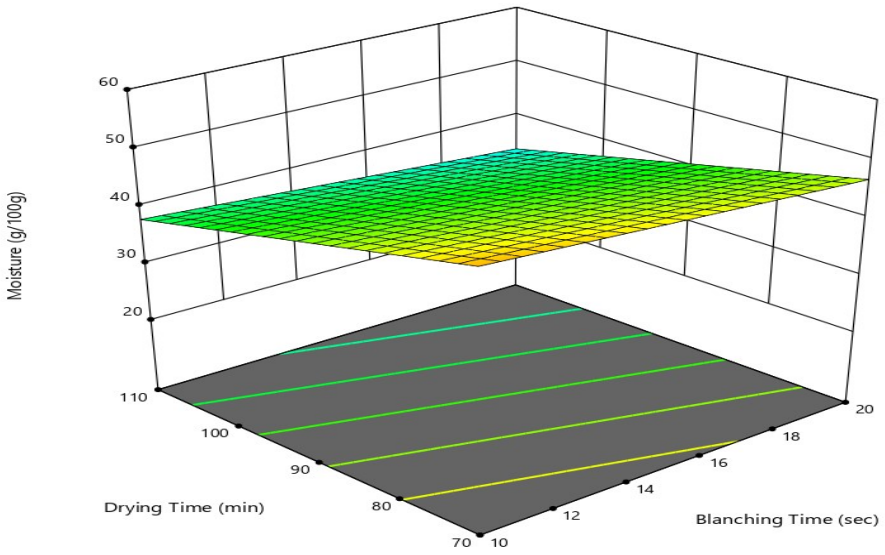

Figure 4.1 (b): Response surface plot of the effect of drying time and blanching time on moisture content of mushroom *A. auricula–Judae*
Source: Field Data (2023)

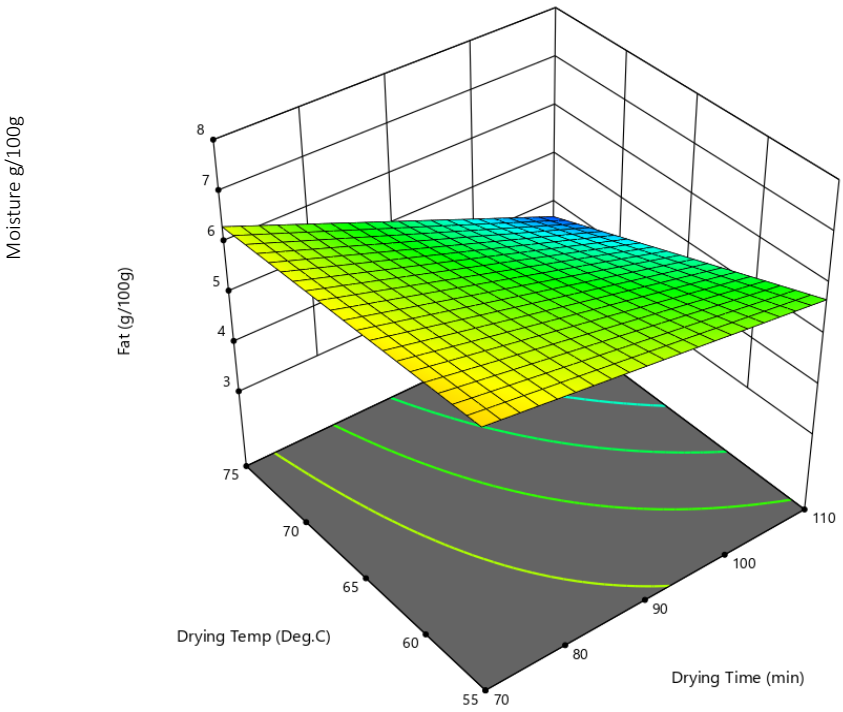

Figure 4.1(c): Response surface plot of the effect of drying temperature and drying time on moisture content of mushroom *A. auricula–Judae*

Similarly, drying time and temperature in figures 4.1(b-c) indicated that increase in drying time and temperature resulted in decreased moisture content.

The results in Table 4.4 showed that the ash content of *A. auricula–Judae* was modeled using response surface linear model.

Table 4: Modeling of effect of blanching time, drying time and drying temperature on ash content of mushroom *A. auricula–Judae*

Source	Sum of Squares	D f	Mean Square	F-value	P-value	
Model	4.01	3	1.34	9.71	0.0007	Significant
X_1-Blanching Time	0.4898	1	0.4898	3.56	0.0775	
X_2-Drying Time	2.66	1	2.66	19.35	0.0004	Significant
X_3-Drying Temp	0.8578	1	0.8578	6.24	0.0238	Significant
Residual	2.20	16	0.1376			
Lack of Fit	2.20	11	0.2001			
Pure Error	0.0000	5	0.0000			
Cor. Total	6.21	19				
Std. Dev.	0.3709			R^2	0.6456	
Mean	3.63			Adjusted R^2	0.5791	
C.V. %	10.22			Predicted R^2	0.3681	
				Adequate-Precision	10.6279	

Source: Field Data (2023)

The analysis of variance in Table 4. showed that response surface linear model (F=9.71; P = 0.0007) was significant (P<0.05) in describing the ash content of *A. auricula –Judae*. The results also showed that, only drying time (F = 19.35; P = 0.0004) and drying temperature (F = 6.24; P = 0.0238) had significant (P<0.05) effects on the ash content of *A. auricula–Judae*. There was only 0.07 % chance that an F-value this large could occur due to noise.

The coefficient of determination R^2 value of 0.6456 indicated that the model does not have a good fit to predict and that only 64.56 % of variations in ash content were explained by

linear model with the coefficient variations (CV) of 10.22 %. Adequate precision of 10.6279 indicated adequate signal which could be used to navigate the design space.
The Regression Coefficients for Ash Content of *A. auricula-Judae* is presented in Table 5.

Table 5: Estimated regression coefficient for the ash content of Mushroom *A. auricula-Judae*

Factor	Coefficient Estimate	D f	Standard Error	95 % CI Low	95 % CI High	VIF
Intercept	3.63	1	0.0829	3.45	3.80	
X_1-Blanching Time	-0.1894	1	0.1004	-0.4022	0.0234	1.0000
X_2-Drying Time	-0.4415	1	0.1004	-0.6542	-0.2287	1.0000
X_3-Drying Temp	-0.2506	1	0.1004	-0.4634	-0.0378	1.0000

Source: Field data (2023)

The coded regression equation is given by Equation 4.2

$$Y_2 = +3.63 - 0.4415\ X_2 - 0.2506\ X_3 \qquad \text{Equation 4.2}$$

Where X_2, X_3 are coded independent variables of drying time and drying temperature and Y_2 is ash. The coefficient of estimate represents the expected change in response per unit change in factor value when all remaining factor are held constant. The coded equation is useful for identifying the relative impact of the factors by comparing the factor coefficients.

The 3-dimensional plot of response surface methodology of the effect of independent variables on response-ash is presented in Figure 4.2 (a-c).

Figure 4.2(a-c): The 3-dimensional plots of response surface of the combined effects of independent variables on ash content of mushroom *A. auricula–Judae*

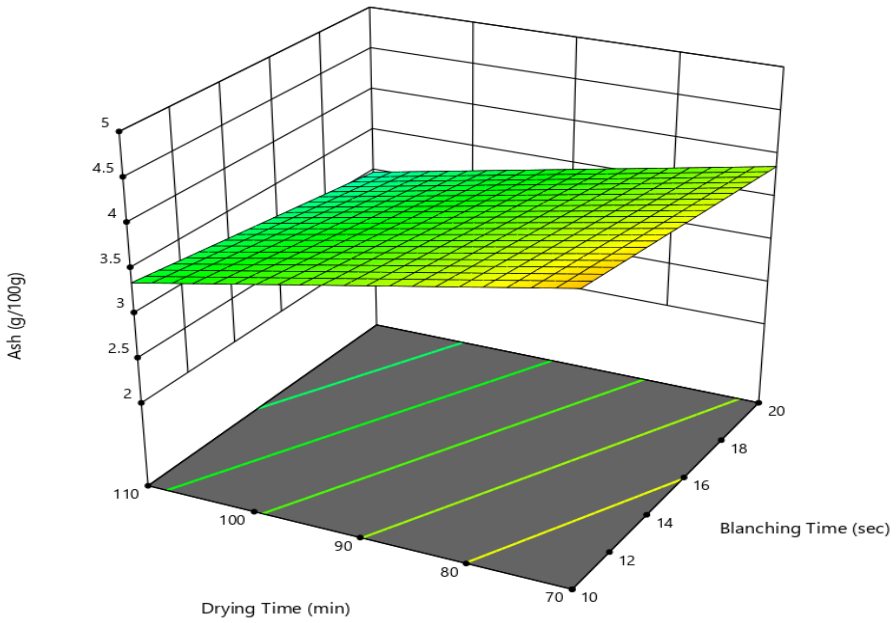

Figure 4.2 (a): Response surface plot of the effect of blanching time and drying time on ash content of mushroom *A. auricula-Judae*
Source: Field data (2023)

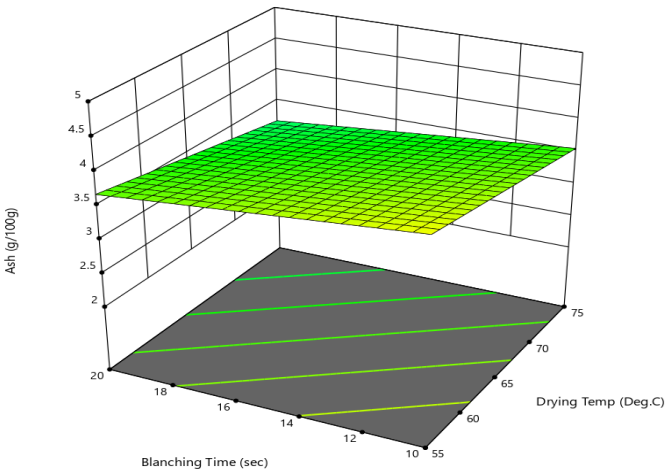

Figure 4.2(b): Response surface plot of the effect of blanching time and drying temperature on ash content of mushroom *A. auricula-Judae*
Source: Field data (2023)

Figure 4.2 (a-b): Showed that drying time significantly affected the ash content of the mushroom *A. auricula-Judae*. Increase in drying time from 70–110 min resulted in decreased ash content of *A. auricula-Judae.*

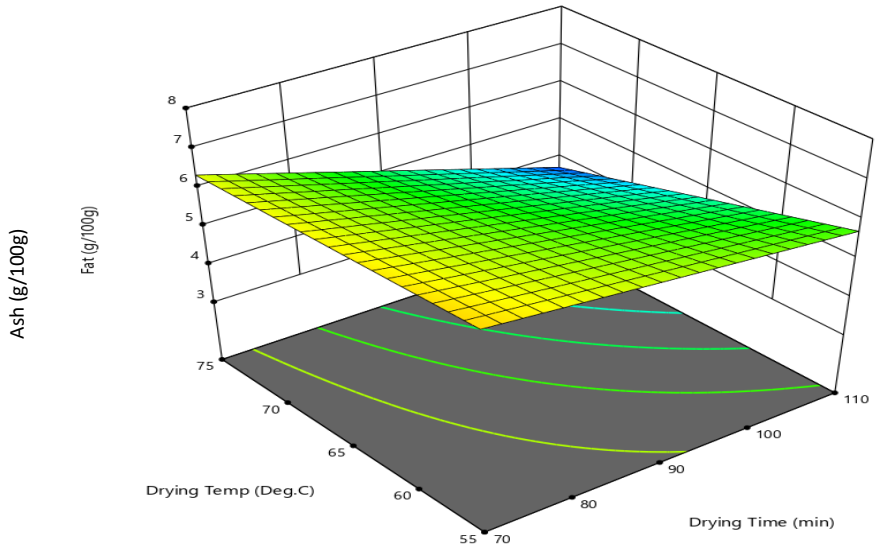

Figure 4.2(c): Response surface plot of the effect of drying time and drying temperature on ash content of mushroom *A. auricula-Judae*
Source: Field data (2023)

Similarly, a decreased in ash content was obtained with increased drying temperature, (Figure 4.2c).

The response surface model for effect of blanching time, drying time and drying temperature on protein content of *A. auricula–Judae* is presented in Table 4.6.

Table 6: Modeling of effect of blanching time, drying time and drying temperature on protein content of mushroom *A. auricula–Judae*

Source	Sum of Squares	D f	Mean Square	F-value	p-value	
Model	15.19	3	5.06	3.36	0.0029	Significant
X_1-Blanching Time	5.22	1	5.22	1.40	0.2538	

X_2-Drying Time	9.38	1	9.38	2.51	0.0132	Significant
X_3-Drying Temp	0.5917	1	0.5917	0.1587	0.6956	
Residual	59.65	16	3.73			
Lack of Fit	59.65	11	5.42			
Pure Error	0.0000	5	0.0000			
Cor. Total	74.84	19				
Std. Dev.	1.93			R^2	0.2030	
Mean	11.42			Adjusted R^2	0.0535	
C.V. %	16.90			Predicted R^2	-0.4225	
				Adequate-Precision	3.8336	

Source: Field data (2023)

Conclusion and recommendation

The combined effects of blanching and drying significantly influence the moisture and ash content of the mushroom Auricularia auricula-judae. Blanching typically results in a reduction of moisture content due to the partial removal of water, while the drying process further decreases moisture levels, leading to a more concentrated product. Additionally, blanching and drying can impact the ash content, with blanching potentially causing some mineral loss through leaching and drying possibly increasing mineral concentration. These findings revealed the importance of optimizing blanching and drying conditions to preserve the nutritional quality of A. auricula-judae.

Recommendations

The following recommendations were reached based on the study findings;

i. Establish optimal blanching temperatures and durations to minimize mineral loss and preserve the nutritional quality of A. auricula-judae.
ii. Choose drying methods that maximize nutrient retention, such as air drying or freeze-drying, to enhance the ash content of the final product.
iii. Develop combined blanching and drying protocols that enhance the overall nutritional profile of A. auricula-judae, ensuring minimal loss of essential minerals.

iv. Regularly assess the mineral content of mushrooms before and after processing to ensure that the blanching and drying methods are effective in preserving essential nutrients.

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