

Dept. of Food Hygiene,  
 Fac. of Vet. Medicine, Assiut University,  
 Head of Dept. Prof. Dr. H. Youssef.

## ASSESSMENT OF FUNGAL CONTAMINATION OF FRESH GOAT MUSCLES

(With 3 Tables)

By

**SH. M. FATHI and A.M. ABDEL-FATAH**

(Received at 12/4/1995)

إيجاد التقييم الفطري لعضلات الماعز الطازجة

شوكت فتحي ، أحمد مرتضى

تم إجراء البحث على عدد ١٥ عضله كامله من ذبائح الماعز الطازجه التى تم ذبحها خارج المجزر فى احدى قرى مركز أسيوط وتحت شروط غير صحيه. العضلات التى تم فحصها كانت خمس عضلات من كل من عضلات الكتف ، العضلات القطنيه تحت الظهرية ، عضلات الفخذ وذلك للوقوف على مدى التلوث الفطرى لذبائح الماعز الطازجه. حيث كان متوسط عدد الفطريات ٢٤٥٢ و ٤٤/جرام وكذلك متوسط عدد الخمائر ٢٤ x ٣١٠ ، ٣١٠ x ١٩ ، ٢٤ x ١٥ / جرام من عضلات الكتف ، العضلات القطنيه تحت الظهرية وعضلات الفخذ على التوالى. كما تم عزل وتصنيف فطر الاسبرجيليس فلافس ، الاسبرجيليس نيجر ، واليوكر والبسيليوم بنسب ١٤.٢٩% ، ٥٧.١٣% ، ٢٩.١٤% و ٢٩.١٤% على التوالى. كما تم مناقشة مصادر التلوث المختلفه والأهميه الصحيه لدراسة الفطريات فى عضلات الماعز الطازجه المذبوحه فى القرى خارج المجازر الحكوميه.

### SUMMARY

A total of 15 samples of goat muscles were collected from a village related to Assiut Governorate. The animals were slaughtered outside the slaughter houses under unhygienic conditions. The collected samples were 5 muscles of each shoulder, psoas and thigh and obtained from the same owner at different intervals to evaluate the mycological quality of goat carcasses as meat is retailed in small quantities from hung carcasses throughout the day and the carcass is exposed to ambient temperature, atmospheric and microbial load due to handling practices. The average mould count was 52, 24 and 44/g, while the average yeast count was  $24 \times 10^3$ ,  $19 \times 10^3$  and  $24 \times 10^2$ /g of the examined shoulder, psoas and thigh muscles, respectively. Also, the incidence of identified mould species isolated from examined goat muscles was *Asp. flavus* (14.29%), *Asp. niger* (57.13%), *Mucor* spp. (14.29%) and *penicillium* spp. (14.29%).

**Keywords:** Assessment of fungal contamination of fresh goat muscles.

## INTRODUCTION

Determination of the numbers and types of moulds and yeasts of the goat muscles are important from the standpoint of public health, for judging effectiveness of sanitary handling during slaughtering and dressing of goat particularly in rural places and for estimating quality characteristics including shelf-life.

From the meat hygiene point of view, the main sources of mould contamination of the fresh meat are air, water, soil, hands of attendants, utensils, skin and hides. However, the intestinal contents of slaughtered animals are considered as an important source of contamination of meat with mould during skinning, dressing, evisceration and preparation of the carcasses (EL-DALY *et al.*, 1988). The significance of such contamination is intensively discussed by many authors such as REFAI and LOOT (1969) who isolated 186 mould strains out of 96 examined goat meat samples. The isolated strains were identified as *Asp. niger* (52), *Asp. fumigatus* (2), *Asp. flavus* (2), *Penicillium* (21), *Mucor* (2), *Rhizopus* (1), *Cephalosporium* (2), *Scopulariopsis* (1), *pullularia* (11) and *Streptomyces* (2) strains.

VANDERZANT and NICKELSON (1969) examined the microbial flora of muscle tissue of beef, pork; and lamb carcasses. They found that the incidence of isolated yeast and mould from lamb carcasses was 4 (12.5%), whereas KOBURGER and FARHAT (1975) found

that the total yeasts and moulds organisms per gram of the examined lamb shop was  $56 \times 10^4$ .

In India, SINHA and MANDAL (1977) reported that the average counts of total microbial load and microflora present in market goat chest and thigh muscles were  $28.6 \times 10^5$  and  $6.6 \times 10^5$ , respectively, however, ABDEL-RAHMAN *et al.* (1983) and (1985) stated that genus *Aspergillus* and *penicillium* were the most predominant mould genera which were isolated from fresh, cured and processed meat, while DAVIS (1981) and MISLIVIC (1981) mentioned that various species of *Aspergillus*, *penicillium* and *mucor* have been implicated in production of mycotoxins which occur in levels sufficient to be regarded as significant hazards to animals and human health.

Therefore, the present study deals with total fungal load and the isolation and identification of various mould species present in goat muscles being sold to the consumers in a rural place.

## MATERIALS and METHODS

Fifteen random samples of fresh goat muscles, five of each shoulder, psoas and thigh muscles were collected. The samples of muscles were transferred separately to the laboratory in pre-sterilized polyethylene containers, where they were prepared for mycological analysis immediately upon receipt in the laboratory.



## ASSESSMENT, FUNGAL CONTAMINATION, FRESH GOAT

Twenty five grams of each muscle sample were weighed aseptically into a sterile blender jar and 225 ml of peptone water were added. The samples were homogenized at low speed (8000 r.p.m.) for 2 minutes. Subsequent 10 fold serial dilutions of the homogenate were prepared with peptone water up to  $10^{-6}$  from the original dilution (1:10), ICMSF (1978).

From the previously prepared dilutions, duplicate sterile Petri-dishes were pipetted with 1 ml from each dilution by accurate pipettes which deliver required volume. Then about 15 ml of acidified malt agar melted and cooled at  $45^{\circ}\text{C}$  were poured into each Petri-dish. The in-oculated plates, after being thoroughly mixed and solidified were incubated at  $20^{\circ}\text{C}$  for 5 days, A.O.A.C. (1975). The colonies were enumerated and recorded according to A.P.H.A., (1978).

Isolated moulds were identified according to rapidity of growth, colony morphology, texture of growth, mycelium and pigmentation production as well as microscopically.

## RESULTS

Are presented in Tables 1-3.

## DISCUSSION

Mould and yeast are of wide distribution and regarded more or less a source of contamination of meat and its products which may lead to spoilage and/or food poisoning.

From the results outlined in Tables 1 and 2, it is observed that the average

mould count was 52, 24 and  $44/\text{g.}$ , while the average yeast count was  $24 \times 10^3$ ,  $19 \times 10^3$  and  $24 \times 10^2/\text{g.}$  of the examined shoulder, psoas and thigh muscles of fresh goat carcasses, respectively. On the other hand, the incidence of isolated *Asp. flavus*, *Asp. niger*, *Mucor* spp. and *Penicillium* spp. from examined goat muscles was 14.29, 57.13, 14.29 and 14.29, respectively, Table 3. It is noticed that *Asp. niger* was the predominant mould isolated from all examined samples which is in agreement to the findings recorded by REFAI and LOOT (1969) in goat meat.

From the Public health point of view, *Asp. fumigatus* has been often incriminated as a causative agent in many infections in man and animals involving the ethmoid maxillary, sphenoid sinuses, the orbit, pulmonary infection and skin infection (MORGAN *et al.*, 1983). As result of contamination with mould and yeast, such meat may undergo spoilage beside they are incriminated in human mycosis as it was mentioned by MOSSEL (1977). Moreover, incidence of mould and yeast in meat indicate the bad hygienic measures adopted in the slaughtering places as well as during evisceration and handling of goat carcasses particularly in rural areas.

Moulds on meat may therefore be prevented if the temperature and the atmospheric humidity are kept low and for this reason proper ventilation in refrigerating and storage chamber is necessary so that circulating air may dry the surface of food and containers. Also foods should be kept away from dust.

## FATHI &amp; ABDEL-FATAH

Fluctuation in temperature will cause atmospheric condensation on the meat surface so intermittent freezing of a refrigerator chamber are common pre-

disposing causes to mould growth and therefore this should be avoided (REFAI and SADEK, 1968).

Table 1: Statistical analytical results of mould count/g of examined goat muscles.

Type of examined muscles	No. of examined muscles	positive samples No.	%	Min.	Max.	Average
Shoulder	5	3	60	0	130	52
Psoas	5	2	40	0	110	24
Thigh	5	3	60	0	100	44

Table 2: Statistical analytical results of yeast count/g of examined goat muscles.

Type of examined muscles	No. of examined muscles	Positive samples No.	%	Min.	Max.	Average
Shoulder	5	5	100	$30 \times 10^2$	$60 \times 10^3$	$24 \times 10^3$
Psoas	5	5	100	$40 \times 10^2$	$50 \times 10^3$	$19 \times 10^3$
Thigh	5	5	100	$60 \times 10^2$	$40 \times 10^3$	$24 \times 10^2$

Table 3: Frequency distribution of identified mould species isolated from examined goat muscles.

Isolates	No. of isolates	%
<i>Aspergillus flavus</i>	1	14.29
<i>Aspergillus niger</i>	4	57.13
<i>Mucor</i> spp.	1	14.29
<i>Penicillium</i> spp.	1	14.29
Total	7	100.00

## REFERENCES

- Abdel-Rahman, H.A.; Youssef, H. and Hefnawy, Y. (1983): Mycological quality of meat products in Egypt. *Assiut Vet. Med. J.* 12: 153-159.
- Abdel-Rahman, H.A.; Darwish, A. and Hamdy, M. (1985): Mould affection of a meat cold store. *Assiut Vet. Med. J.*, 14: 131-135.



### ASSESSMENT, FUNGAL CONTAMINATION, FRESH GOAT

- A.O.A.C. (1975):* Association of official Analytical Chemists. Official methods of analysis. 12<sup>th</sup> Ed. Po Box 540, Benjamin Franklin Station. Washington, DC 20044.
- A.P.H.A. (1978):* Standard methods for examination of dairy products. 14<sup>th</sup> Ed. American Public Health Association. Washington, D.C.
- Davis, N. (1981):* Stregmatocystin and other mycotoxins produced by *Aspergillus* species. *J. food prot.* 44; 711-714.
- El-Daly, El-Said, Abdel-Galil, Y. and Saleh, E. (1988):* Studies on food borne fungi an carcass surfac and air in Zagazic abattoir. *The Bulletin of High Institute of Public Health* Vol. XVIII, 5:1065-1071.
- I.C.M.S.F. (1978):* Microorganisms in foods, 2<sup>nd</sup> Ed. A publication of the International Commission on Microbiological Specifications for foods. University of Toronto press. Canada.
- Koburger, J.A. and Farhat, B.Y. (1975):* Fungi in Foods. VI. A comparison media to enumerate yeasts and molds. *J. Milk Food Technol.* 38,8: 466-468.
- Mislivic, P.B. (1981):* Toxic species of penicillium common in food. *J. Food prot.* 44: 723-727.
- Morgan, S.D.; Abdel Rahman, H.A.; Hamdy, M. and El-Essawy, H.A. (1983):* Mycological studies on imported hen's eggs. *Assiut Vet. Med. J.* 11(21): 167-170.
- Mossel, A.A.D. (1977):* Microbiology of food. Uni. of Utrecht, Fac. of Vet. Med. Netherland.
- Refai, M. and Sadek, I. (1968):* Studies on mould contamination of different foods in Egypt. *Mykosen*, 11 (9): 625-630.
- Refai, M. and Loot, A. (1969):* Studies of mould contaminations of meat in slaughter houses, butcher's shops and in cold stores. *mykosen*, 12 (10): 621-624.
- Sinha, B.K. and Mandal, L.N. (1977):* Studies on bacteriological quality of market goat and its public health importance, *Indian, J. Animal Sci.*, 47 (8): 478-481.
- Vanderzant, C. and Nickelson, R. (1969):* A microbiological examination of muscle tissue of beef, pork and lamb carcasses. *J. Milk Food Technol.*, 32: 357-361.