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Authors INRA: Régine TALON, Sabine LEROY, Jean Paul CHACORNAC

Authors CIRAD: Thierry GOLI

Authors UCAD: Nicolas AYEISSOU, Coumba KANE, Mariama DIATTA

Authors ADIV : Valérie SCISLOWSKI , Olivier RIPAL

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Abstract

The goal of this work consists in adapting local products from Kong to the expectations, tastes and regulatory requirements of European markets. To meet the European markets requirements, different strategies can be applied, one consists to improve the storage and the shelf life by different packaging (under vacuum, in controlled atmosphere...) and by adding starter culture for biopreservation of Kong.

Biopreservation tests have been carried out by inoculation with *Lactobacillus plantarum* commercial starter cultures. No shelf life extension has been observed when the smoked fishes were stored in paper films at 30°C (traditional way) whereas it has been extended from 8 to 14 days when stored at 4°C under vacuum.

1. Introduction

The goal of this work consists in adapting local products from Kong to the expectations, tastes and regulatory requirements of European markets. To meet the European markets requirements:

- moderate smoking has to be done to avoid high levels of HAP which are toxics,
- shelf life has to be increased by different packaging (under vacuum, in controlled atmosphere..) and by adding starter culture for biopreservation of kong.

In deliverables 3.2.2.3 and 3.3.3, collections of technological bacteria haven't been done for Kong as the level of technological bacteria was low. Even if the technological bacteria were not dominant in these products, the biopreservation by adding cultures together with packaging have been tested to check if the shelf life could be improved. In this case, a strain of *L. plantarum* has been tested.

In this deliverable (D3.3.2), we report only results concerning the impact of starter culture for biopreservation. The impact of other factors (smoking, curing brine...) on physico-chemical and nutritional characteristics and toxicological indicators will be reported in the deliverable D3.3.4.

2. Samples analysis: methodology

Smoked Kong was manufactured by CIRAD according to the flow diagram Figure 1, established by UCAD (Dakar). More details will be given in Deliverable 3.3.4. For the adaptation to the European market, one of the strategies was based on the addition of starter culture *L. plantarum* to improve the storage and shelf life of the products.

The fishes (*Arius heudelotii*, IQF, imported from Senegal) were purchased from a French importer (Seablue; Marseille, France). The average weight of the fishes was 700g, ranging from 400g to 1kg/piece.

The biopreservation treatment was implemented by spraying a commercial culture suspension of *L. plantarum* on the surface of the smoked Kong. The starter culture suspension was activated by a 4 hours incubation at 37°C before spraying, which corresponds to about 10⁵-10⁶ UFC sprayed by cm² of smoked fish. The bacterial suspension was sprayed on the fishes after the smoking and cooling steps, to avoid its destruction by heat. A control batch was produced by storing kong smoked and cooled before the spraying step. After biopreservation or control treatment, the products were stored under two different conditions: (i) under paper bag, at 30°C (= traditional storage) or (ii) in plastic bags (PA/PE 90 µm) under vacuum at 4°C (+/- 2°C).

For each of the 4 experimental samples (control or biopreserved x 30°C or 4°C), at each day of assessment, 3 fishes were assessed for odour and aspect. In the particular case of vacuum packed fishes, one bag only was opened and destroyed at each assessment time for odour testing (control and biopreserved).

The shelf life of biopreserved products was assessed only on the basis of sensory analysis along a storage period of 14 days. 5 panelists had to score the fishes as acceptable (A) or not

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acceptable (NA) using a 5 to 10 points scoring scale taking into consideration the odour and presence of visible moulds on the surface of the fishes.

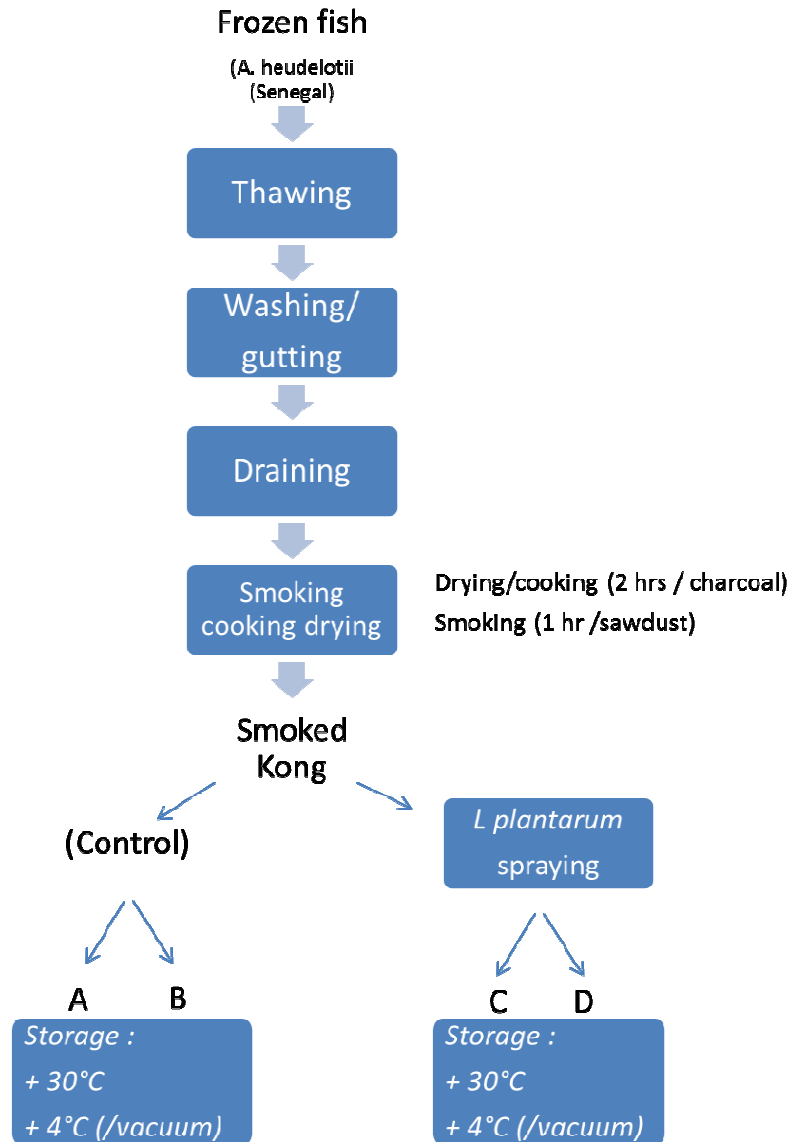


Figure 1: Process Flow diagram for Kong

3. Results and discussion

The results summarized on table 1 show that:

- Stored at +30°C, a shelf life between 3 and 5 days is reached with overall acceptable quality. No significant difference with the control is observed.

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- Stored at +4°C under vacuum, a shelf life between 11 and 14 days is reached with overall acceptable quality for the biopreserved kong, whereas it is about 8 days for the control.

Fish #	+30°C						+4°C (Vac.)					
	Control(A)			Biopreserved(C)			Control(B)			Biopreserved(D)		
	1	2	3	1	2	3	1	2	3	1	2	3
Do	A	A	A	A	A	A	A	A	A	A	A	A
D3	A	A	A	A	A	A	A	A	A	A	A	A
D5	NA	NA	A	A	NA	NA	A	A	A	A	A	A
D8	-	-	NA	NA	-	-	A	A	A	A	A	A
D11	-	-	-	-	-	-	NA	NA	NA	A	A	A
D14	-	-	-	-	-	-	-	-	-	A	A	NA

Table 1: shelf life of biopreserved kong at +4 and +30°C, assessed from odour and aspect. (A= acceptable, NA = non acceptable, Do to D14 = day of smoking to Do + 14 days, n = 3 for each sample)

4. Conclusion

We assume that a biopreservation treatment opens up serious perspectives for kong shelf life along a cold chain, adding a few days necessary for meeting market requirements. However, these preliminary experiments should be confirmed and completed by (i) testing various starter cultures and (ii) taking into account microbiological criteria, these experiments making sense if implemented locally in Senegal.