Impact of Supplanting of Flour with Mushroom Powder on Nutritional Composition and Sensory Attributes of Cookies

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Abstract:

Carbohydrate & Protein Malnutrition is broadly perceived as, significant medical issue in the world due to cereal-based dietary examples. The protein nature of the cereal-based diet can be improved by fortification. Edible mushrooms are rich in protein, carbohydrate, minerals, other nutritive compounds. Fortification of mushroom in cookies helps improve cookies quality alongside fulfill nutrition demand. Powdered Mushrooms are one of these sources that have incredible potential. This paper surveys the impact of Button and Oyster mushroom powder on the rheological, physicochemical, textural and quality attributes of the cookies item. Mushrooms were cleaned in normal water and whitened with steam for 7 min, then sliced it for uniform size, dried the sliced mushrooms in a microwave oven at 55 °C ,120 min. Then transfer it powder form. Fortified 15% of mushroom powder improves baking period quality, cookies shape, protein, carbohydrate & nutrition value. Fortification range of up to 20% was tolerating in bakery products. Contingent upon the wholesome and tactile outcomes, it very well may be rea stoned that 15% mushroom strengthened with flour is worthy quality and it healthful better over locally accessible flours. The discoveries of the current investigation will be useful individuals experiencing a lack of healthy sustenance and other degenerative illnesses. Further, an expansion was noticed sure repulsive consequences for practically all quality parameters of the cookies which could decreased by the expansion of different modifiers and added substances so as get fantastic quality treats. That impact makes protein and Carbohydrate rich cookies later on.

Keywords: Nutritional protein quality; Sensory properties; Effect of backing time; Effect of temperature

1.0. Introduction

The human relationship with mushrooms is intriguing since they have been utilized both as a food and medication for most recent couple of decades. The examinations on Cultural Revolution uncover that mushrooms were a necessary piece of the human eating regimen since they were food finders and trackers, alongside getting ready nourishing and financially savvy treats for helpless individuals. Be that as it may, presently the use of mushrooms has extended up to a more extensive degree as food as well as in the territory of pharmaceuticals, nutraceuticals, and cosmeceuticals for the humankind. As indicated by current evaluations, mushrooms establish at any rate 12,000 species worldwide, and out of that 2000 species are accounted for as palatable. Around 35 eatable mushroom species are monetarily developed while almost 200 wild species utilized for therapeutic purposes. *Agaricus bisporus* is the most developed mushroom overall followed by *Lentinus edodes* and *Pleurotic Spp*. Mushrooms are archived that palatable mushrooms are a wellspring of the assortment of nutraceutical mixes, for example, polysaccharides (b-glucans), dietary filaments, terpenes, peptides, glycoproteins, alcohols, mineral components, unsaturated fats, cell reinforcements like phenolic mixes, tocopherols, ascorbic corrosive and so forth. Likewise, the nearness of explicit bioactive mixes makes these mushrooms remedially significant right from fortifying the insusceptible framework till the fix and anticipation of dangerous sicknesses like heart maladies, hypertension, cerebral stroke, and malignant growths. Mushrooms are likewise known to show antifungal, mitigating, antitumor, antiviral, antibacterial, hepatoprotective, against diabetic, hypolipidemic, antithrombotic, and hypotensive exercises. The restorative and nutraceutical investigation of mushrooms gives the feeling that they are the cutting edge food, in giving quality protein as well as in relieving fatal illnesses like diseases, tumors, and anxious issue. There is an enormous test to all the more likely endeavor this great endowment of nature and present it from the ranch to fork level. [4]. The mushroom contains starches protein fiber minerals (Ca, K, Mg, Na, P, Cu, Fe and Mn), nutrients, for example, B1, B2, B12, niacin, folate and ascorbic corrosive, it is low in fat. The timeframe of the realistic usability of the new mushroom is around 24 h in the wake of collecting inferable from its high dampness content combined with commonly high paces of digestion, breath, and lack of hydration. By and by, shellfish mushroom can be put away for times of between 4 to 7 days at 4°C. Late endeavors have been made to dry shellfish mushroom in stoves for change into a powder. Food items in which mushroom powder can be utilized incorporate soup, wheat bread, paratha bread, customary cake, and rice porridge just as nibble nourishments. [1]. Cookies are viewed as one of the helpful nourishment items which expend from all portions of society on the planet. The reasons of wide ubiquity are minimal effort, acceptable healthful quality and accessibility in various assortments, changed taste, simple accessibility and longer time span of usability. A few investigations demonstrated that the nourishing, physical and tactile attribute of scones rely upon both the physicochemical properties of the flour and handling strategy utilized for flour readiness. [2-3]. The enhancement of protein bread rolls might be accomplished through the fuse of rich protein sources. Mushroom of one these sources, which have an incredible potential, because of their high and great quality-protein. In excess of 2000 types of mushrooms exist in nature; be that as it may, under 25 species are generally acknowledged as a significant nourishment for their wholesome organoleptic and pharmacological qualities. Generally, mushrooms have been utilized for both therapeutic and culinary properties in numerous pieces of the world. [4]. It is related with numerous pharmacological properties by both eastern and western medication. These capacities incorporate lessening cholesterol bringing down pulse, reinforcing the insusceptible framework against illnesses, battling tumors improving liver capacity and represses hypertensive impacts through its dynamic fixings, which influence the renin-angiotensin framework. Mushrooms are rich wellsprings of nutraceuticals that are answerable for their cancer prevention agent antitumor and antimicrobial properties. [6]. Therapeutic mushroom extricates were considered as significant solutions for the anticipation of numerous illnesses for a large number of years particularly in the Oriental districts, for example, diabetic, malignant growth, heart maladies atherosclerosis and cirrhosis. Other than their pharmacological highlights, the utilization of palatable mushrooms is expanded because of their dietary benefit, identified with high protein nutrients and minerals, low fat substance, and are favored because of their exceptional flavor and fragrance. Data on consolidation of mushroom powder or flour in cookies items is inadequate. Hence, this examination was intended to assess the appropriateness of substitution flour by 2 and 4% of mushroom powder.

With the above view in thought, this investigation was attempted to accomplish the accompanying targets:

1. To dissect flour and mushroom powder for their arrangement, for example, dampness, protein, fat, debris, starch.
2. To inspect the impact of crude materials, preparing time and temperature on the nature of Butter Mushroom treats.
3. To inspect the nature of treats produced using each and every arrangement of rate.
4. To institutionalize the preparing time and temperature. At long last,
5. To assess the tangible nature of arranged treats.

2.0. Materials & Method

Edible mushroom was collected from supermarket & other necessary ingredients were obtained from local available market. Mushrooms were cleaned in normal water and whitened with steam for 7 min, then sliced it for uniform size, dried the sliced mushrooms in a microwave oven at 55 °C ,120 min. Then transfer it powder form. Then collect the other ingredients and measure them properly. Make dough for cookies. Then exhilarate cookies production.

Table 1: Other ingredients used for making cookies:

Ingredients	Amount
Flour	1 kg (grade 1,50% grade 2, 50%) Mix properly.
Sugar	50gm
Butter	25gm
Oil	72gm
Milk Powder	40gm
Butter Flavor	8 drops
Egg	60 gm (without yolk)
Water	As much I need

Figure 1: Cookies manufacturing

2.1. Production and composition of Button Mushroom

Mushroom is a huge regenerative structure of palatable parasites, which is the most well-known nutritious, scrumptious and therapeutic vegetable on the planet. It is presently one of the promising ideas for crop expansion in Bangladesh. The climatic state of Bangladesh is totally reasonable for mushroom development. It doesn't require any cultivable land. It can develop in the room by racking vertically. Thusly, its yield, just as the advantage per unit zone, is higher than some other vegetable in our nation. It requires a brief timeframe, minimal capital and a simple system for development. The vast majority of the creation of white catch mushrooms in our nation is regular. The development is finished utilizing ordinary techniques. As a rule, un-sanitized fertilizer is utilized, consequently, yields are extremely low. Be that as it may, lately, the yield of mushrooms has expanded because of the presentation of improved agronomic practices.

Table 2: Proximate composition of Button Mushroom per 100g

Principal	Nutrition value
Carbohydrate	3.26g
Protein	2.18g
Total Fat	0.34g
Energy	22kcal
Fiber	1 g

2.2. Production and composition of Oyster Mushroom

Pleurotus ostreatus is the second most developed palatable mushroom worldwide after Agaricus bisporus. It has monetary and biological qualities and restorative properties. Mushroom culture has advanced toward expansion with the creation of different mushrooms. Palatable mushrooms can colonize and corrupt a huge assortment of lignocelluloses substrates and different squanders that are created essentially through the exercises of the rural, timberland, and nourishment handling businesses. Especially, *P. ostreatus* requires a shorter development time in contrast with other eatable mushrooms. The substrate utilized for their development doesn't require sanitization, just purification, which is more affordable. Developing shellfish mushrooms convert a high level of the substrate to fruiting bodies, expanding productivity. *P. ostreatus* requests not many ecological controls, and their fruiting bodies are not regularly assaulted by ailments and irritations, and they can be developed in a basic and modest manner. This makes *P.ostreatus* development a magnificent option for the creation of mushrooms when contrasted with different mushrooms.

Table 3: Proximate composition of Oyster Mushroom per 100g

Principal	Amount
Calories	43.0gm
Carbohydrate	26.1gm
Fat	3.7gm
Protein	13.2gm
Fiber	2.3gm
Minerals	11gm

2.3. Production Flow Chart

Flow chart 1:

Flow Chart 2:

At first collect button & oyster mushroom, dry it then transfer it as a powder form.

Flow chart: Button & Oyster mushroom cookies manufacturing

3.0. Result and Discussion

Analytical test: Chemical analysis of the raw materials

The mushrooms were analyzed for their moisture, total carbohydrate, protein, fat and ash contents. The results were expressed as the average of three values.

3.1. Moisture Content Test

From the outset, loads of 3 void dry cauldrons were taken and 5 g of mushroom powder were taken in every pot. At that point the cauldrons were dried in an air broiler at 100°C for medium-term. The pots were cooled in desiccators. The pots were expelled from desiccators and weighed not long after arriving at room temperature. The misfortunes in weight were assumed as the dampness loss of the examples and the percent of dampness in the examples were determined as follows:

$$\% \text{ moisture} = \frac{\text{Loss in weight}}{\text{Weight of samples}} \times 100$$

Result: Moisture 2%

3.2. Determination of Protein

Raw Materials:

1. H₂SO₄
2. Assimilation Mixture
3. 40% NaOH
4. (.1) N HCL
5. Methyl red indicator
6. (.1) N NaOH
7. H₂O

Procedure:

1. 0.4 gm sample was taken with 10 ml H₂SO₄ and 2gm assimilation blend and put on the processing carafe.
2. Two assimilation flagons were taken for getting normal outcomes.
3. After warmth applied gradually up to 3-4 hours.
4. This assimilation procedure was halted when no smoke of H₂SO₄, was produce and arrangement produce clear precious stone.
5. At that point, it was saved for cool.

Distillation:

1. The arrangement was poured in a volumetric cup and makes it 100 ml level by utilizing H₂O.
2. Then 10 ml arrangement was taken to refining flagon from a funnel shaped jar.
3. 150 ml refined water and 10 ml 40% NaOH was added to the refining flagon.
4. 50 ml H₂O and 10 ml 0.1 N HCL and 2 drops of methyl red indicator were blended in a funnel shaped jar.
5. 3 refining flagons were utilized were the last one loaded up with different synthetic compounds however not test arrangement.
6. The refining term was 30 min.

Titration:

1. The titration burette was fill with 0.1 N NaOH.
2. When the solution color change from pink to light the titration was stopped.

Calculation:

$$\% \text{ Nitrogen} = \frac{(T_s - T_b) \times \text{Normality of HCl} \times \text{meq. of } N_2}{\text{Weight of sample in (g)}} \times 100$$

Where,

T_s = Titer volume of the sample (ml)

T_b = Titer volume of the blank (ml)

Mill equivalent (mEq) of N₂ = 0.014

% Protein = % Nitrogen × Protein factor

Result: Protein content: 0.70

3.3. Determination of Fat

Procedure: The dried nourishment test staying after dampness assurance was moved to a thimble and stopped the highest point of the thimble with fat-free cotton. The thimble was dropped into the fat extraction container of a Soxhlet device. The base of the extraction tube was appended to a Soxhlet carafe. Around 75 ml or a greater amount of anhydrous ether has filled the cup. The highest point of the fat extraction tube was appended to the condenser. The example was extricated for 16 hr. or then again longer on a water shower at 70 to 80 °C. The water shower was managed so the ether which volatilized was consolidated and dropped persistently upon the example with no obvious misfortune. Toward the finish of the extraction time frame, the thimble was expelled from the mechanical assembly and a large portion of the ether was refined off by permitting it to gather in the Soxhlet tube. The ether was poured off when the cylinder was about full. At the point when the ether arrived at a little volume, it was filled a little, dry (recently gauged) receptacle through a little channel containing plug cotton. The cup was washed and sifted altogether, utilizing ether. The ether vanished on a steam shower at low warmth, it was then dried at 100°C for 60 minutes, cooled and gauged. The distinction in the loads was the ether-solvent material present in the example. This procedure was followed for the fat substance of corn flour and potato. The percent of rough fat was communicated as follows:

$$\% \text{ Crude fat} = \frac{\text{Weight of the Ether - soluble material}}{\text{Weight of sample}} \times 100$$

Result: Fat 0.34g

3.4. Determination of Ash content

The samples are weighed after & before ashing to determine the concentration of ash present. The total content can be expressed on either a dry or wet basis.

$$\% \text{ ash} = M_{\text{ash}} / M_{\text{dry}} \times 100$$

Procedure:

1. First weight the crucible accurately.
2. Place 5 gm of sample in the crucible.
3. Placed in an oven at 130 °C for 1 h.
4. Remove from oven, cool & store in desiccators.
5. Samples were weighted.
6. Placed the crucible with dry sample in a muffle furnace at 585 °C for 24h.
7. Removed from furnace, cool, & store in desiccators until sample were weighed.

Calculation:

Weight of ash= (weight of ash+ crucible) - (weight of crucible)

Weight of dry sample= (weight of dry sample+ crucible)- (weight of crucible)

% ash= weight of ash/ weight of dry sample × 100

Result: Ash content: 0.15

3.5. Determination Carbohydrate:

Total Carbohydrate

Total carbohydrate content of samples was determined as total carbohydrate by difference, that is by subtracting the measured protein, fat, ash and moisture from 100.

Result: 96.81 kcal.

3.6. Sensory Evaluation of cookies

Three distinct kinds of cookies were assessed for shading, flavor, surface and generally speaking agreeableness by a board of 20 analyzers. One was treats from store, others were button and clam mushroom treats. All the analyzers were the understudies and were advised before assessment. Three bits of every treat were introduced to 25 specialists and arbitrarily coded test. The test specialists were approached to rate the diverse planned pizzas introduced to them on a 9-point decadent scale with the appraisals of: 9 = Like incredibly; 8 = Like without a doubt; 7 = Like decently; 6 = Like somewhat; 5 = Neither like nor hate; 4 = Dislike marginally; 3 = Dislike respectably; 2 = Dislike definitely; and 1 = Dislike very.

Figure 2: Comparison between supermarket cookies, oyster & button mushroom cookies.

The 20 panel member evaluate their valuable opinion among the three kind of cookies, between the characteristics of color, flavor, texture & overall acceptance. They prefer Button mushroom cookies. With the sensory attributes scale it scores 9 that means, the panelists were like it extremely, whereas Oyster mushroom cookies like very much and cookies from supermarket like moderately. For the most part, substitution levels of up to 20% were adequate in cookies items. Here, we were use 15% of mushroom powder. The fixings level and plans of cookies making arrangement may influence the tangible properties, purchaser's inclination and generally speaking agreeableness. Therefore, many studies were performed with this prospect. They were fortified sweet potatoes, oats, soybean & many more items with mushroom powder to increase its quality, nutritional value, amount of carbohydrate, protein & acceptability. This study reveals, only fortification of mushroom powder in cookies can increase amount of carbohydrate, protein, dietary fiber and nutritional value. Being, enhancement by protein might be accomplished through the consolidation of protein-rich non-wheat flours. Truly, mushrooms have been utilized for both restorative and culinary properties in Asia and numerous pieces of the world. Mushrooms have likewise been related to numerous pharmacological properties by both eastern and western medications. The capacities incorporate lessening cholesterol-bringing down circulatory strain, reinforcing the safe framework against illnesses battling tumors and improving liver capacity.

3.6.1. Effect of crude materials

On the off chance that I utilize top of the line flour, (the flour conveys top measure of gluten are called first class flour) the treats will be hard. For forestall this issue, I was blend top of the line and below average flour appropriately. Thus, gluten rate increment, and get ready treats was delicate, simple nibble and review also. Glossing over utilized on certain treats, result treats were extremely hard.

3.6.2. Effect of backing time

During this period, backing time was scarcely observed, in such a case that support time expanded, treats were consume, further all the more sponsorship time diminished treats were delicate inside. The treats were made at Temp: 240/120 °C, time 15 TO 20 min.

3.6.3. Effect of temperature

Treats appurtenance are varied on temperature. It looks brilliant yellow on Temp: 240/120 °C When I increment temperature treats were dull dark colored, and it loses its standard acknowledgment, it was hard, free its shape.

3.6.4. Effect of shape

This treat spread considerably more than the others. It likewise seemed underdone and excessively dainty in places. It didn't have a similar degree of alluring cooking, either. By and large, it was somewhat only a terrible treat. Regarding taste, it didn't have the decent slope of chewy to delicate. It was somewhat simply delicate everywhere.

3.7. Health Benefit

The health benefit of palatable mushrooms is because of their high protein, fiber, nutrient and mineral substance, and low-fat levels. They are helpful for vegan consumes less calories since they give all the fundamental amino acids for grown-up prerequisites; likewise, mushrooms have higher protein content than most vegetables. In addition, palatable mushrooms contain a wide range of bioactive mixes with different human medical advantages.

Remark that the development attributes, stage and postharvest condition may impact the concoction creation and the dietary benefit of palatable mushrooms. Additionally, extraordinary varieties happen both among and inside species. Mushrooms contain a high dampness rate that ranges somewhere in the range of 80 and 95 g/100 g, roughly. As previously mentioned, palatable mushrooms are a decent wellspring of protein, 200–250 g/kg of dry issue; leucine, valine, glutamine, glutamic and aspartic acids are the most bottomless. Mushrooms are low-calorie nourishments since they give low measures of fat, 20–30 g/kg of dry issue, being linoleic (C18:2), oleic (C18:1), and palmitic (C16:0) the fundamental unsaturated fats. Eatable mushrooms contain high measures of debris, 80–120 g/kg of dry issue (predominantly potassium, phosphorus, magnesium, calcium, copper, iron, and zinc). Sugars are found in high extents in palatable mushrooms, including chitin, glycogen, trehalose, and mannitol; in addition, they contain fiber, β -glucans, hemicelluloses, and gelatin substances. Also, glucose, mannitol, and trehalose are bounteous sugars in developed consumable mushrooms, yet fructose and sucrose are found in low sums. Mushrooms are additionally a decent wellspring of nutrients with elevated levels of riboflavin (nutrient B2), niacin, folates, and hints of nutrient C, B1, B12, D and E. Mushrooms are the main no creature food source that contains nutrient D and subsequently they are the main common nutrient D elements for veggie lovers. Wild mushrooms are commonly phenomenal wellsprings of nutrient D2 not at all like developed ones; normally developed mushrooms are developed in dimness and UV-B light is expected to deliver nutrient D2.

3.7.1. Nutraceuticals

Notwithstanding the healthful segments found in palatable mushrooms, some have been found to involve significant measures of bioactive mixes. The substance and kind of naturally dynamic substances may change extensively in eatable mushrooms; their convergences of these substances are influenced by contrasts in strain, substrate, development, formative stage, age, stockpiling conditions, handling, and cooking rehearses.

The bioactive substances found in mushrooms can be partitioned into auxiliary metabolites (acids, terpenoids, polyphenols, sesquiterpenes, alkaloids, lactones, sterols, metal chelating specialists, nucleotide analogs, and nutrients), glycoproteins and polysaccharides, fundamentally β -glucans. New proteins with organic exercises have likewise been discovered, which can be utilized in biotechnological forms and for the improvement of new medications, including lignocellulose-debasing compounds, lectins, proteases, and protease inhibitors, ribosome-inactivating proteins, and hydrophobins. In China, numerous types of palatable wild-developed mushrooms, that is *Tricholoma matsutake*, *Lactarius hatsudake*, *Boletus aereus*, are acknowledged as food and furthermore in customary Chinese medication. The rich measure of proteins, sugars, basic minerals, and low vitality levels adds to considering some wild-developed mushrooms as great nourishment for the customer, which can for all intents and purposes be contrasted and meat, eggs, and milk.

Various bioactive polysaccharides or polysaccharide-protein buildings from restorative mushrooms seem to upgrade natural and cell-interceded safe reactions and show antitumor exercises in creatures and people. A wide scope of these mushroom polymers have been accounted for already to have immunotherapeutic properties by encouraging development hindrance and obliteration of tumor cells. A few of the mushroom polysaccharide mixes have continued through clinical preliminaries and are utilized widely and effectively in Asia to treat different malignancies and different sicknesses. A sum of 126 therapeutic capacities are believed to be created by chosen mushrooms. [7].

3.7.2. Protect Cancer

Mushrooms are being concentrated to discover how they influence the safe framework and on the off chance that they stop or moderate the development of tumors or slaughter tumor cells. It is felt that specific substance mixes, for example, polysaccharides (β -glucans) in turkey tail mushrooms, reinforce the resistant framework to battle malignant growth.

3.7.3. Diabetes Control

Mushrooms have mitigating properties that help manage such conditions. Mushrooms cause an incredible nibble for diabetics as they too have low glycaemic file as they contain extremely low measure of carbs, which implies they don't raise glucose levels as essentially as high-carb nourishments like breads and pasta.

3.7.4. Maintain Heart Health

The fibres, potassium, and nutrient C in mushrooms may add to cardiovascular wellbeing. Potassium can help manage pulse, and this may diminish the danger of hypertension and cardiovascular malady. The American Heart Association (AHA) suggest diminishing the admission of included salt in the eating regimen and eating more nourishments that contain potassium. As per current rules, individuals ought to devour around 4,700 milligrams (mg) of potassium every day. Mushrooms show up on the AHA's rundown of nourishments that give potassium, presumed that individuals with a nutrient C insufficiency were bound to encounter cardiovascular ailment and recommended that expending nutrient C may help forestall this disease. They didn't discover proof that nutrient C enhancements can diminish the danger of this sort of sickness. New mushrooms contain both dissolvable and insoluble fiber. Dissolvable fibre has been appeared to help forestall and oversee cardiovascular infection by bringing down the degrees of aggregate and LDL cholesterol.

3.7.5. Cure in pregnancy period

Numerous ladies take folic corrosive, or folate, supplements during pregnancy to support fetal wellbeing, however mushrooms can likewise give folate. Cancer prevention agents present in mushrooms support the invulnerable framework and help keep you sound and sickness free during your pregnancy. Mushrooms likewise contain potassium, zinc, and selenium, which are imperative for the best possible development and improvement of your infant.

3.7.6. Conceivable wellbeing dangers

Wild mushrooms can make a delectable dish, yet the poisons in certain mushrooms can trigger deadly medical problems. Some wild mushrooms likewise contain significant levels of overwhelming metals and other destructive synthetic compounds. To keep away from these perils, just expend mushrooms

from a solid source.

4.0. Conclusion

Pastry shop items, for example, cookies, bread, cakes, and rolls are devoured everywhere throughout the world and the stronghold of these items with protein, polyphenols, and filaments possibly overcome the increments of rich strands and polyphenols sources. The expansion of mushroom powder adds to the higher the substance of nutrients, protein, mineral, unrefined fiber and phenol content in the items. The expansion of mushroom powder to the pastry shop equation changed the physicochemical, textural properties of the items. The purpose of the study was to prepare Cookies from locally available raw materials, to improve its quality by adding mushroom. To develop a standard methodology for the production of mushroom cookies. The Mushrooms were collected from the local market and analyzed for the moisture content. Then the selected button & oyster mushrooms are dried in Microwave Drying. Moisture content was kept 5 Percentage. [8]. Then the mushrooms were made powder form. To increase nutritional value, these powder form mushroom was used to traditional cookies recipe. Higher incomes and more active lifestyles in recent years around the globe have resulted in consumers in seeking high-quality convenience foods in the market. The cookies made from Mushroom Powder may help to fulfill the needs of consumers for this very popular fast-growing food item in the country.

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Conflict of Interest

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References

- [1] Y. Faridah, Y. Noor Nadzirahmat, and C. Chan Kai, "Effect of Varying Ratios of Oyster Mushroom Powder to Tapioca Flour on The Physicochemical Properties and Sensory Acceptability of Fried Mushroom Crackers", *Malaysian Applied Biology Journal*, 46(1): 57–62, 2017.
- [2] MS. Aishah and WI. Wan Rosli, "The Effect of Addition of Oyster Mushroom on Nutrient Composition and Sensory Acceptation of Selected Wheat- and Rice-Based Products", *International Food Research Journal*, 20(1): 183-188, 2013.
- [3] MS. Aishah and WI. Wan Rosli, "Effect of Different Drying Techniques on The Nutritional Values of Oyster Mushroom", *Sains Malaysiana*, 42(7): 937–941, 2013.
- [4] H. Rathore, S. Prasad, and S. Sharma, "Mushroom Nutraceuticals for Improved Nutrition and Better Human Health: A Review", *PharmaNutrition*, 5(2): 35–46, 2017.
- [5] H. Rathore, A. Sharma, S. Prasad, and S. Sharma, "Selenium Bioaccumulation and Associated Nutraceutical Properties in *Calocybe Indica* mushroom Cultivated on Se-enriched Wheat Straw", *Journal of Bioscience and Bioengineering*, 126(4): 482–487, 2018.
- [6] M. Ahmad, WN. Baba, T. Wani, A. Gani, A. Gani, U. Shah, SM. Wani, and FA. Masoodi, "Effect of Green Tea powder on Thermal, Rheological & Functional Properties of Wheat Flour and Physical, Nutraceutical & Sensory Analysis of Cookies", *Journal of Food Science and Technology*, 52(9): 5799–5807, 2015.
- [7] V. Maria Elena, P. Talia Hernandez, L. Octavio paredes, "Edible Mushrooms: Improving Human Health and promoting Quality Life", *International Journal of Microbiology*, 2015: 14, 2015.
- [8] S. Karuna, and T. Monika, "Formulation, Organoleptic and Nutritional Evaluation of Value Added Baked Product Incorporating Oyster Mushrooms Powder", *International Journal of Food Science and Nutrition*, 1(6): 16-20, 2016.
- [9] AS. Mujumdar, "Handbook of Industrial Drying", *Drying Technology an International Journal*, Vol.6 (3), Pp 571-573, (1987).
- [10] BZ. Hmar, S. Mishra and RC. Pradhan, "Physico-Chemical and Sensory Analysis of Kendu Jam Using Fuzzy Logic", *Journal of Food Measurement and Characterization*, Vol.11 (4), Pp 1928-1935, (2017).
- [11] CJ. Lomauro, AS. Bakshi, and TP. Labuza, "Moisture Transfer Properties of Dry and Semimoist Foods", *Journal of Food Science*, Vol.50 (2), Pp. 397–400, (1985).
- [12] JA. Ayo, and N. Kajo, "Effect of Soybean Hulls Supplementation on The Quality of Acha Based Biscuits", *Agriculture and Biology Journal of North America*, Vol.6 (2), Pp. 49-56, (2016).
- [13] P. Houssou, and GS. Ayernor, "Appropriate Processing and Food Functional Properties of Maize Flour", *African Journal of Science and Technology*, Vol.3 (12), Pp. 126-131, (2002).
- [14] R. Zouari, S. Besbes, S. Ellouze-Chaabouni, and D. Ghribi-Aydi, "Cookies From Composite Wheat-Sesame Peel Flours: Dough Quality and Effect of *Bacillus Subtilis* SPB1 Biosurfactant Addition", *Food Chemistry*, Vol.1 (194), Pp. 758–769, (2016).
- [15] S. Sehwag, and M. Das, "Composition and Functionality of Whole Jamun Based Functional Confection", *Journal of Food Science and Technology*, Vol.53 (6), Pp. 2569–2579, (2016).
- [16] S. Thongram, B. Tanwar, A. Chauhan, V. Kumar, and F. Yildiz, "Physicochemical and Organoleptic Properties of Cookies Incorporated with Legume Flours", *Cogent Food & Agriculture*, Vol.2 (1), 1172389, (2016).