

## COMMERCIAL AND MICROBIOLOGICAL QUALITIES OF FROZEN RABBIT CARCASSES IN BENIN

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### ABSTRACT

A survey of the commercial and microbiological qualities of rabbit frozen carcasses was undertaken in Benin in order to contribute to the improvement of the conditions of slaughtering and distribution of the rabbits. The survey showed that the transformation and the marketing of the rabbit meat do not generally respect the norms. From the survey of the commercial quality, it came out that the carcasses are presented traditionally and escorted to the stockists in jute bags.

The microbiological analyses done on 30 samples of carcasses revealed that: 100% are contaminated by the Total Mesophile Aerobic Flora (TMAF); 93.33% are contaminated by the Thermotolerant Coliformes; 26% are contaminated by the Presumed Pathogenic Staphylococci (PPS); 3.33% are contaminated by the Anaerobic Sulfito-Reducing (ASR); no sample revealed the presence of *Salmonella*.

In relation to the norms, 83.3% of the samples analyzed were conform whereas 16.7% were not conform. The quasi-totality of the samples analyzed were contaminated by the TMAF and the Thermotolerant Coliformes. Thus the conditions of hygiene were deficient during the technology of slaughtering. The construction of modern slaughtering areas, the refrigerators' purchase for the transportation of the carcasses, and the maintenance of a cold weather chain in the stations of sale would permit to reduce the bacteriological contamination and to improve the commercial quality of rabbit carcasses in Benin.

**Key words:** Rabbit, Commercial quality, Microbiological quality, Frozen carcasses, Benin.

### INTRODUCTION

In Benin, the consumption of animal proteins is estimated to 8 kg/habitant/year and remains inferior to the admitted norm that is 12 kg/habitant/year. The research of a lasting solution in order to assure self-sufficiency in animal proteins has induced Benin to promote the breeding of short cycle and prolific animal species. Among these species, the rabbit (*Oryctolagus cuniculus*) occupies a place of choice. The rabbit breeding is in full expansion in Benin. The yearly production of rabbit carcasses by the members of the Beninese Rabbit Breeders Association (Association Béninoise des Cuniculteurs, ABeC) is estimated to 400 tons in 2005 (Thoto, 2006).

Thanks to the creation of the Centre Cunicole de Recherche et d'Information (CECURI) in December 1987, many efforts have been initiated to professionalize the rabbit production in Benin. Rabbit breeding in Benin, is practiced currently in all part of the country. Rabbit meat entered nowadays in the eating habits of the Beninese (Fagbohoun, 2006). The demand for rabbit meat becomes more and more important, especially in the big agglomerations. So, in Cotonou several stockists are counted. The carcasses are often distributed frozen. Rabbit meat characteristic added to the psychosis created by the advent of the Avian Influenza in the world and especially in Africa (Benin, Nigeria, Burkina, Côte-d'Ivoire, Ghana, Togo), dragged a very important demand of this meat. Therefore Beninese population prefers to consume rabbit meat to the detriment of chicken meat. Nevertheless, the norms

of transformation and distribution of rabbit carcasses in Benin are not often respected: there is not a modern slaughterhouse and the sanitary inspection is not always achieved. These observations bring us to interrogate on the possibility to get a quality meat so much hygienic that commercial in a little adapted infrastructural and organizational environment.

The purpose of this survey is to contribute to the improvement of the conditions of slaughtering and marketing of the frozen carcasses of rabbit in Benin.

## **MATERIALS AND METHODS**

### **Materials included**

- rabbit frozen carcasses;
- culture medium (PCA, BLBVB, PB, TSN);
- test tubes.

### **Study of the commercial quality**

It consists in the appreciation of the

- slaughtering technology;
- presentation of the rabbit carcasses;
- the distribution conditions of these carcasses.

### **Microbiological analyses**

These analyses were carried out from a sample of thirty (30) carcasses. For each analysis, a unit of 25 g has been constituted aseptically from a small quantity of meat taken of the whole carcass. The searched floras and the normative references used are:

- Total Mesophile Aerobic Flora (TMAF): norm ISO 4833
- Total Coliformes: norm ISO 4831
- Thermotolerant and Fecal Coliformes: norm ISO 6380
- Sulfite - Reducing Anaerobic (SRA): norm ISO 7937
- Presumed Pathogenic Staphylococci (PPS): norm ISO 6888
- Salmonella: norm ISO 6579.

### **Statistical analysis of the results**

The observations made during the survey of the commercial quality have been the object of a descriptive analysis. The microbiological analyses results have been registered on the Excel calculator and transferred on the software Statistical Package heart Social Sciences (SPSS) for the averages calculation.

## **RESULTS AND DISCUSSION**

### **Survey of the commercial quality**

The rabbit slaughtering was done directly in the farms without a slaughterhouse exclusively reserved to this action. The different phases of slaughtering are: bleeding by cutting of the throat, remains and evisceration. After evisceration, the rabbit carcasses are folded for the conditioning. These slaughtering take place little in satisfactory conditions of hygiene. Besides, these carcasses are not object of veterinary inspection. The carcasses produced in Benin are conditioned in transparent plastic bags and are escorted in jute bags toward the stockists, with no respect of a cold weather chain.

Slaughtering takes place within the farms, with no respect of the hygiene rules. Sakho (1988) makes the same observations in Senegal while underlining that the respect of the sanitary hygiene is often relegated to the second plan, because the breeders think that the medical prophylaxis is the only valid prevention method. Some steps of the slaughtering technology as the sanitary inspection and healthiness as well as the refrigeration of the carcasses are not respected. The conditioning is not often hygienic. These facts can be prejudicial to the carcasses quality as indicated by Ouhayoun (1990). According to this author, the meat value output, aspect of the carcass, hygienic and organoleptic quality of meat can be affected in case of failings at the first transformation.

The red colour of the carcasses is often due to the incomplete bleeding. In Benin the slaughtering by cutting of throat is the most widespread method. According to Vorob'ev and Stankovskii (1979), the decapitation permits a fast and more complete bleeding and provides a more lucid meat.

### Microbiological analyses

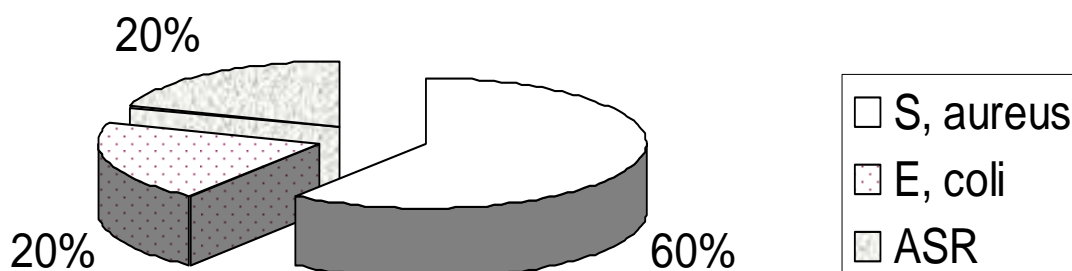
#### *Global appreciation*

The microbiological analyses showed that:

- 100% of the samples were contaminated by the TMAF. The level of contamination varies from 100 to  $1.1 \times 10^6$  Colony Forming Unit (CFU)/g;
- 26% of the samples were contaminated by the SPP. The maximal contamination level is  $1.1 \times 10^3$  CFU/g. The general average of contamination registered is  $4.7 \times 10^2$  CFU/g;
- the indicatory flora of faecal pollution (coliformes) was found in 96.66% of the samples. It oscillated between 0 and 1400 CFU/g;
- only one sample revealed a number uncountable in ASR, either 3.33%;
- no sample revealed the presence of Salmonella.

In another way, according to a plan of two classes (satisfactory when the value is lower or equal to the reference criteria, and non satisfactory when the value is superior to the criteria), 25 samples, either 83.33% of the studied samples were satisfactory whereas 5 samples, either 16.66% of the batch were non satisfactory. These percentages are similar to those related by Kane (2002) on thighs of frozen chickens imported to Senegal. This author indicates that 77.5% of the samples are satisfactory, 10% are acceptable and 12.5% are non satisfactory.

Among the 5 non satisfactory samples three were those for excess of SPP, one sample for the thermotolerant or fecal coliformes and another one for the spores of SRA. The relative proportion of nonconformity in relation to the different floras is given by the Figure 1.



**Figure 1:** Frequencies of nonconformity in relation to the floras

#### *Appreciation by class of contamination in relation to the searched floras*

In order to appreciate the healthiness of the analyzed samples, the registered results were distributed by class of contamination. For each class of contamination in order to really appreciate the microbiological quality of samples, the pertaining percentage of each flora have been calculated. The

table 1 shows the microbiological quality of the analyzed rabbit frozen carcasses and the relative percentages according to flora.

**Table 1:** Microbiological quality of the rabbit frozen carcasses

Germes	Percentage of the samples (%)	Microbiological quality
TMAF	76.66	Satisfactory
	23.33	Acceptable
	0	Unsatisfactory
Thermotolerant or Fecal Coliformes	96.55	Satisfactory
	3.44	Acceptable
	0	Unsatisfactory
PPS	62.5	Satisfactory
	37.5	Acceptable
	0	Unsatisfactory
ASR	96.66	Satisfactory
	0	Acceptable
	3.33	Unsatisfactory

## CONCLUSIONS

This study shows that the rabbits are in general slaughtered within farms. The carcasses are escorted largely in jute bags from the farms to the stockist without the respect of a cold weather chain. In spite of all failings observed at the time of the slaughtering rabbits and during the marketing of the carcasses, their microbiological qualities are satisfactory, since the potentially pathogenic germs are not practically isolated. However, in order to reduce the level of contamination, the construction of slaughtering areas and the refrigerators purchase must be considered.

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