Diversity of staphylococcal species in pork and beef Kitoza

A. RATSIMBA[1], D. RAKOTO[1], V. JEANNODA[1], E. ARNAUD[2], G. LOISEAU[3], J. P. CHACORNAC[4], S. LEROY[4], R. TALON[4]

[1] UT, University of Tananarive, Madagascar, [2] UMR QualiSud, CIRAD, Department PERSYST, Montpellier, France
[3]UMR QualiSud Montpellier SupAgro, France; [4] INRA - UR454 Microbiologie, Saint-Genès Champanelle, France

Introduction

Kitoza is a traditional product from Madagascar manufactured either with strips of pork or beef meat. It is an artisanal product manufactured in rural and urban regions. The first step of the process is salting with coarse salt mixed with spices and then either a drying or smoking step is carried out. The microbiological analyses of these products revealed the presence of bacteria with potential technological interest. Among them, a high level of presumed coagulase negative staphylococci (CNS) was found (5 to 7 log CFU/g). These bacteria seemed well adapted to the two processes drying or smoking.

The aim of this work was to identify the CNS species in Kitoza manufactured according the two processes: drying or smoking from pork or beef meat. This accurate identification represented the first step for the potential development of specific starters for Kitoza.

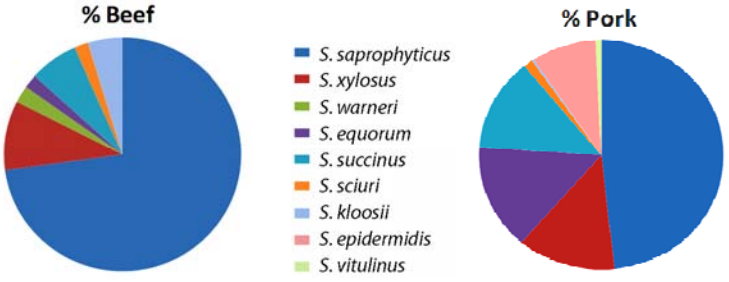
Methodology

Samples from pork or beef and drying or smoking processes representative of the diversity of the products have been analysed. From these samples, 811 isolates of presumed CNS were isolated from Mannitol Salt agar.

For the identification two approaches have been applied. First the isolates were identified by PCR multiplex which allowed identifying the isolates belonging to the *Staphylococcus* genus and the three species *S. epidermidis*, *S. saprophyticus* and *S. xylosus* (Corbière Morot-Bizot et al. 2004 J. Appl. Microbiol. 97: 1087).

Secondly the isolates were identified by a "staph array" targeting *sod* gene for the identification of 36 CNS species potentially found in food from animal origin (Giammarinaro et al. 2005 J. Clin. Microbiol. 43: 3673).

Inventory of the species in beef and pork Kitoza

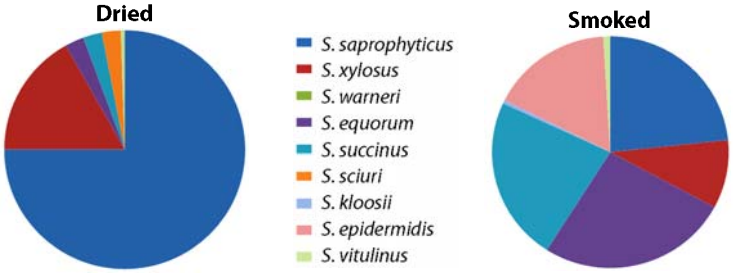


All the 811 isolates belonged to the *Staphylococcus* genus. We have compared the diversity of CNS species in beef and pork Kitoza. Seven species were identified in beef products and 8 species were identified in pork products. The *S. epidermidis* and *S. vitulinus* species were absent in beef products while *S. warneri* was absent in pork products.

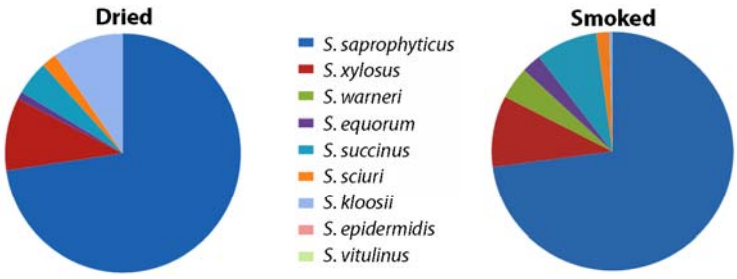
S. *saprophyticus* represented the dominant species in both products. But it was the dominant species (76%) in beef while it represented half of the staphylococcal population (48%) in pork products. The other 50% of the population in pork were shared between *S. xylosus* (13%), *S. equorum* (15%), *S. succinus* (13%) and *S. epidermidis* (9%).

Impact of the process on the CNS species in pork Kitoza

406 *Staphylococcus* isolates were identified from the pork Kitoza with 210 from smoked and 196 from dried products. The comparison between the dried and smoked samples revealed that *S. kloosii* and *S. epidermidis* were absent in the dried samples while *S. sciuri* was not found in the smoked ones. *S. saprophyticus* represented the major species (75%) with *S. xylosus* the second one (17%) in the dried products. In the smoked products, 5 species (*S. saprophyticus, S. xylosus* , *S. equorum*, *S. succinus*, *S. epidermidis*) with almost similar population were identified.



Impact of the process on the CNS species in beef Kitosa



405 *Staphylococcus* isolates were identified from the beef Kitoza with 211 from smoked and 194 from dried products. The comparison of the dried and smoked samples revealed that *S. saprophyticus* was dominant in both processes: 73% and 79 % for dried and smoked beef, respectively. *S. xylosus* represented 10% of the CNS population in the two processes. But while *S. kloosii* represented 10% of the population in the dried beef, it was minor in the smoked beef. It was the opposite for *S. sciuri* and *S. vitulinus* higher in the smoked than in the dried samples. Furthermore, *S. warneri* was only detected in the smoked beef samples.

Acknowledgement

This work was funded by EU, AFTER project (grant agreement 245025)
Coordinated by D. Pallet (CIRAD), UMR Qualisud, Montpellier, France