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PREPARING VEAL BURGERS BY PARTIALLY REPLACING VEAL WITH TRUFFLES AND MUSHROOMS AND STUDYING THEIR INDUSTRIAL PROPERTIES

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Abstract:

Meat and its products are distinguished from the food that the consumer wants to eat because of its unique taste and its richness in nutrients that provide the best quality in terms of protein, essential amino acids, essential fatty acids, and a number of minerals and vitamins, especially the vitamin B group. is considered harmful to health, and that its consumption is linked to many diseases, including obesity, cardiovascular diseases and other types of cancer.

The appearance of the clear composition of the control samples was revealed, as the results showed that the local burger was significantly superior to the other two types, with the percentage of moisture in it being 69.10% compared to the laboratory Burger, 58.44%, and the imported Burger, 61.30%, as the laboratory Burger was superior in the percentage of moisture present in it, 69.10%, compared to the laboratory Burger, 58.44. % and the imported burger is 61.30%, whereas the laboratory burger is superior in its moisture content of 69.10%.

The results showed that the plant sources and replacement ratios had a significant effect ($P \geq 0.05$) for the prepared product, as the percentage of carbohydrates and moisture was higher in the burger replaced with mushrooms and truffles, and a lower moisture percentage was recorded, while the percentage of ash, fat and protein was lower in the burger replaced with mushrooms, truffles, zucchini, eggplant, millet, barley and oats compared to Laboratory beef burger.

Keywords: Beef burger, truffle burger, mushroom burger, chemical ingredients

1. INTRODUCTION

Meat products that contain dietary fiber are excellent alternatives to meat due to their inherent functional and nutritional effects. Moreover, eating meat products replaced with dietary fiber reduces harmful cholesterol and reduces the risk of major nutritional problems such as obesity, coronary artery disease, diabetes, and digestive disorders, including Including constipation, inflammatory bowel diseases, etc. In addition to the effects of health benefits, dietary fiber supplements increase volume and prevent cooking loss in meat products with less changes in texture parameters by enhancing water binding ability and carry significant economic benefits for both consumers and workers [1 , 2] .

Beef is the most commonly consumed meat, and consumer choices tend towards low-fat beef, but sometimes they prefer completely fat-free red meat for diet purposes or for healthier food, so the search for producing red meat products with low fat content has increased [3], and the trend has become to manufacture low-fat products instead of high-fat products by providing alternative products that are low in fat content and acceptable in terms of functional, sensory and stability properties. In addition, the development in food production and manufacturing has given food manufacturing modern trends such as the production of protein or carbohydrate foods. Low or fat-free [4].

Truffles contain minerals similar to those contained in the human body, such as phosphorus, sodium, calcium, and potassium. They contain vitamins (B1, B2) and are rich in vitamin A. They also contain an amount of nitrogen in addition to carbon, oxygen, and hydrogen, and this is what makes their composition similar to that of meat and their taste. Cooked ones taste like lamb kidneys and contain amino acids necessary for building human body cells [5] .

It is also considered a laboratory test for iron and calcium present in the body. It is also used in several other treatments. It protects against chronic diseases, is an essential source of protecting the eyes from swelling, contributes to facilitating physical therapy, and is an essential component for the growth and strengthening of bones and cancer cells that affect women in the breast [6] .

The Food and Agriculture Organization of the United Nations (FAO) has recommended the consumption of mushrooms as a staple food due to their rich protein content, especially in developing countries that depend on grains

for their diet. Mushrooms are a rich source of many essential nutrients, such as proteins, dietary fiber, and many vitamins and minerals, and they contain large amounts of Calcium, vitamin D, niacin, riboflavin, potassium, and selenium. Mushrooms are included in weight loss systems due to their low calorie content. They are a free source of fat, cholesterol, and gluten. They help boost and strengthen immunity and prevent diseases. They contain powerful antioxidants, which makes them help prevent cancer. It helps in controlling diabetes, it also contributes to lowering cholesterol levels in the blood, it helps in controlling blood pressure levels in the body, and it helps in strengthening bones and enhancing their health [7], as food consisting of meaty syrup leads to increased intelligence and preservation. For youth and increasing the strength and activity of the human body [8], 45% of mushroom fruits are consumed fresh due to their short shelf life because they contain 90% water [9] .

2. MATERIALS AND METHODS

2.1 Burger manufacturing

The study was conducted in the laboratories of the College of Agriculture, University of Tikrit, during the period between 20/5/2022 - 22/1/2023, during which beef veal was purchased and other vegetable samples (zucchini, eggplant, mushrooms, truffles, millet, oats, and barley) were collected, and the burger was manufactured according to the following method

- The meat was minced using a Chinese GOSONIC electric mincing machine with holes of 3 mm. Meat was added by 20% and vegetable matter by 80% for each type separately.
- Adding salt, black burger and garlic: 0.5% salt, 0.5% black burger, 0.5% crushed garlic per kilogram of meat, then chopping it again to ensure homogeneity.
- Forming pieces of the mixture of 80-90 grams for the manufacture of Birker tablets.
- Manufacture of Alberker tablets using a special mold after adjusting the thickness and diameter of the manufactured Alberker tablets and then wrapping them with butter paper and keeping them until the subsequent tests are conducted. Figure (1)

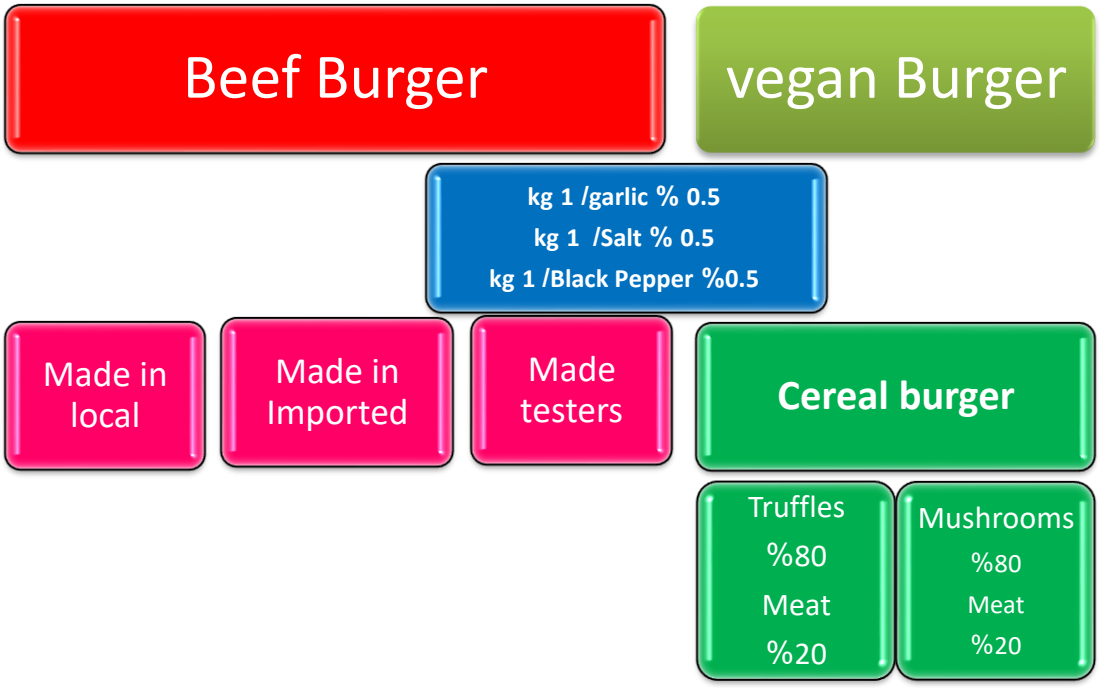

Figure (1) Experiment design diagram

2.2. chemical Tests

2.2.1 Moisture content determination

The percentage of moisture in the Burger species used in the study was estimated based on the method mentioned in A [10] Association of Official Analytical Chemists 12th ed. Using a known weight of Burger types up to (40) gm in glass dishes, and it was dried in an electric oven at a temperature of (105) ° C until the weight is stable, then the difference in weight was calculated and the percentage of moisture was estimated**.**

2.2.2. Fat determination

The percentage of fat in Alberker samples was estimated according to the method mentioned in [10] using Soxhlet extraction units, using known weights of dry samples in the range of (0.5-2) g. Petroleum ether was used for extraction, then calculating the amount of fat according to the following equation.

$$\% \text{ Fat} = \frac{amount\ of\ fat\ (\text{gm})}{Sample\ Weight\ (gm)} \times 100$$

2.2.3. Protein determination

The amount of total nitrogen in the Burger samples was estimated using the method mentioned in [10] using the Micro kjeldahl apparatus, using concentrated sulfuric acid to digest the samples, then conducting a distillation process

using boric acid with bromo cresol green, and a purification process was carried out with hydrochloric acid N 0.1, with the use of a conversion factor (6.25) to extract the protein percentage in the Burger samples.

% of protein = nitrogen x 6.25.

2.2.4. Ash determination

Ash percentage was estimated depending on the method mentioned in [10] using a known weight from the Burger samples used in the study, and the incineration process was carried out in an incineration furnace at a temperature of 525 ° C until the weight was stable and the amount of ash was calculated according to the following equation:

the amount of ash = the weight of the lid with the sample after incineration (g) - the weight of the empty lid (g).

For ash = (of ash quantity(gm)) / (of sample weight(gm)) x 100

2.2.5. Carbohydrate

The percentage of carbohydrates was estimated using the difference method, as:

carbohydrate percentage % = 100 - (moisture percentage + protein percentage + fat percentage + ash percentage)%

2.2.6. Calories Thermal Tota

The caloric value was calculated based on was mentioned by [11] using the indices for fat x 9, protein x 4, carbohydrates x 4, and the total is kilocalories/100 grams. Calorie value kilocalories/100 grams = % protein x 4
+ % carbohydrates x 4
+ % fat x 9

3. RESULTS AND DISCUSSION

3.1. Chemical components of burger

3.1.1. The chemical composition of beef brisket

Table (1) shows the chemical composition of the meat curd. We note from the results that there was a significant increase of 0.05 ≥ P in the percentage of moisture in the local curd and it was at 69.10% compared to the laboratory currants 58.44% and the imported curds 61.30%, while the laboratory currants excelled in the proportion of protein and fat And ash and energy over the other types, and they were at 27.10, 11.39, 2.87, 211.71, respectively, compared to the local and imported beer, which were at (21.3, 28.4), (7.73, 7.78) and (1.17, 2.38) respectively, and this may be due to the use of meat pure bovine with the fatty tissues attached to it. These results may agree with [12] concluded that the moisture percentage in the bran made from veal meat ranges between 67.71-69.24, protein between 25.54-25.33, and the percentage of fat ranges between 10.42-10.71, while the percentage of ash ranges between 2.27-3

Table (1) The chemical composition of beef patties

Types of Burger	Humiditu %	Ash	Fat	carbohydrates	protein	calories (energy)
Burger made in laboratory	58.44 6.11 c±	2.87 0.481 a±	11.39 2.880 a±	0.20 ±0.01 c	27.10 4.51 a±	211.71 6.80 a±
Burger local commercial	69.10 4.33 a±	1.17 0.28 c±	7.73 1.33 b±	0.7 ± 0.051 a	21.3 1.91 b±	155.27 5.37 c±
Burger international commercial	61.30 3.70 b±	2.38 0.51 b±	7.68 1.40 b±	0.2 ± 0.033 b	28.4 1.58 a±	183.68 5.94 b±

3.1.2. Chemical composition of beef burger and burger (mushrooms and truffles).

Table (2) shows the beef broth, mushroom broth, and truffles. We note from the results that the truffle broth was significantly superior by P ≥ 0.05 in the percentage of ash, fat, carbohydrates, protein, and energy, as it was at 2.26, 5.94, 18.3, 7.92, and 158.34 compared to the mushroom broth, which was At 2.10, 1.35, 9.87, 6.88, and 79.16, respectively, while mushroom burger was superior in moisture content, which was 79.80 compared to truffle burger, which was 65.58.

While the percentage of protein, fat, ash, and energy in the laboratory burger was superior to the other types, as it was at 27.10, 11.39, 2.87, and 211.71, respectively, while the percentage of moisture and carbohydrates in the laboratory burger decreased compared to the other types, as it was at 58.44, 0.2, respectively, and these agree. The results are in line with the findings of [13], where the percentage of moisture in the burger samples to which the arrowroot mushrooms were added ranged between 72.03-77.07%.

These results converge with the findings of [14], when replacing beef with truffles in different proportions, as the moisture percentage in the burger products was recorded at 71.8% in the control samples and 67.16% for the meat burger and truffles 50/50, where the percentage of rutin was 58.27.3 and the fat was 10.36. , 3.54 and ash 1.2, 1.26

in control and replacement, respectively. The reason for the low fat content of mushroom and truffle bacon may be due to them containing a high percentage of moisture and fiber, which have an inverse relationship with fat.
The study agreed with the findings of [15]. who analyzed 200 grams of truffles and found that they contain the following percentages: protein 9%, starchy substances 13%, fat 7%, saturated fat 1%, carbohydrates 17%, and calories 150.

Table (2) Chemical composition of beef burger and burger (mushroom and truffle) containing 20% meat

Types of Burger	Humiditu %	Ash	Fat	carbohydrates	protein	calories (energy)
Burger made in laboratory	58.44 ±6.11 c	2.87 ±0.481 a	11.39 ± 2.880 a	0.2 ±0.01 c	27.10 ±4.51 a	211.71 ±6.80 a
Burger mushroom	79.80 ±8.13 a	2.10 ±0.61 b	1.35 ±0.41 c	9.87 ±2.10 b	6.88 ±2.05 b	79.16 ±6.41 c
Burger truffle	65.58 ±4.67 b	2.26 ±0.82 b	5.94 ±1.19 b	18.3 ±2.87 a	7.92 ±1.66 b	158.34 ±7.28 b

REFERENCES

1. **Heck R. T., Vendruscolo R. G., de Araújo Etchepare M., Cichoski A. J., de Menezes C. R., Barin J. S., and Campagnol P. C. B. (2017)**. Is it possible to produce a low-fat burger with a healthy n – 6/n – 3 PUFA ratio without affecting the technological and sensory properties? Meat Science, (130): 16–25.
2. **Soliman G. A. (2019).** Dietary Fiber, Atherosclerosis and Cardiovascular Disease. Nutrients.11(1155): 2 – 11.
3. **Weiss J., Gibis M., Schuh V. and Salminen H. (2010).** Advance ingredient and processing systems for meat and meat products. Meat Sci., 86 (1): 196-213.
4. **Yun S. C., Ji H. C., Doo J. H., Hack Y. K., Mi A. L., Hyun W. K., Jong Y. J. and Cheon J. K. (2009).** Characteristics if low fat meat emulsion systems with pork fat replaced by vegetable oils and rice bran fiber. Meat Sci., 82: 266-271.
5. **Bouatia M., Touré H. A., Cheikh A., Eljaoudi R., Rahali Y., Idrissi O. M. B., Draoui M. (2018).** Analysis of nutrient and antinutrient content of the truffle (Tirmania pinoyi) from Morocco. International Food Research Journal, 25(1), 174-178.
6. **Picardi P., Ciaglia E., Proto M. C. and Pisanti S. (2014).** Anandamide inhibits breast tumor-induced angiogenesis. Translational Medicine@ UniSa, (10): 8.
7. **Zhang Y., Geng W., Shen Y., Wang Y. and Dai Y.C. (2014).** Edible mushroom cultivation for food security and rural development in China: bio-innovation, technological dissemination and marketing. Sustainability, 6(5): 2961-2973.
8. **Babu P. D. and Subhasree R. S. (2008)**. The sacred mushroom" Reishi " A Review. American J. of Botany, 1 (3): 107-110.
9. **Singh P., Langowski H. C., Wani A. A. and Saengerlaub S. (2010).** Recent advances in extending the shelf life of fresh Agaricus mushrooms: a review. Journal of the Science of Food and Agriculture, 90(9): 1393-1402.
10. **Kumar, V.; Biswas, A.K.; Chatli, M.K and Sahoo, J.(2010)**. Effect of banana and soybean hull flours on vacuum packaged chicken nuggets during refrigeration storage. Int. J. Food Sci. Technol., (In Press).
11. **Soliman , G.A. (2019).** Dietary Fiber, Atherosclerosis and Cardiovascular Disease. Nutrients.11(1155): 2 – 11.
12. **Hoffman, L C and Fisher P P (2001).** Composipn of meat quality characteristics between young and old ostriches. Meat Sci.(3): 335- 337.
13. **Patinho I., Saldaña E., Selani M. M., de Camargo A. C., Merlo T. C., Menegali B. S. and Contreras-Castillo C. J. (2019).** Use of Agaricus bisporus mushroom in beef burgers: Antioxidant, flavor enhancer and fat replacing potential. Food Production, Processing and Nutrition, (1): 1-15.
14. **Makki G. A., and Yousif E. Y. (2021).** Study of qualitative characteristics of burgers from beef partially replaced by truffle during different storage periods. Multidisciplinary Science Journal, 3(2): 2021007-2021007.
15. **Lee H., Nam K., Zahra Z. and Farooqi M. Q. U. (2020).** Potentials of truffles in nutritional and medicinal applications: A review. Fungal biology and biotechnology, 7(1): 1-17.