Influence of location, fish species and presence of pesticides on the bacterial quality of dried and smoked fishes, consumed in the northern part of Cameroon

Justine Maiwore, Leopold Tatsadieug Ngoune, Mahi Koumba Koné, Didier Montet, Noël Durand
Department of Life and Earth Sciences, Higher Teachers Training College, University of Maroua P. O. Box 55, Maroua, Cameroon
UMR 95 QualiSud/Cirad of Montpellier, TA B-95 /16, 73 rue J-F Breton, 34398 Montpellier cedex 5, France

Introduction

- About 25% of fish are lost due to a lack of effective means of conservation and processing in the sub-Saharan Africa
- The northern part of Cameroon 75% of the catches are smoked or dried
- Processed fish, usually packaged in recovery bags are stored in uncontrolled environment infested by insects, rodents and even microbes.
- Some processors and traders use toxic pesticides like dieldrin, to extend the shelf life of the products

Purpose: identification of the bacterial flora, evaluate the effect of treatment, fish species on the bacterial profile and determine pesticide residues on some samples

Method
- Dry and smoked fish collected in 8 towns of the northern part of Cameroon
- Identification of fish species
- DNA extraction with phenol/chloroform/isoamyl alcohol mixture
- amplification of the V3 variable region of bacterial 16S rDNA using a couple of primers GC338f and 518r
- Electrophoresis using the Polyacrylamide gels (8% w/v, Acrylamide/Bisacrylamide 37.5/1 of 0.8 mm thickness) were prepared using 30-60% Urea-formamide denaturing gradients
- Sequencing by GATC Biotech (Germany)
- For pesticides analysis, the solid/cold liquid extraction followed by the dispersive SPE purification Gas chromatography-mass spectrometry (GC-MS) was used

Results

- 25 species identified and grouped into 15 families: Alestiidae; Arapaimidae; Bagridae; Centropomidae; Characidae; Cichlidae; Citharinidae; Claridae; Claroteidae; Cyprinidae; Gymnarchidae; Mochokidae; Mormyridae; Protopтерidae; Schilbeidae
- 53% of the fish were smoked while 47% were dried.
- 32 species of bacteria identified and grouped into 20 genera: Vagococcus, Kurthia, Bacillus, Planococccaceae, Lactobacillus, Peptostreptococcus, Macroccocus, Saviga, Myroides, Enterococcus, Streptococcus, Acetobacter, Staphylococcus, Lysinibacillus, Acinetobacter, Tissierella, Gemmatimonas, Vibrio, Paraclostidium, Classtridium.
- The diversity of bacteria species in dried fish was higher than in smoked fish.
- Amongst the 11 fish samples analyzed, pesticides were detected in 7 samples (mostly the dried ones).
- Cypermethrin ($\alpha + \beta + \theta + \iota$), with a concentration ranging from 15 to 3600$\mu$g/kg; Chlorpyrifos with a concentration ranging from 19 to 8800 $\mu$g/kg (PBB2) and Profenophos with a concentration ranging from 62 to 92 $\mu$g/kg.

Conclusion

- Whatever the specie or the technological treatment of fish, the geographical origin influences the bacterial profile of fish.
- Processors and sellers should be trained on good hygiene and handling practices in order to produce a safe products.

Acknowledgments: This study was supported by The SCAC Fellowship of the French embassy in Cameroon.