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PREPARATION OF COOKIE BISCUITS WITH DIFFERENT QUANTITIES OF MOIST MLT BAG AND WHEAT FLOUR

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Abstract: Cookies type cookies are foods of good acceptance in all age groups and consumed daily. Thus, the choice of malt bagasse is due to its chemical and nutritional composition and benefits to the environment as it is an agro-industrial residue. In this project, different cookie formulations were elaborated, replacing part of the wheat flour by wet malt bagasse where in formulation 1 (5%) of the residue was used, in formulation 2 (10%), in formulation 3 (15%), in formulation 4 (20%), formulation 5 (25%) and formulation 6 (30%). Microbiological analyzes of thermotolerant Coliforms, Staphylococcus positive coagulase and *Salmonella* sp in cookies made. The ordering-preference test and purchase intention were performed with 80 untrained judges. The microbiological results were in accordance with the criteria established in the legislation. Results obtained in the sensory analysis showed that formulation 4 was preferred at the 5% probability level. The purchase intention showed that 67% of the judges would certainly buy this product. Based on the results obtained, wet malt bagasse is an excellent alternative as a raw material for cookies, providing a diversified destination for this agro-industrial residue.
Keywords: Cookie, Microbiological analysis; Sensory analysis; Agro-industrial waste;

INTRODUCTION

Agribusiness is one of the most important sectors of the market, however, the amount of waste generated is high. The brewing industry is one of the main generators of waste from the production of beer, including malt bagasse, whose one of the obstacles to storage is the humidity and space that makes it unattractive due to the expenses involved in drying for its conservation. The most used destination of this residue is for feeding ruminants.

Being available all year round, malt bagasse has nutrients, proteins, vitamins and minerals accessible to the transformation of an industry by-product to an ingredient for human food, having several health benefits (REIS, 2019; NAKOSONE, 2020).

In view of this, this work proposed the elaboration of cookies with the use of different amounts of wheat flour and wet malt bagasse.

MATERIAL AND METHODS

CREATION OF COOKIES

For the preparation of cookies, the following ingredients were used: wheat flour, refined sugar, brown sugar, salt, egg, unsalted butter, chemical yeast, vanilla essence, semisweet chocolate and wet malt bagasse. The quantities of each raw material are found in table 1, while in table 2 the quantities of wheat flour and malt bagasse are found, as well as the percentage of replacement of wet malt bagasse used in the project.

For the processing of cookie-type cookies, the step of mixing the butter and sugars was carried out in a planetary mixer, until the formation of a homogeneous cream. To the cream were incorporated the eggs and vanilla essence still in the mixer. After homogenization, the rest of the ingredients was added to the cream, being last the chemical yeast and mixed manually.

Then portions of the dough were made, added to the baking sheet covered with parchment paper, carefully positioned. Soon after the chocolate chips were placed on them. Finally, the baking sheet was taken to a preheated oven at 200ºC for approximately 10 minutes. Then the cookies were cooled to room temperature and packaged.

PHYSICO-CHEMICAL ANALYSIS

Physicochemical analyzes of moisture, ash, pH, fiber content, sugars totals, proteins and lipids at the bagasse in malt and us Cookies in wake up with the methodology described fur Adolf Institute Lutz (2011).

Ingredients	Quantity (g)
Flour and malt bagasse*	150.00
Refined sugar	85.50
Brown sugar	85.50
salt	0.85
Egg	56.00
Butter without salt	85.5
chemical yeast	0.85
Vanilla essence	4.15
semisweet chocolate chips	1.20

* Sum of the amount of wheat flour and malt bagasse will be 150g.

TABLE 1. Ingredients used in the formulation of cookies.

Formulation	Wheat flour (g)	Moist malt cake (g)	% replacement of malt bagasse
F1	142.5	7.5	5
F2	135	15	10
F3	127.5	22.5	15
F4	120	30	20
F5	112.5	37.5	25
F6	105	45	30

TABLE 2. Quantities of wheat flour and malt bagasse used in the different formulations and percentage of replacement

	ashes(%)	proteins(%)	sugarstotals (%)	lipids(%)	Moisture(%)	pH
Bagasse in malt	0.75	1.14	20.53	0.68	23.09	5.65

TABLE 3. Analyzes physico-chemical of bagasse in malt wet.

Cookie formulations	Thermotolerant coliforms at 45°C (MPN/g)	*Salmonella sp* / *25g*	Coagulase positive staphylococci/g
Formulation 1	<3.0	Absence	Absence
Formulation 2	<3.0	Absence	Absence
Formulation 3	<3.0	Absence	Absence
Formulation 4	<3.0	Absence	Absence
Formulation 5	<3.0	Absence	Absence
Formulation 6	<3.0	Absence	Absence

TABLE 4. Microbiological analysis of different cookie formulations.

In the formulation chosen through the sensory test, an analysis of color at the colorimeter Delta, according at instructions of manufacturer of equipment being the parameter L* referring to luminosity where L* = 0 black and L* = 100 white; and coordinates in chromaticity represented per the* and B*, Where The* standing positive if refers to red and negative a* refers to green, and b* being positive refers to to yellow and B* negative if refers to blue.

The caloric value was calculated by multiplying the total percentages of each sample in extract ethereal, protein and carbohydrates soluble by their values calories related: 9, 4 and 4 kcal – factors in conversion in Atwater. O value caloric in hundred grams in cookie corresponds the sum from results totals of multiplications.

MICROBIOLOGICAL ANALYZES

Microbiological analyzes of thermotolerant Coliforms, Coagulase positive Staphylococcus and *Salmonella* sp described in Silva et al. (2010).

SENSORY ANALYZES

Sensory analyzes of ordering-preference test and purchase intention were performed after approval by the Ethics Committee, CAAE n° 30881020.1.0000.5473 carried out with 80 untrained judges. Individual packages were used for each cookie containing the coding of the sample and delivered to each judge, along with the Free and Informed Consent Term (FICT), questionnaire and sensory form.

The judges were instructed to fill out the informed consent first, right after the questionnaire and if they did not have any disease or food allergy, they could proceed and, this way, carry out the sensory analysis.

RESULTS AND DISCUSSION

ANALYSIS PHYSICO-CHEMICAL OF BAGASSE IN MALT DAMP

In table 3 it is possible to visualize the results obtained in the physical- chemicals performed at the bagasse in malt.

The composition of malt bagasse, presented by Ceccato (2019) based on 100g of sample was 1.70% for ash; 7.76% protein; 1.67%; of lipids, 13.69% moisture and pH 5.70. In the characterization carried out by Carvalho (2011), were obtained as results 6.32% in sugars totals, 0.98% in lipids, 5.14% in moisture, ash 1.99%, 3.96% in proteins and 4 in pH.

The difference found for the protein and total sugars content is due to probably by conditions in cultivation and type in barley used, at conditions in malting process as well as the possibility of using an adjunct brewer.

With relationship to parameter the moisture, it was observed that difference in between you works due to the way in which the bagasse was used for the analysis. In this project, wet bagasse was used while in the others, bagasse was dried for conservation before Realization of analysis.

The more acidic pH found by Carvalho (2011) may be due to the fermentation Natural what occurs at the bagasse in malt When no It is dry or refrigerated after The separation of wort. That fact he can to be observed fur contents in sugars totals what he was most low When bought as bagasse used in this job.

MICROBIOLOGICAL ANALYSIS OF COOKIES AND COMPARISON WITH LEGISLATION

In table 4 it is possible to observe the results obtained in the microbiological analyzes carried out on the cookies.

Both in the analysis of *Salmonella* sp as in coagulase positive Staphylococci after the incubation period there was no growth of any

microorganism.

Table 5 shows the values of Resolution RDC No. 331, of 12/23/2019, which establishes ANVISA's microbiological standards for food with the values obtained in the analysis of cookie formulations.

Based on table 5, it is possible to verify that the cookies created are in compliance with the legislation and, therefore, suitable for human consumption.

SENSORY ANALYSIS OF COOKIES

The preference test was used to assess the judges' preference for different cookie formulations.

For the analysis of the formulations, it was initially verified whether there was a significant difference between the samples, using the Friedman test, calculating the F_{test} and comparing it with the $_{tabulated}F$.

The formula used was:

$$F_{test:} \frac{12}{jt(t+1)}(S_1^2 + S_2^2 + S_3^2) - 3j(t+1)$$

Where J= number of judges; T= number of treatments (samples) and S= sum of orders assigned to each treatment.

The $F_{test\ value}$ (Friedman test) obtained was compared to the minimum critical value tabulated to establish whether there is a significant difference between the samples, at 5% probability.

The F_{test} obtained was 27.84 and the $_{tabulated}F$ was 11.07 indicating that the samples differed from each other, at the level of 5% of probability, because the F test is greater than the tabulated number in the different concentrations of malt bagasse moist used in the preparation of cookies.

Christensen 's table, the minimum critical difference between the ranking totals with respect to 5% of significance is 47. Therefore, formulations that differ from each other have a value greater than or equal to 47. After comparing the samples, if sample F5 differed from all formulations and F4 differed from F5 and F6. Based on the data obtained, the preferred sample was formulation 4, which had the highest sum, since the order requested from the judges was to assign a grade 1 to the least preferred sample, ordering until reaching a grade of 6 to the most preferred sample.

BUY INTENTION

The purchase intention of cookies with wet malt bagasse was obtained taking into account the 5-point scale whose denomination of each value can be seen in Figure 1.

It can be seen in the graph that 65% of the judges would certainly buy the cookie of their choice, 31.25% would probably buy it, 2.5% would not buy it, 0% would probably not buy it and only 1.25% would certainly not buy it.

CONCLUSIONS

Cookies with wet malt bagasse are a healthy and viable option, given the amount of wet malt bagasse generated in agribusinesses. The results found showed that the use of wet malt bagasse replacing wheat flour is viable, showing the potential for the use of this agro-industrial residue as a raw material, showing promising and satisfactory results regarding sensory analyzes with the intention to purchase the proposed product.

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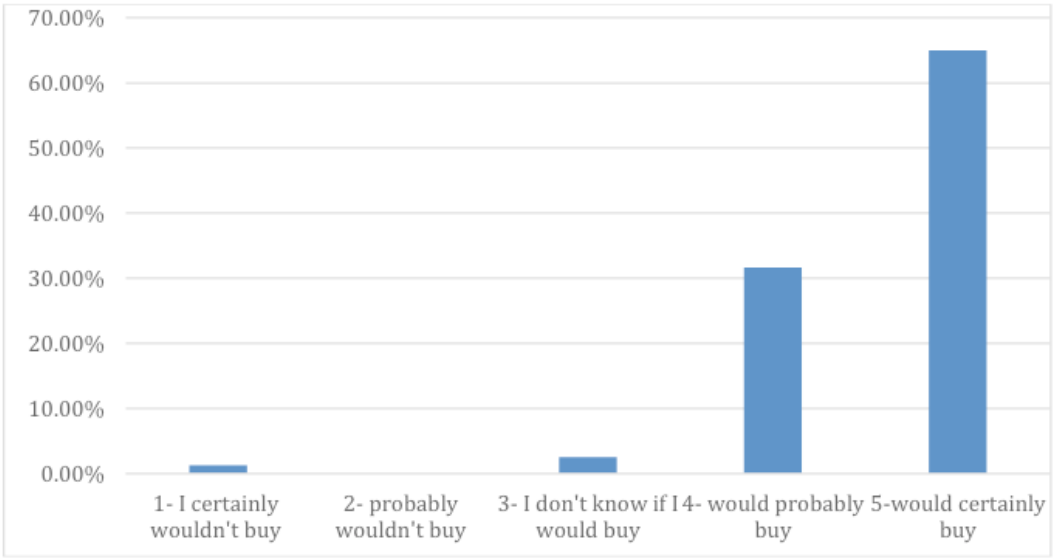
Microbiological parameter	Cookie formulations	Resolution RDC No. 331, of 12/23/2019 (Sample Tolerance)
Positive.coag.staf /g	Absence	$5x10^{2}$
***salmonella* sp /25g**	Absence	Absence

TABLE 5. Comparison of the results obtained with the legislation



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