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

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Introduction

- **About 25% of fish are lost due to a lack of effective means of conservation and processing.in 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 determin pesticide residues on some samples

Method

- Dry and smoked fish collected in 8 towns of the northern part of Cameroun
- 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
- Electrophorese using The Polyacrlamide 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

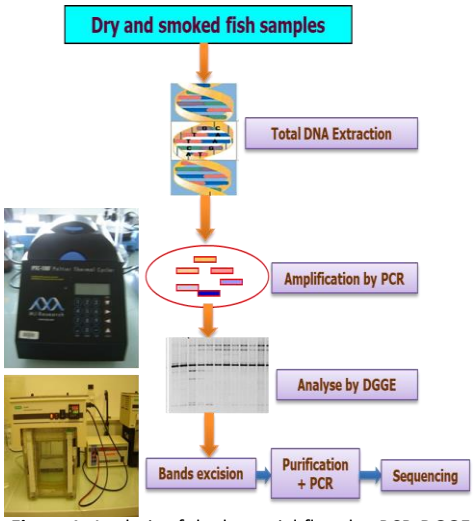

Figure 1: Analysis of the bacterial flora by PCR-DGGE

Results

- 25 species identified and grouped into 15 families:: Alestiidae; Arapaimidae; Bagridae; Centropomidae; Characidae; Cichlidae; Citharinidae; Clariidae; Claroteidae; Cyprinidae; Gymnarchidae; Mochokidae; Mormyridae; Protopteridae; Schilbeidae
- 53% of the fish were smoked while 47% were dried.
- 32 species of bacteria identified and grouped into 20 genera): *Vagococcus, Kurthia, Bacillus, Planococcaceae, Lactobacillus, Peptostreptococcus, Macrococcus, Savagea, Myroides, Enterococcus, Streptococcus, Acetobacter, Staphylococcus, Lysinibacillus, Acinetobacter, Tissierella, Gemmatimonas, Vibrio, Paraclostridium, Clostridium.*
- 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 (α + β + θ + ζ), with a concentration ranging from 15 to 3600µg/kg; Chlorpyrifos with a concentration ranging from 19 to 8800 µg/kg (PBB2) and Profenophos with a concentration ranging from 62 to 92 µg/kg .

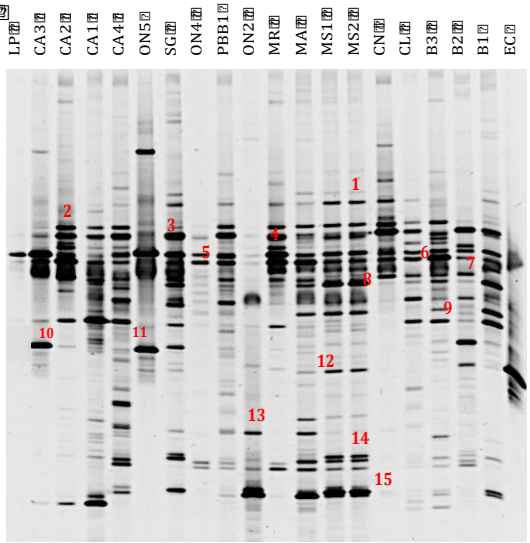

Figure 2: Influence of the specie and origin on the PCR-DGGE profile of smoked and dried fish

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.

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