



Production of New Yogurt

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Abstract

Some investigations on the new natural compounds and also development of new ingredients have allowed food innovation. Yogurt's consumption is recommended due to its nutritional features. On the other side, the advantages of consuming mushroom for human health has been the target for scientific researches all over the world once the search for functional foods, which bring health benefits for human, has become an international trend. One of the main active principles investigated in mushrooms is Beta-D-Glucana polysaccharide that has been thought to reduce cholesterol's absorption. In order to encourage the consumption of beverages that provide benefits for human health, this work was developed with a production of yogurt added with *Agaricus subrufescens* mushroom. The formulation which had intermediate concentration (0.6 g mushroom/200 mL of yogurt) was the most accepted by the evaluators. Developing an innovative beverage (COCurte – Yogurt with Mushroom) has allowed a deposit of an Invention Patent at National Institute of Intellectual Property (NIIP) registered under the code BR 10 2016 018766 4 (Brazil).

Keywords: Human Health; *Agaricus subrufescens*; Sun Mushroom; Beverage; Innovative Research; Sensory Acceptance

Introduction

In the last few years, functional foods and nutraceutical have been presented as a food which has physiologic benefits beyond its basic nutritional functions. They are highlighted as healthy option regarding health care process [1].

Yogurt is considered a product highly recommended due to its sensorial and nutritional features. Although its nutritional composition, the consumption of yogurt in Brazil is still low (about 3 kg per person/year) when compared to other countries such Argentina, Uruguay and France, where the person consumption is something between 7 and 19 kg per year. Applying sensorial techniques may increase yogurt's consumption by adjusting fundamental characteristics from this food in a way that consumer's expectation has reached [2].

By the other side, mushrooms have so long been appreciated in cook art due to flavor and nutritional, economic, ecological and medicinal importance. Mushrooms might offer an alternative source for protein on diet of consumers once some varieties have high concentration of good quality protein in that composition. They are almost compared to meat bovine protein [3].

One of the more researched active principles which compound mushroom *Agaricus subrufescens* Peck is the polysaccharide Beta-D-Glucana, which may act on reduction of cholesterol absorption, however, its consumption may be associated to healthy habits [4]. The microorganisms surprise us in so many ways yet it is very difficult to understand their role in immunological mechanisms [5].

The amount of Beta-D-Glucana found in 1g of *A. subrufescens* may vary between 120 to 130 mg, but in some cases it may be a bit higher.

Investigative researches regarding to functional foods may stimulate innovators food ingestion as well as to increase consumptions of such products that may bring health benefits as yogurt and edible mushrooms. Observing the very few numbers of studies talking about milk beverages and yogurts having mushrooms flower in their formulation, this research aimed to obtain and add sun mushroom (*Agaricus subrufescens*) powder to natural yogurt's formulation. After, to evaluate the acceptance of this new beverage through sensory analyze.

Materials and Methods

This research project was done at the facilities of Federal Institute Baiano of Education, Science and Technology – Santa Inês campus. Sensory and sample analyses were done at Milk Technology Lab from October 2015 to October 2016.

Mushroom powder extraction (*A. subrufescens*)

Mushrooms used in this research were obtained from a culture cycle that had three production flux duration. Culture cycle was done in greenhouses located at the Milk Technology Lab, and it was carried out according to the suggested conditions to mushroom selected development. Previously to yogurt addition, mushrooms were picked up and daily collected in a random way showing a commercial awesome commercial development.

Carpophores were sliced and undertook to thermo treatment at 40°C for 72h in dehydration greenhouse who had forced-air ventilation. Just after sliced carpophores dehydration process, it was crushed until to obtain powder mushroom. With this material, it was done physical-chemical analyses for humidity, ashes, protein and lipids. The techniques used in this research are according to Adofo Lutz Institute [6].

In order to determine dry matter content was used gravimetric method which samples were dried in greenhouse at 105oC up to obtain constant weight. Nitrogen total content was determined by using microkjeldahl Method where protein content was found multiplying nitrogen total by factor 3,99. Lipids were determined by continuum extraction using ethyl ether in Soxhlet extractor at 45 - 50oC for almost 8 hours. After this time, solvent was recovered and recipients containing ether extract were cooled in desiccator and weighed having lipids weight by gravimetric difference.

Ashes percentage was found by samples carbonization and incineration in muffin at 550°C for 4 hours.

Natural sweetened yogurt elaboration

Yogurt's elaboration process was done at Milk Technology Lab located at Agro industry facilities (Santa Ines Campus) from a basic formulation. Thus, it was done a craft prepare using equipments and basic facilities. First of all, 10 liters of milk was pasteurized by adding 10% of sugar maintaining a temperature of 72°C for 15 seconds.

After pasteurization, it was needed to reduce temperature from 72°C to 38 - 42°C. Afterwards, it was added 2% of milk on milk culture. This culture was granted by the Milk Technology Lab. It was homogenized with milk and conserved in a recipient who kept ideal temperature (keeping in greenhouse at 40°C ± for 8 hours).

Once this mixing stays under a temperature of 28 - 42°C, yogurt was obtained where were added different concentrations of powder mushrooms. Again, it was done a new homogenization and just after, yogurt was cooled (6°C ± C) to preserve its characteristics and to avoid any undeserved microbiological contamination. After cooled for 4 hours, the yogurt was bottled in a recipient of 500 mL of capacity.

Formulations

It was tested three variations of powder mushroom content added to the yogurt (0,3 g/200 mL; 0,6 g/200 mL; 1,2 g/200 mL). In addition, it was used a control formulation with no powder mushroom addition.

Sensory analyses of yogurt with powder mushroom addition

Next to yogurt's added elaboration, sensory analyze was done by using acceptance test to evaluate sensory quality of the product and consumers' acceptance. These acceptance tests might be classified into two categories: of preference (choice) and acceptance (category). This method is used in food, beverage and water sen-

sory analyses. The jury expresses its emotional situation or acceptance reaction to choose one product instead of another. It is the usual way of measuring opinion of a large consumers group regarding their preference. Acceptances testes may be of lab, central locations or domestic use. It will depend on applying place.

For sensory analyzes, the used acceptance test was of preference once its performance do not depend on juries' training and other skills, just usual consumers of the such product in evaluation. The test procedure consists in obtaining individual's preference with regard to product that is being tested. The used scale was order-preference. In this test, a roll of samples was showed to be ordered according to juries' preference. For each formulation (based on concentration) were used 50 juries.

Results and Discussion

This research had as stake-holders people from 15 to 46 years-old who had as consumption habit to have yogurt. These people have signed a consent form. Also, this research was approved by Ethic Committee on research (Brazil Board/ Federal University of the Reconcavo of Bahia) under the following CAEE number: 54414016.4.0000.0056 and Compliance: 1.530.191. From the results of this work, it was done a patent deposit n INPI (National Institute of Intellectual Propriety) with process number BR 10 2016 018766 4, assuring all legal and ethical rules. Project development has provided an elaboration of an innovator product with regard to food gender.

When characterizing Mushroom powder extract (Figure 1) the *Agaricus subrufescens* it was found humidity values of 8,9%, ashes of 5,9%, Lipids of 1,9%, and protein of 28%. In general, *Agaricus subrufescens* has low humidity, ashes and lipids content whereas it shows high levels of proteins especially when compared to other species of edible mushrooms. Lipids content found was of 1,9% being considered a good number once food which has high levels of lipids are thought to be bad for human feeding due to problems originated from irregular consumption of this type of nutrients. Mushrooms are usually known by having low levels of lipids which becomes it an excellent source of nutrients in many food diets. After performing sensory analyze of prepared different formulation (Figure 2), it was possible to note that the high mushrooms concentration on these samples (1,2 g/200 mL de yogurt) has caused less preference of juries. On the other hand, 53% of juries showed more acceptances by samples that had powder mushroom addition. Among those, 35% of juries declared more preference for samples which had formulation of 0,6 g/200 mL de yogurt. Thus, it is thought that consumers show more acceptance and buy intention for yogurts that contain medium powder mushroom concentration (0,6 g/mL of yogurt). It is worthy to highlight that Brazilians consumers has been changing their feed habits looking for a very healthy life mainly consuming such products which bring well-being.



Figure 1: Powder extract.



Figure 2: Different formulations.

Results from extract Mushroom physical-chemical analyzes are showed on table 1.

Physical-Chemical Parameters	Values
Humidity	8,9%
Ashes	5,9%
Lipids	1,9%
Protein	28%

Table 1: Physical-chemical characterization of powder mushrooms (*Agaricus subrufescens*).

Conclusions

Yogurt production added of powder mushrooms may be considered a potential ingredient due to its functional and therapeutic proprieties where consumers and market in general have such good expectation.

Functional foods beyond innovators are very important on current days once food habits have changed in the last few years because people have look for more quality their food.

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Conflict of Interest

The author declares no conflicts of interest in this article.

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