REFORMULATION OF GOAT BURGER USING AÇAÍ OIL HYDROGEL

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I. INTRODUCTION

Most meat products contain a high amount of saturated fat which can lead to cardiovascular and coronary diseases, atherosclerosis, obesity, and type II diabetes [1]. An alternative to reformulating these products and improving the fatty acid profile is to use healthier fats such as açaí oil which has good quality fatty acids, containing 70% oleic acid [2]. Hydrogel is a viable way of applying vegetable oils to meat products [3].

II. MATERIALS AND METHODS

The hydrogel was formed from a mixture of water, açaí oil, polysorbate 80 and guar gum. Five goat meat burguer treatments were developed with 0, 25, 50, 75 and 100% replacement of pork backfat with açaí oil hydrogel and frozen for 120 days. Moisture, protein, and ash determinations were carried out in accordance with AOAC [4]. Determination of lipid content followed the Bligh Dyer method [5] and lipid oxidation (TBARS) according to the method of Raharjo et al. [6]. For the analysis of water activity (a_w) the equipment was used Aqualab 4TE (METER Group Inc., Pullman, USA) and the pH was determined by the Hanna pH meter (Hanna Instruments, Woonsocket, USA). The color of the burgers was determined using Konica Minolta CR-400 colorimeter (Minolta Optics Inc. Konica, Japan). All analyses were carried out in triplicate and analyzed using ANOVA and the Tukey test through Statistica® 7.0 software with a 5% significance level.

III. RESULTS AND DISCUSSION

Table 1 shows the proximate analyzes of the burgers.

Table 1 – Proximate composition of burgers with the addition of açaí oil hydrogel.

(%)	Treatments				
	H0	H25	H50	H75	H100
Moisture	62.65±0.18c	65.06±0.06c	65.95±0.14c	69.24±0.15b	72.26±0.01a
Proteins	19.89±0.77	18.71±0.88	18.32±1.70	18.78±1.21	20.06±0.52
Lipids	12.12±0.30a	7.70±1.97b	8.22±1.14b	5.24±0.46b	1.85±0.85c
Ash	2.05±0.18	2.37±0.06	2.20±0.06	2.33±0.99	2.00±0.06

Means ± standard error in the same line followed by different lowercase letters indicate significant difference ($p<0.05$), according to the Tukey's test.

In the present study moisture increased as the percentage of hydrogel in the burgers increased, this may be since the guar gum, present in hydrogel formulation it is one hydrocolloid polysaccharide with ability to form solutions viscous in the presence of water, as it has nature hydrophilic. Protein, ash, and lipid values presented no significant differences ($p>0.05$).

The pH values were not affected by the reformulation ($p>0.05$), however there was a decrease during the 120-day storage period except for H0. a_w was not affected ($p>0.05$) by lipid replacement and was within the values established for this parameter.

Table 2 –Lipid oxidation (mg malonaldehyde /kg of meat) from burgers with fat replacement stored for 120 days.

	Days				
Treatment	0	30	60	90	120
H0	0.13 ± 0.01Bb	0.21 ± 0.05ABab	0.48 ± 0.21Aa	0.45 ± 0.02Aa	0.53 ± 0.13Aa
H25	0.17 ± 0.03ABb	0.26 ± 0.04Ab	0.44 ± 0.02Aa	0.34 ± 0.05ABa	0.42 ± 0.09Aa
H50	0.10 ± 0.02Bb	0.25 ± 0.03Aab	0.34 ± 0.03ABa	0.28 ± 0.03 Bab	0.38 ± 0.08ABa
H75	0.11 ± 0.07Bb	0.14 ± 0.02Bb	0.35 ± 0.01ABa	0.25 ± 0.08 Bab	0.30 ± 0.07Ba
H100	0.21 ± 0.03Ab	0.16 ± 0.03Bb	0.30 ± 0.04ABa	0.24 ± 0.04 Bab	0.34 ± 0.06Ba

Means ± standard error in the same line followed by different lowercase letters indicate significant difference ($p<0.05$), according to the Tukey's test. Means ± standard error in the same column followed by different uppercase letters indicate significant difference ($p<0.05$), according to the Tukey's test.

The açaí oil hydrogel reduced lipid oxidation of the burgers (Table 2). The H0 sample without hydrogel showed an increase of 307.70% in the TBARS content between day 0 and day 120, while the H100 sample showed an increase of 61.90%. One possible explanation for this is the presence of antioxidants in açaí oil, which contributed to lower fat oxidation.

Regarding the color of the burgers, on day 120 of storage, sample H100 was different from the control and showed one decrease in brightness which can be explained by the greater amount of replacement with açaí oil hydrogel. The attribute a* decreased and b* increased during the storage period.

IV. CONCLUSION

Through the analyzes it was possible to conclude that the replacement with açaí oil hydrogel was viable and reduced lipid oxidation.

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