MICROBIOLOGICAL COMPARISON OF THE ORAL AND PUMP METHODS OF INFLATING GOAT CARCASSES

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ABSTRACT

Two methods of inflating goat carcasses prior to dehairing - the oral and the mechanical pump - are compared for efficiency and microbial contamination. The mechanical pump method was found to be two times faster, to have less total bacterial load with no pathogenic organism as seen in the oral method.

INTRODUCTION

The goat population in Nigeria was 23,743,000 in 1987 out of which 2,308,885 were officially recorded slaughtered exclusive of sacrificial offerings. Goat is a major source of animal protein to the Nigerian populace (Clottey, 1985; FLD, 1988). The use of the animal skin after slaughter dictates the method used for removing the skin. The skin forms a very useful by-product of goat production in several countries and there is a significant export trade in skins from Nigeria, Morocco, etc. (Devendra and Burns, 1970).

In some communities in Nigeria, the skin forms part of the total edible meat derivable from the animal. Such societies do not skin their animals. Instead, the animal body is singed and scraped of the hair, then scrubbed with a sponge and water to remove residual char and hair. After this, they are close-shaved, rewashed and eviscerated (Clottey, 1985). Where skinning is practised, air is blown into the subcutaneous space. This is done either by mouth or mechanical pump method. Larger slaughter houses use compressors which blow a much larger quantity of air more easily and

affect a greater separation of the skin (French, 1970). Inflation was originally approved for the removal of the skin of calf so as to eliminate deleterious cutting (Gracey, 1981).

The meat of freshly slaughtered animals should be sterile if there is no infection (Clottey, 1985). However, during the process of inflating the subcutaneous space, the tissues may become contaminated. The consumption of contaminated meat may result in food poisoning which may take the form of food borne infection or intoxication (Gill *et al.*, 1979). The bacteriological load of meat should be examined qualitatively to evaluate the potential hazards and quantitatively to predict the shelf-life (Alonge, 1980).

This work was carried out to compare the speed and microbial status of oral and mechanical pump inflation methods of inflating goat carcasses for skinning.

MATERIALS AND METHOD

This work was carried out at Orita-Basorun slaughter slab in Ibadan, Nigeria. 60 goats for slaughter were divided into 2 groups - for mouth and mechanical pump inflation respectively.

Inflation

An incision was made above the coffin joint then a metal rod was used to create space subcutaneously. Inflation was made through this opening. Goats of an average 10kg were used for the work. Inflation was carried out until the goat was fully blown with all the limbs fully extended and turgid. The times taken for full inflation were recorded. A Honda (Honda, Japan) motorised air pump was used for the mechanical inflation.

Bacteriological tests

The template sampling method as described by Alonge (1982) was used. The area of point of incision within the inflation point was 1.56 cm². Sterile moistened cotton wool swabs were used to rub the point of inflation subcutaneously within the cut metal template removing as much bacterial colonies as possible. The cotton swabs were taken in screw-capped universal bottles containing 5ml 0.1% sterile peptone water to the laboratory. In the laboratory, each swab plus the 5ml peptone water was transferred into a sterile stomacher bag containing 25ml peptone-water. Using the Colworth Stomacher (A.J. Seward, U.K.) the swab was shaken for 1 minute. Serial dilutions were carried out and the samples were plated on plate count agar. Replicate plates were incubated at 37°C for 24 hours and colony forming units were counted and computed.

Bacterial identifications were carried out using procedures described by Cruickshank et al (1975) and Alonge (1982).

Statistical Analysis

The total bacterial counts were adjusted by the dilution factor and the surface area of the template. The results were statistically analysed using the student's t-test for the bacterial load. Results were classified as significantly different when $P < 0.05$ (Gore, 1952).

RESULT

The inflation efficiency of each method as related to time, the bacterial loads, and the bacterial species isolated are shown in the table 1

DISCUSSION

In Nigeria, majority of households use 'hot' meat because cooling or freezing facilities are uncommon. also, house wives prefer fresh morning meat in the market. Butchers therefore always rush to meet the morning market i.e. deliver their meat to the market as early as possible. Therefore dressing procedures in the abattoirs call for speed. Carcass inflation is one of the methods adopted to enable speedy dehairing of sheep and goats carcasses. Sources

of contamination at the point of incision and inflation would include the knife, the metal rod used to create space subcutaneously prior to slaughter, air from the human mouth and air from the mechanical pump.

From this work, it is clear that the mechanical inflation method is more efficient. Half of the time used by mouth is required using the pump. It is also more hygienic with less bacterial load ($P < 0.05$). While known pathogenic bacteria, *E. Coli* and *S. aureus* were isolated from the mouth in larger numbers, only one isolation of *E. Coli* was made from the mechanical pump method. The pump inflation methods has recently been introduced into dressing cattle.

REFERENCES

- ALONGE, D.O. (1980): Evaluation of two techniques for the enumeration of bacteria in Venison (Red Deer) meat. *Nigeria Journal of Science*, 14:331 - 340.
- ALONGE, D.O. (1982): Bacteria causing beef spoilage in a meat shop in Ibadan. *Nig. J. Microbiology* 2 (2):168-172.
- CLOTTEY, ST. JOHN (1985): Manual for the slaughter of small ruminants in developing countries. *FAO Animal Production Health Paper* 49, pp 19-20
- CRUICKSHANK, R.; J.P. DUGUID; B.P. MARMION and R.H.A. Swain (1975): *Medical Microbiology*. ELBS and Churchill, London (1975).
- DEVENDRA, C. and M. BURN (1970): *Goat Production in the Tropics*. Commonwealth Agricultural Bureaux Farnham Roayl Bricks, England pp 115.
- FEDERAL LIVESTOCK DEPT.: 1984 Annual Bulletin. Data Collection and Marketing Unit, Fed. Ministry of Agriculture, Lagos.
- FRENCH, M.N. (1970): Observation on the Goat. Food and Agriculture Organisation of the United Nations, Rome, pp 146- 153.
- GILL, C.O; K.G. NEWTON and P.M. NOTTINHAM, (1979): *Microbiology in the meat industry*. Meat Industry Research Institute of New Zealand Publ. No 695, pp 6-9.
- GORE, W.L. (1952): *Statistical Methods for Chemical Experimentation*. Interscience Publ. Inc. New York, pp 20-36.
- GRACEY, J.F. (1981): *Thornton's Meat Hygiene*. 7th Edition, Publisher: ELBS and Bailliere Tindall, London, pp 119.

Table 1 SUMMARY OF INFLATION EFFICIENCY, BACTERIAL LOAD AND TYPES.

Inflation efficiency (Av. wt. 10kg goat)	Mouth 113 Secs	Mechanical 57 Secs
Bacterial load (log cfu/cm ²)	10.4	9.9
Frequency of isolation:		
<u>Staphylococcus aureus</u>	13	-
<u>Escherichia coli</u>	6	1
<u>Klebsiella pneumoniae</u>	2	-