FTER
CONGRÈS
11 & 12 novembre 2014

Effect of some preservation agents and method of packaging on the stability of Lanhouin during storage

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Sun drier used (Type of shell of GERES/GRET)

Lanhouin is a traditional condiment produced from various types of fish in West Africa countries. It is used to enhance the flavour and the taste of many dishes including soups and sauces. But one of the most important inconveniences related with Lanhouin production is that bacterial and enzymatic activities become major during ripening step and continue within the final product during storage, leading to an unsteady final product. To surmount this problem, the ripening was done in brine and the final product was treated with mixture of lemon juice and garlic extract for preservation during storage.

Objectives

- To use the ripening in brine of fish fillet in order to prevent the increase of level of histamine in ripened fillet fish
- To extend the shelf life of Lanhouin using lemon juice and garlic extract as preservative agents

Methodology

Lanhouin was manufactured according to the flow diagram (Fig1) below. Then, the fermented fillets (Lanhouin fillet) were divided into two portions:

✓ Portion P1 samples immersed for 5 min in mixed solution of lemon juice (8% v/m) and garlic extract (8% m/m)

✓ Portion P2: untreated samples used as control

stored at 4°C in a refrigerator and at ambient temperature (30 ± 2°C)

The two portions were sun dried for 18 hours and packaged under or with vacuum in a plastic bag (Type Walovac 90 B) before stored at 4°C in a refrigerator and at ambient temperature (30 ± 2°C).

For the determination of the shelf life, the Lanhouin fillets samples were taken at 0, 60 and 90 days of storage for the microbiological and physico-chemical analyses which were investigated using standard methods (ISO-4833, 2003; Anihouvi *et al.*, 2006).

Lanhouin fillet samples were also evaluated for odour, texture and overall acceptability using a 9 points verbal hedonic box scale which varied from 'extremely dislike' to 'extremely like'(Kindossi *et al.*, 2013).

Results

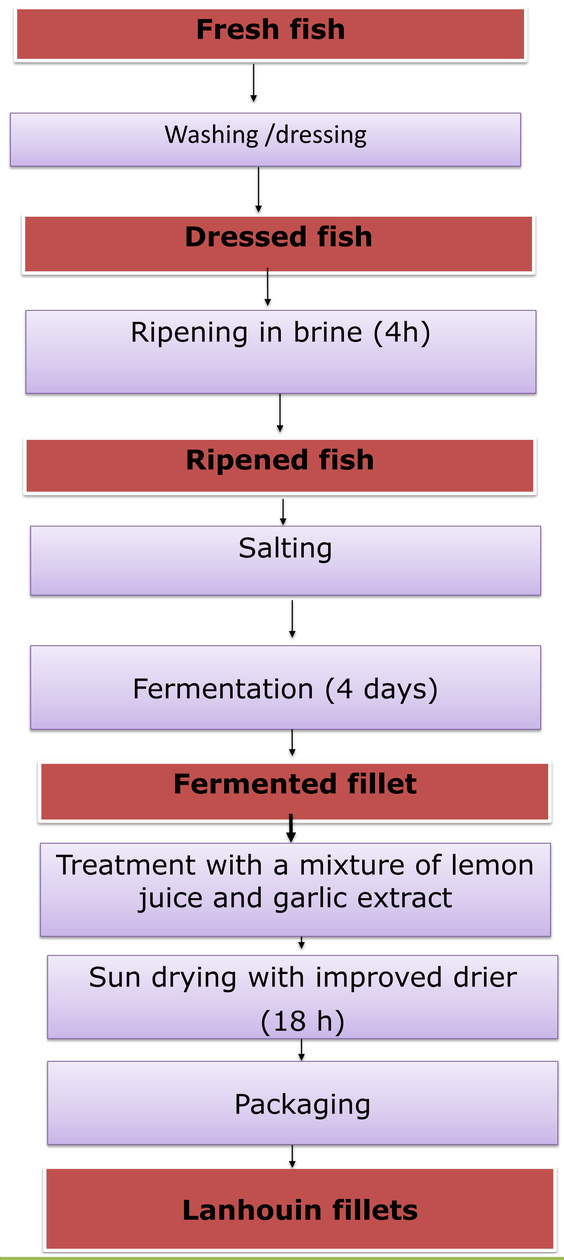

Fig1. Flow diagram of Lanhouin

All the samples showed a decreasing trend in microbial population as storage period progressed (Figure 2). The Lanhouin fillet samples (p1) treated with lemon juice and garlic extract mixture, and stored at 4°C had the lowest TVC loads followed by the ones stored at 30°C.

The water activity (a_w) values of treated Lanhouin fillet samples (P1) stored at 4°C was significantly lower ($p < 0.05$) than those of treated Lanhouin samples stored at 30°C. This could confirm that effect of temperature was significant on water activity of Lanhouin fillet samples. In addition, the a_w of treated Lanhouin fillet samples (P1) was significantly ($p < 0.05$) lower than those of untreated Lanhouin fillet samples (P2) whatever the storage conditions.

The pH values of stored Lanhouin fillets were statistically different ($p < 0.05$) and increased gradually with storage period (Figure 2). The Lanhouin fillet samples treated with the mixture of lemon juice and garlic extract and stored at 4°C had the lowest pH because of the presence of citric acid contained in the lemon juice.

The treated Lanhouin fillet samples stored at 30°C and the untreated ones stored at 4°C showed an increasing trend in TVN with storage period. But the TVN values of treated Lanhouin fillet samples stored at 4°C were stable during all the storage period. This means that the effect of preservative agents used and the effect of temperature were significant ($p < 0.05$) on TVN contents of treated Lanhouin fillet samples.

Sensory evaluation of Lanhouin fillet samples according to the treatment and the storage period showed that (Table 1), the average scores of treated Lanhouin fillet samples (P1) stored at 30°C and 4°C during 60 and 90 days were significantly higher ($p < 0.05$) than those of untreated Lanhouin fillet samples (P2) stored in the same conditions and storage period.

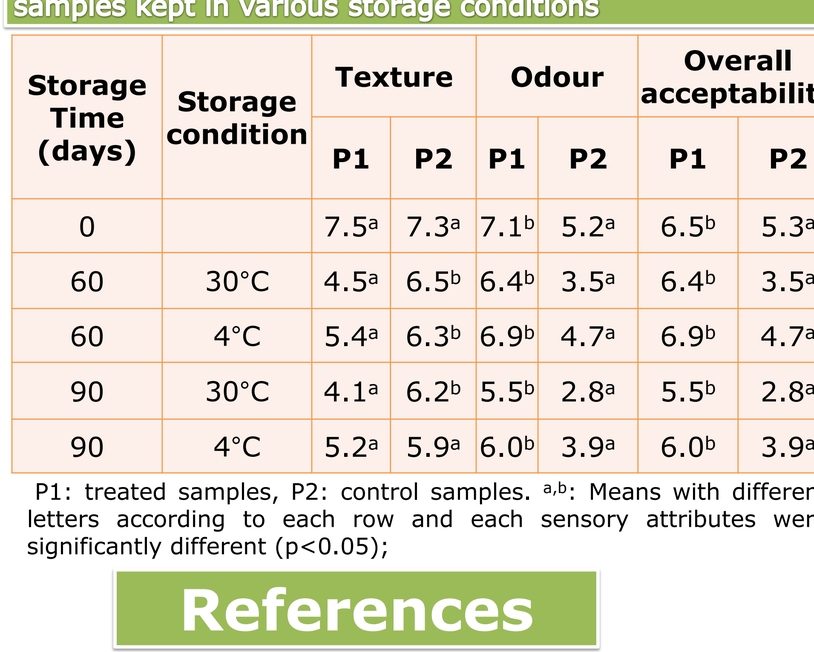

Fig2. Changes in TVC, water activity, pH and TVN of Lanhouin fillet samples during storage

TVC : total viable counts , TVN : total volatile nitrogen , P1: treated samples, P2: control

Lanhouin fillet packaged

Lanhouin fillet packaged under vacuum

Table 1. Score of sensory evaluation test of Lanhouin fillet samples kept in various storage conditions

Storage Time (days)	Storage condition	Texture		Odour		Overall acceptability	
		P1	P2	P1	P2	P1	P2
0		7.5^a	7.3^a	7.1^b	5.2^a	6.5^b	5.3^a
60	30°C	4.5^a	6.5^b	6.4^b	3.5^a	6.4^b	3.5^a
60	4°C	5.4^a	6.3^b	6.9^b	4.7^a	6.9^b	4.7^a
90	30°C	4.1^a	6.2^b	5.5^b	2.8^a	5.5^b	2.8^a
90	4°C	5.2^a	5.9^a	6.0^b	3.9^a	6.0^b	3.9^a

P1: treated samples, P2: control samples. ^{a,b}: Means with different letters according to each row and each sensory attributes were significantly different ($p<0.05$);

Conclusion

- The treatment of Lanhouin fillet with a mixture of lemon juice and garlic extract, followed by a packaging in plastic bag and storage at 4°C have significant effect on the microbiological and physico-chemical stability of the product.
- For the sensory evaluation, it appears that, the overall acceptability scores of the treated Lanhouin fillet samples kept at 4°C remain constant during all the storage period.
- In practice, the biological agents are available and more affordable in Africa countries.

References

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« The research leading to these results has received funding from the European Union's Seventh Framework Programme for research, technological development and demonstration under grant agreement n°245-025 - AFTER - www.after-fp7.eu »