SENSORY CHARACTERISTICS OF CANNED CORNED BEEF CURED WITH CELERY EXTRACT

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I. INTRODUCTION

Corned Beef is the industrialized meat product, produced exclusively with beef, cured, cooked, hermetically packaged, commercially sterilized and quickly cooled [1]. The typical curing of the product is made with synthetic sodium nitrate and nitrite, providing preservation, typical color and the control of the lipid oxidation. Corned Beef can also be made with other curing agents as long as the food safety and the commercial requirements of the final product is not compromised [1]. As a way to meet the demand of current consumers toward natural foods, the meat industry has been searching for alternative sources of nitrates and nitrites to replace the traditional synthetic curing salts. Celery extract is naturally rich in nitrate (which can be reduced to nitrite) and a candidate to replace the synthetic salts in the preparation of cured meat, thus allowing the claim of natural curing. To achieve this, it is important that the final product presents sensory characteristics similar to those of the original product [2], as they are the first ones to be considered by the consumer. The present study aimed to analyze the sensory characteristics and the acceptance of Canned Corned Beef (CCB) made with celery plant extract to replace sodium nitrite.

II. MATERIALS AND METHODS

The following CCB formulations were prepared: F1) standard formulation (control), containing 0.01% sodium nitrite, 1.1% sucrose and 2.3% NaCl; F2) 0.12% celery extract, 1.1% sucrose, 1.3% NaCl and 0.7% BR flavouring; F3) 0.12% celery extract, 1.1% sucrose, 1.3% NaCl and 0.7% UK flavouring; F4) 0.12% celery extract, 1.1% sucrose and 1.3% NaCl and F5) 0.12% celery extract, 1.1% sucrose and 2.3% NaCl. The celery extract used was ACCELTM XP30 (Kerry Inc.; 30,000 - 36,000 ppm NaNO₃ equivalent). The formulations were hermetically canned (340 g per can) and commercially sterilized according to the Brazilian legislation [1]. The residual sodium nitrite in the formulations was determined according to AOAC [3].

The sensory analyses were performed according to Brazilian standards [4] with 45 untrained panelists, who manifested their awareness and agreement in a Free and Informed Consent Form (CEP-FOA/Unesp number 4.561.244). The formulated CCB were offered to the tasters at 7 °C on white plastic plates as 1 cm³ cubes coded with three random digits. For the multiple comparison test, the control was first set as a reference to the attributes "salty taste", "meat flavor", "after taste" and "color". Then the panelists were invited to evaluate how intense each of the sensory characteristic was in relation to the control, using a 5-point multiple comparison scale, in which 1 corresponded to "extremely less intense than control" and 5 corresponded to "extremely more intense than control". For the acceptance test, the panelists tasted one sample of each formulation and evaluated the attributes "meat flavor", "salty taste" and "general impression" according to their preference, using a 5-point hedonic scale in which 1 corresponded to "I dislike it very much" and 5 to "I like it very much". One-way ANOVA was used for the statistical analysis and Duncan's test was used to compare different means at 5% of probability.

III. RESULTS AND DISCUSSION

Except to F4, all the formulations made with celery extract were considered equivalent to the standard product made with sodium nitrite regarding to the sensory attributes evaluated (Fig. 1). Due to the lower content of NaCl, F4 differed from the other formulations in "salty taste" and "meat

flavor", showing itself to be the least favorable to replace nitrite curing in CCB. The residual nitrite concentrations in the formulations were (ppm): F1 8.23; F2 6.79; F3 7.62; F4 6.49; F5 6.51, thus meeting the requirements of the Brazilian legislation (maximum 150 ppm; [5]).





All the formulations received equivalent scores in the acceptance test for "meat flavor", "salty taste" and "general impression" (Table 1), thus confirming the suitability of the celery extract to provide the characteristics of CCB. So we can say that the products made with celery extract had the same acceptability as the product made with synthetic sodium nitrite. In addition, celery extract is highly compatible with processed meat products, due to its low pigmentation and mild flavor, which do not interfere with the color and the taste of the final product [6]. These results confirm the use of celery extract to produce naturally cured CCB, without any disadvantage to its organoleptic characteristics.

| | Formulations | | | | | |
|--------------------|------------------|--------------|--------------|--------------|------------------|-------|
| Attributes | F1 | F2 | F3 | F4 | F5 | value |
| Meat flavor | 3.44 ± 0.121 | 3.38 ± 0.143 | 3.38 ± 0.147 | 3.22 ± 0.149 | 3.47 ± 0.144 | 0.76 |
| Salty taste | 3.30 ± 0.151 | 3.24 ± 0.135 | 3.22 ± 0.155 | 3.11 ± 0.163 | 3.53 ± 0.141 | 0.36 |
| Overall impression | 3.20 ± 0.129 | 3.16 ± 0.149 | 3.29 ± 0.148 | 3.16 ± 0.162 | 3.42 ± 0.140 | 0.66 |

| Table 1 _ | Accentance | test of the | evnerimental | Canned (| Corned Reef |
|-----------|------------|-------------|--------------|----------|---------------|
| | Acceptance | | experimental | Canneu | Jullieu Deel. |

IV CONCLUSION

The celery extract used as the agent of natural cure to produce Canned Corned Beef was able to provide the original characteristics of the synthetic nitrite cured product and reached the consumers acceptance.

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