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Sensory Characterization Of Healthier Bologna-Type Sausages Using The Consumer-Based 'Check-All-That-Apply' Method (#68)

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Introduction

Studies into healthier meat products have increased recently. One method to produce healthier bologna sausage is the addition of omega-3 fatty acids and/or reducing the sodium content. However, these technologies can affect the physicochemical and sensory characteristics of these products [1, 2]. Sensory characterization of foods through the usual methodologies, such as quantitative descriptive analysis (QDA), is costly and time consuming. Nowadays, faster sensory methods, such as check-all-that-apply (CATA), have been applied in order to characterize new products. Some studies have shown that this technique could be a useful tool in the development of meat products [1, 3, 4]. In this context, this study aimed to characterize healthier bologna sausages, enriched with omega-3 fatty acids through the partial replacement of pork back fat with *Echium* oil, using the consumer-based CATA method, in comparison to a regular bologna sausage (100% fat added as pork back fat).

Methods

Three bologna formulations were evaluated: control bologna sausage with 100% fat added as pork back fat, and T25 and T50 (bologna sausages with replacement of 25% and 50% of the pork fat by *Echium* oil, respectively). The sausages were processed according to Trindade et al. (2010) [5]. The CATA questionnaire was evaluated by 120 consumers of the bologna, recruited from among students, faculty and staff of São Paulo University. The 32 sensory terms applied in the CATA test were developed based on a previous study (unpublished). The samples, 3 mm in thickness, were served in a randomized complete block design and monadic order, coded by three-digit random numerals. The results were evaluated using XLStat software (Addinsoft, France) by the frequency of citations for each sensory terms/sample, followed by Cochran's Q test in order to identify significance differences between treatments for the sensory terms [6].

Results

The answer frequencies for each CATA term applied to each bologna sausage treatment are shown in Table 1. The majority of sensory terms cited for control were equal to those for T25 (p > 0.05), except for bright colour; T25 had the highest frequency of this attribute (p < 0.05). The most cited attributes for both were: smooth texture, uniform colour, without salt, pink colour, tasteless, low fat and elastic texture. The T50 treatment differed from control (p < 0.05) for the majority of the sensory terms, and was characterized by terms such as aerated appearance and fish odour, i.e. terms more related to negative characteristics.

Conclusion

Considering the consumer-based bologna sausage profile, established using the consumer-based CATA test, 50% fat replacement by *Echium* oil resulted in poorer sensory characteristics. However, the consumers did not notice sensory differences between the traditional bologna sausage in comparison with the sausage with 25% pork fat replacement by *Echium* oil. Therefore, this level of replacement may be appropriate to produce a healthier meat product with desirable sensory characteristics.

Acknowledgements

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842

Table 1 – Numbers of citations for each term in different bologna treatments assigned in the CATA analysis

Treatment	Control	T25	T50	p-value
Aerated appearance	15[b]	21[b]	41[a]	0.000
Bright	7[b]	5[b]	18[a]	0.004
Bright colour	15[b]	33[a]	6[b]	0.000
Brittle texture	11[b]	9[b]	52[a]	0.000
Chicken meat odour	5	4	1	0.236
Condimented	7	7	7	1.000
Dark colour	2[b]	1[b]	29[a]	0.000
Dry	14	18	12	0.393
Elastic	35[a]	38[a]	6[b]	0.000
Fat	7[b]	5[b]	30[a]	0.000
Fibrous	6	7	12	0.260
Fish odour	3[b]	2[b]	10[a]	0.009
Gummy	9	9	9	1.000
Hard	15[a]	17[a]	4[b]	0.004
Herbs door	1	4	6	0.066
Hot dog sausage taste	7	9	9	0.810
Ideal salt	33	28	40	0.153
Intense flavour	5[b]	5[b]	15[a]	0.013
Low fat	36	29	24	0.113
Meat odour	5	2	5	0.472
Metallic	3	2	8	0.076
Opaque	11	10	8	0.727
Pink colour	50[a]	52[a]	22[b]	0.000
Rancid	5	1	8	0.058
Red colour	11[b]	9[b]	42[a]	0.000
Salty	3	2	6	0.236
Smooth	56[a]	48[a]	17[b]	0.000
Spicy	8	9	5	0.486
Tasteless	37[a]	39[a]	17[b]	0.001
Uniform colour	53[a]	40[ab]	31[b]	0.009
Weak flavour	18	22	16	0.537
Without salt	53[a]	40[ab]	28[b]	0.000

Frequencies presenting with the same letter for the same attribute (row) are not significantly different (p<0.05) by

Cochran's test [7] between treatments. Control: bologna with pork back fat; T25 and T50: bolognas with 25% and 50%

Table 1 – Numbers of citations for each term in different bolognas assigned in the CATA analysis
Table 1 should be insert in the Results Section of the Abstract