



## **Study N° 1 of efficacy of EXTRACTO DE ESPECIAS/65-S in fresh meat products**

### **INTRODUCTION**

The present study is aimed at proving the effectiveness of **SPICE EXTRACT/65-S** for the preservation of bratwurst sausages. The parameter upon which the quantification of preservation is based on the evolution of the microbiota over time under predetermined environmental conditions.

### **MATERIAL AND METHODS**

- **SPICE EXTRACT/65-S:** It is a product formulated with essential oil of Garlic, Cinnamon, Clove and Rosemary, Mono- and diglycerides of fatty acids and Lactic acid, in salt as excipient.
- Bratwurst sausages, made according to the standard formula and elaboration process.
- **SPICE EXTRACT/65-S** dosage:
  - 200 g of **SPICE EXTRACT/65-S** were added to 100 Kg of sausages. That lot was labeled as **EE/65-S**.
  - 100 kg of sausages that did not receive any preservative. That lot was labelled B (white control)
- Storage conditions: the sausage packages are stored at 2-4 °C.
- Microbiological analyses: every week, for a nine-week period, samples B and **EE/65-S** are microbiologically analyzed. In those analyses the total **mesophile microbiota** is measured quantitatively by gram of product.

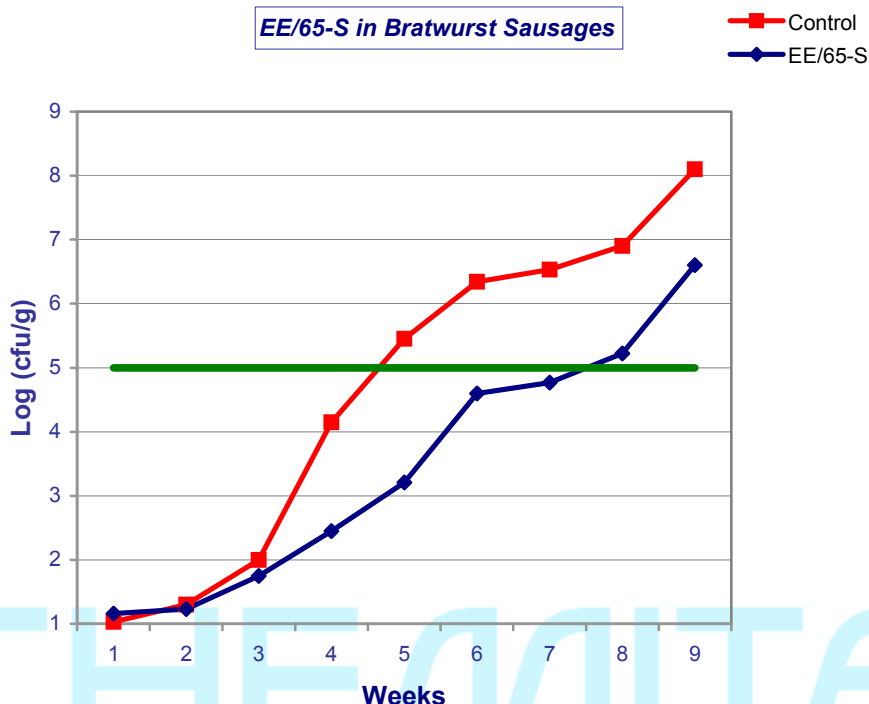
### **RESULTS**

They are expressed as log of CFU/g

<b>Lots</b> \ <b>Weeks</b>	<b>1</b>	<b>2</b>	<b>3</b>	<b>4</b>	<b>5</b>	<b>6</b>	<b>7</b>	<b>8</b>	<b>9</b>
<b>Control (B)</b>	1.03	1.30	2.00	4.15	5.45	6.34	6.53	6.90	8.10
<b>EE/65-S</b>	1.16	1.23	1.75	2.45	3.21	4.60	4.77	5.22	6.60



**EE/65-S in Bratwurst Sausages**



**COMMENTS AND CONCLUSIONS**

It should be considered that contamination levels of the analyzed microbiota above  $1 \times 10^5$ , surpasses the limits recommended by Spain's National Centre for Food and Nutrition (CENAN).

We consider that value ( $1 \times 10^5$ ), as the one that establishes the commercial lifetime of the analyzed sausages.

According to such standards the useful commercial lifetime of the two lots that were analyzed would be the following:

LOT	USEFUL COMMERCIAL SHELF LIFE
Control	5-6 Weeks
EE/65-S	8-9 Weeks

**Extracto de Especies/65-S** has a bacteriostatic effect, thus slowing down the growth of the microbial flora. It allows prolonging the commercial lifetime of bratwurst sausages up to 40 percent more of its preservation time.



## **Study N° 2 of efficacy of EXTRACTO DE ESPECIAS/65-S in cooked meat products.**

### **INTRODUCTION**

The present study has been carried out in order to determine the preservation capacity of **EXTRACTO DE ESPECIAS/65-S** with cooked ham. For that purpose two lots of extra lean cooked ham have been made (A and B) with a 20 percent injection and a wastage of  $5.7 \pm 0.2$  percent. To the lot **A**, **EXTRACTO DE ESPECIAS/65-S** was added in a dose of 2 ‰ (per thousand).

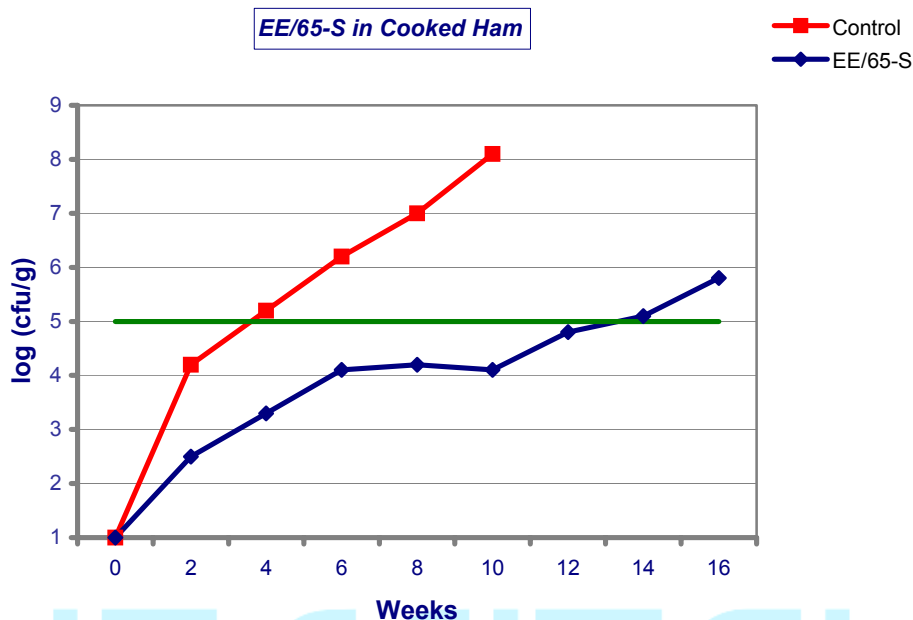
### **MATERIAL AND METHODS**

- **EXTRACTO DE ESPECIAS/65-S.**
- COOKED HAM: Extra lean cooked ham with wastage and a 20 percent injection
- **EXTRACTO DE ESPECIAS/65-S** dosage:
  - Lot A is injected with brine containing 1.2 percent of **EXTRACTO DE ESPECIAS/65-S.**
  - Lot B is the control sample to which it is not added any preservative.
- Storage conditions: 2-4° C.
- Microbiological analysis: Every 15 days, for a 16-week period, an aliquot of the tests with **EE/65-S** (lot A) and an aliquot of the control sample, stored at  $\pm 4^{\circ}\text{C}$ , are analyzed. In those analyses the total mesophile microbiota is quantitatively measured by gram of product.

### **RESULTS**

They are expressed as log of CFU/g

<i>Lots</i> \ <i>Weeks</i>	0	2	4	6	8	10	12	14	16
<b>EE/65-S (A)</b>	< 1	2.5	3.3	4.1	4.2	4.1	4.8	5.1	5.8
<b>Control (B)</b>	< 1	4.2	5.2	6.2	7.0	8.1	-	-	-



**COMMENTS AND CONCLUSIONS**

It should be considered that contamination levels higher than  $1 \times 10^5$  surpass the limits **recommended** by CENAN.

Considering the above-mentioned value as the one that establishes the preservation time, we have that:

LOT	USEFUL COMMERCIAL SHELF LIFE
EE/65-S (A)	13-14 Weeks
Control (B)	2-4 Weeks

**EXTRACTO DE ESPECIAS/65-S** is very effective with cooked shoulders and hams with wastage, slowing down the growth of the microbial flora.

Hams preserved with **EXTRACTO DE ESPECIAS/65-S** did not show significant organoleptic differences as compared to the control sample.



## **CONCLUSION**

The tests presented in this report prove the **EXTRACTO DE ESPECIAS/65-S** preservation capacity.

In addition to the applications presented in this study, **EXTRACTO DE ESPECIAS/65-S** can be used with other heat-treated meat products, as well as with any other processed meat product, which needs preservation during its elaboration process.

**EXTRACTO DE ESPECIAS/65-S** is especially effective to prolong the average lifetime of any meat product by slowing down the development of the microorganisms which may alter it.

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