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Quality evaluation of Cassava chips (abacha) produced from two local bitter varieties (Agbaoji TMS 3055) and (Nwaocha *Esuclenta dulcis*)

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The quality of cassava chips (Abacha) produced from two local bitter cassava varieties TMS 3055 and Nwaocha were evaluated for proximate, microbiological and sensory properties. Mean results of the proximate composition of the two cassava varieties revealed higher nutritional content in all the parameters of the new improved cassava TMS 3055 more than the other Nwaocha. However, the microbiological analysis result ranged from 7.0 x 10^2 – 7 x 5 x 10^3 bacterial count for wet cassava chip and 0.0 x 10^2 – 1.0 x 10^3 for dried cassava chips. Fungi count ranged from 6.25 x 10^2 – 7.45 x 10^3 for wet chips and 0.0 x 10^2 – 1.0 x 10^3 for dried chips. Furthermore, sensory analysis of the chips (wet basis and dry basis) showed significant difference (P>0.05) on the taste only while there was no significant difference (P<0.05) the texture, colour and general acceptability among the cassava chips. TMS 3055 Nwaocha cassava variety showed higher nutritive value with less hydrogencyanide after chip production. Microbiologically, both varieties showed less growth of organisms because of chip drying, however significant differences (p>0.05) existed in taste of the 2 varieties but no significant difference (p<0.05) in texture and general acceptability of the chips. TMS 3055 has been recommended for chips and other dry products like garri, flour because of its high nutrient content and low cyanide content than local nwaocha.

Keywords: Agbaoji TMS 3055, Nwaocha *Esculenta dulcis*, Cassava chips, Microbiological analysis, sensory analysis.

Relating microbiological and physicochemical patterns of a traditional Portuguese fermented sausage along processing

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'*Linguiça*' is a Portuguese ready-to-eat traditional dry-fermented sausage manufactured by small production units following spontaneous fermentation. In two regional industries, systematic samplings of *linguiça* at five stages along processing were carried out in order to investigate the particularities of the manufacturing technology that explain the different levels of *Enterobacteriaceae*, *S. aureus* and *L. monocytogenes* in the product from batch to batch. In addition, physicochemical analyses of the product were conducted: pH, water activity (Aw), sodium nitrite, sodium chloride and polyphosphate (P_2O_5) concentrations. Statistical analyses were applied to such complete longitudinal microbial and physicochemical data in order to elucidate main contamination sources, critical production stages and risk factors leading to the growth/survival of *Enterobacteriaceae* and the tested pathogens in final products.

The mixing stage can be deemed as a critical point as *Enterobacteriaceae*, *S. aureus* and *L. monocytogenes* increased significantly until the end of this stage in the batches from Factory II, which raised concerns in relation to their good hygiene practices and equipment sanitisation. Analyses of sausages from Factory II, formulated with nitrite and polyphosphates to meet the maximum legal limits (150 ppm and 5000 ppm, respectively), proved that their fermentation process was not optimal. The delayed fermentation, and higher pH level, was partly responsible for the increase in *Enterobacteriaceae* and pathogens' counts during maceration. The better acidification process of sausages, attained in factory I, led to lower counts of *S. aureus* (2.6 log CFU/g, SD=0.22) and *L. monocytogenes* (10 CFU/g, SD=6.3) in the finished products. Nitrite had a strong effect (p<0.01) on reducing *Enterobacteriaceae* throughout smoking and maceration, and contributed also to the control of *L. monocytogenes* (p=0.061). *S. aureus* was not affected by nitrite, as suggested by their significant increase in numbers during smoking and ripening (up to 3.4 log CFU/g) in the nitrite-formulated sausages. *S. aureus* growth arouse due to improper fermentation (Factory II) that kept the fermenting meats above pH 5.3 for too long time. In Factory II, although *L. monocytogenes* cells entered the chain at the point of mixing, most likely through contaminated environments, the pathogen became steadily inactivated throughout smoking and ripening, despite the delayed fermentation. Likewise, *Enterobacteriaceae* counts decrease in both nitrite-free and nitrite-formulated sausages during ripening, mainly because of sausage dehydration (moisture 46.5%, SD=1.25) and low pH (5.4, SD=0.05).

The main hurdle hindering the development of *S. aureus* is the pH, and so a rapid pH drop in the sausages is needed early in fermentation. Other factors contributing to the control of *S. aureus*, as determined from our data, are ranked as: longer ripening days (if sausage pH below 5.3) (r=0.877), low *S. aureus* in casings (r=0.66), low *S. aureus* in raw meat (r=0.65) and shorter smoking period (r=0.59). In the case of *L. monocytogenes*, at least three hurdles (tested in this study) prevented its viability: low Aw (p=0.004), low pH (p=0.040), nitrites (p=0.061). Ranked factors that contribute to controlling *L. monocytogene*s are: longer ripening and smoking periods (p=0.072), washed casings (p=0.099) and use of nitrite (p=0.179).

Keywords: *Enterobacteriaceae*; *L. monocytogenes*; *S. aureus*; *linguiça*; dry-cured

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