

EVALUATION OF THE BETALAIN IN THE STABILITY OF THE COLOUR OF BRAZILIAN FRESH SAUSAGE DURING STORAGE UNDER REFRIGERATION

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Abstract –Sodium nitrite is an additive used for curing meat giving a typical colour. It is antimicrobial and antioxidant but it has been associated with the risk of cancer. The use of natural colouring in meat has been studied. This work evaluated the influence of betalain on fresh Brazilian sausage stored under refrigeration. The fresh Brazilian sausages were produced with variations in the amounts of sodium nitrite and in the type of colourings used and were subjected to colour and residual nitrite analysis. T1 and T3 presented the highest a* values in raw sausage and T3 maintained the best results even after cooking. Betalain represents an alternative to improve the colour in fresh Brazilian sausage with a reduction of sodium nitrite.

Key Words – meat product, natural colouring, sodium nitrite

I. INTRODUCTION

Pork is the most consumed meat in the world [1]. In Brazil, 89% of the pork consumed is in the form of processed products [2]. The good acceptability of fresh Brazilian sausage has been highlighted among these meat products [3]. In the industrialization of meats, sodium nitrite is the most common additive because it has antimicrobial activity, antioxidant properties and it provides an intense red colour. However, its use has been associated to the increased risk of some types of cancer [4]. Colour is one of the most important factors at the time of purchase in meat products and the use of colouring can help maintain this colour. As natural colouring is associated with a healthy product image, they become an alternative to aid in colouring meat products [5]. The aim of this work was to evaluate the influence of the addition of betalain in fresh Brazilian sausages stored under refrigeration with a reduction of sodium nitrite.

II. MATERIALS AND METHODS

The base of nine treatments of fresh Brazilian sausage consisted of 68% ground lean pork (10 mm disc), 15% ground pork back fat (10 mm disc), 2,0% sodium lactate (Purac, Brazil), 1,0% condiment for fresh sausage, (New Max Industrial, Brazil), 0,6% sodium chloride 0,37% sodium tripolyphosphate (New Max Industrial, Brazil), 0,4% natural garlic, 0,4% sodium erythorbate (New Max Industrial, Brazil), 0,195% white pepper and 0,02% ascorbic acid (New Max Industrial, Brazil). The processing was done in duplicate (n = 2), on different days. The fresh Brazilian sausages were stored under refrigeration (4°C).

Table 1. Difference among the treatments (%).

Treatments	C1	C2	C3	T1	T2	T3	T4	T5	T6
Water	12	12,0075	12,015	10,5075	10,515	11,8175	11,8275	12,0075	12,015
NaNO ₂ ¹	0,015	0,0075	-	0,0075	-	0,0075	-	0,0075	-
CBM ²	-	-	-	1,5	1,5	-	-	-	-
CCB ³	-	-	-	-	-	0,19	0,19	-	-
CCL ⁴	-	-	-	-	-	-	-	0,02	0,02

¹Sodium nitrite; ²Microencapsulated betalain; ³Commercial betalain; ⁴Cochineal carmine.

The analyses of instrumental colour of the external part of the raw and cooked Brazilian fresh sausage were done in a ColorFlex model 45/0 spectrophotometer (Hunterlab, United States), with D65 illuminant, 10 ° observer angle, Universal Software version 4.10 and the colour specification system used was CIELAB. The residual nitrite analysis was performed according to Araújo [7]. The statistical program Minitab 17 On The Hub was used for ANOVA and the Tukey Test (p<0.05).

III. RESULTS AND DISCUSSION

The L* values (Figure 1) showed that, in raw fresh Brazilian sausage, the highest values were obtained in C1, C2 and C3 compared to the other treatments. The a* values (Figure 2) shows highest values in all storage periods for T1 and T3, both of which had the addition of natural colourings and 75 mg / kg of sodium nitrite,. However, after 14

days, T5 presented the highest value for a^* values. In cooked fresh Brazilian sausage, the highest value was obtained for T3 but it remained similar to T5, followed by T1 throughout the storage.

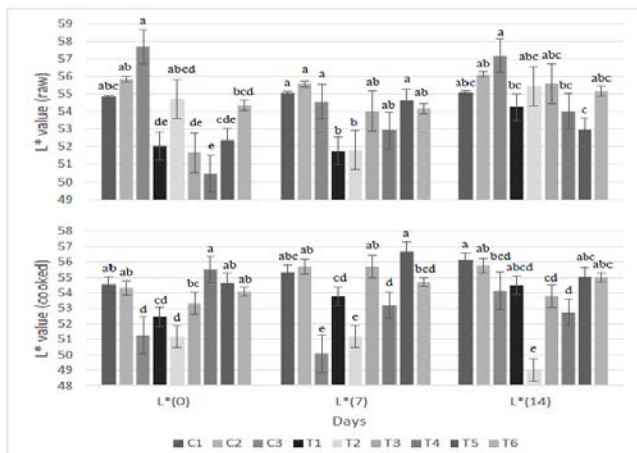


Figure 1. L^* values of the Brazilian fresh sausage during storage.

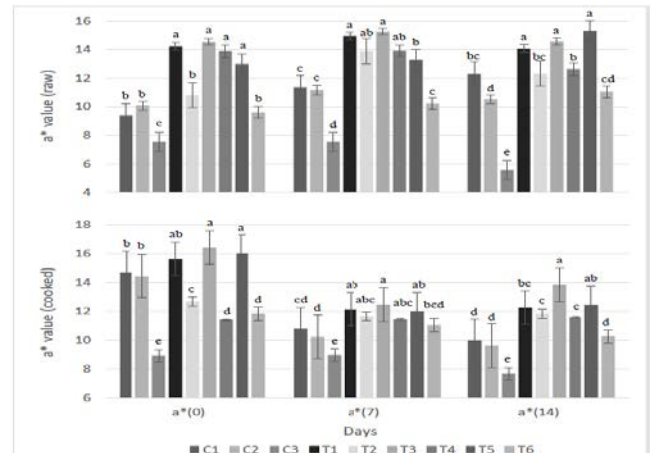


Figure 2. a^* values of the Brazilian fresh sausage during storage.

It can be seen that the addition of betalains to fresh Brazilian sausage with a reduction of 50% of sodium nitrite increased a^* values in relation to C1. Martínez et al. [5] found similar results, where the addition of betalain increased the redness compared to the control in fresh sausage. In raw fresh Brazilian sausage, the highest b^* values were seen for C2 during the storage under refrigeration compared to the other treatments, but remained similar to C1 at day zero. For residual nitrite analysis, it was found that the amounts of sodium nitrite added had a reduction of approximately 55% in the C1 and C2 control treatments at day zero. However, the reduction in the T1, T3 and T5 treatments were 65%, 83% and 75%, respectively at day zero. Honikel [7], on evaluating the changes in the amount of residual nitrite in meats after heating and under storage, found that the greatest drop occurs from the beginning of the process until the end of the heating and this drop represents up to 65% of the total sodium nitrite added. In this study, after seven and fourteen days of storage, only C1 (150 mg / kg of added sodium nitrite) had any residual nitrite.

IV. CONCLUSION

The microencapsulated betalain and commercial betalain are an alternative to improve the colouring in fresh Brazilian sausage with a reduction of sodium nitrite.

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