قســـــم : الصحة ومراقبة الأغذيـــة ـ كلية الطب البيطرى ـ جامعة أسيوط.
رئيس القسم : أ.د / علـــى يوسف لطفـــى .

"دراسة ميكروبيولوجية عن الجلود أثناء عملية التمليـــح" وعلاقتها بصحة مخازن الجـــــلود

فـــــاروق أمين ، حسنى عبد اللطيف

بدراسة أربعة مخازن كبيرة للجلود اثنين منهم فى أسيوط (أ ، ب) واثنين فى ســـوهـاج (جـ ، د) وجد أن متوسط عدد الـ COLIFORMS فى هواء المخـــازن . الأربعة ـ كالتالى ٣٧ ، ٦ر١٥ ، ٢ر١٦ ، ١٥ ويرجع العدد العالى (٣٧) من تلك الميكروبات فى المخزن (أ) لسوء التهوية الى جانب احتوائه على كميات كبيرة من الجلود المخزونة .

ايضا تم عزل العديد من العترات الميكروبية والفطريات من الجلود المخزونة بنوعيها الجلـــود الطازجة والمملحة بنسبة (١ : ٢ر٨) من هنا يتضح أهمية عملية التمليح الخضرى للجلود قبـــل عمليات الدباغة للتخلص من العديد من الميكروبات والفطريات التى تتسبب فى افساد منتجـات الجلود بعد تصنيعهـــا .

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STUDIES ON THE MICROBIOLOGY OF HIDES DURING PROCESS OF SALTING AND ITS RELATIONSHIP WITH HYGIENE OF HIDE STOREHOUSES

(With 3 Tables)

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SUMMARY

The environment of four hides storehouses are examined bacteriologicaly, two of them are located in Assiut and the others in Sohag. Estimation of the most probable number of coliforms revealed that the highest average was 37 for the store A. in Assiut and 15.6, 16.2 and 15 for the storehouses B, C and D. in Assiut and Sohag respectively. The average incidence percentage of microorganisms isolated from fresh and salted hides are in the following manner coagulase positive staph. 18.1, 33.3; coagulase negative staph. 27.6, 26.2; streptococcus faecalis 3.4, 4.8; streptococcus pyogenes 6.9, 7.1; Escherichia coli 8.6, 4.8; Shigella flexneri (type 6) 5.2, 2.4; Proteus vulgaris 14.6, 9.5; Proteus morganii 3.4, 4.8 and Pseudomonas spp. 12, 7.1 respectively; while the average incidence of fungi isolated were as following Aspergillus flavus 5.3, 5.9; Aspergillus amstelodami 3.5, 11.8; Aspergillus candidus 5.3, 2.9; Penicillum capsulatum 10.6, 17.6; Penicillum citrinum 5.3, 2.9; Penicillum frequentans 4.4, 8.8; Cladosporum spp. 4.4, 5.9; Paecilomyces spp. 8, 8.8; Mucor spp. 13.3, 0; Rizopus spp. 10.6, 0; Absidia spp. 5.3, 0; Geotrichum spp. 7.1, 8.8; Fusarium spp. 2.6, 5.9 and Aspergillus niger 14.1, 20.6.

INTRODUCTION

Hides and skin are of the most important sources of the raw material of the leather industry. The skin surface of haired mammals consists largely of keratinised epidermal squames which is permeated by acqueous and oily secretions from underlying glands within the skin itself (JENKINSON, 1965). ROBERTS (1967) reported that the skin protected with three barriers, hair coat, surface sebum and the stratum corneum of the skin which are known to protect uncornified epidermis against infection. On the other hand the skin provides a good culture medium for bacteria because it supplies heat, water, carbohydrates, proteins, lipids, minerals and other nutrients needed for bacterial growth and multiplication (MULLER and KIRK, 1976). Because the hides and skin of animals are considered valuable byproducts, the first essential for a satisfactory yield of good leather is a sound, clean hides. Therefore, skinning should be done properly, without cutting or scoring the hide, and at the same time all the fat and flesh should be removed, for, if left on, they increase the tendency of the hide to rot or spoil. This work is planned with the purpose of the bacteriological and mycological examination of the flesh side of fresh and salted hides, as well as, the investigation is extended to evaluate the environmental status of the hide storehouses.

MATERIAL and METHODS

20 air samples from hide storehouses were subjected to the examination in this work, samples were collected according to the method adopted by WHEELER, et al. (1941) and NEGULESCU et al. (1961). From air born suspension the most probable number of coliforms are estimated according OBLINGER and KOBURGER (1975) and CRUICKSHANK (1975) as shown in table (1).

Moreover, a total of 80 swabs were taken from the flesh side of hides, representing 40 samples each from fresh and salted hides; Half of each were taken from the center point and the other half from the cut edges of hides (head, neck and legs). The swabs are transferred to the laboratory with a minimum time of delay for bacteriological investigations according to EDWARDS and EWING (1962) and BAILEY and SCOTT (1974). As well as, Mycological identification of the isolated mould species were carried out according to RAPER and FENNELL (1965); SAMSON (1979); ARX (1967); BARNNET and HUNTER (1972); ZYCHA et al. (1969) and SCHIPPER (1978). The obtained results are recorded in table (2 & 3).

RESULTS and DISCUSSION

Obtained results recorded in Table (1) revealed that the most probable number of coliforms in 20 air samples of hide storehouses showed wide variation between the average count of the first store in Assiut (A) 37 and the other storehouses (B, C and D) 15.6, 16.2 and 15 respectively. Such high count recorded in store (A) may be attributed to the storage of large numbers of hide heaps, as well as, the insufficient ventelation rate.

Table (1)

Coliform Counts of Air Samples Collected from the Environment of Hide Storehouses

Localites		Coliform counts of air samples					
		1	2	3	4	5	Average
Assiut	A.	45	40	35	35	30	37
	B.	20	17	14	15	12	15.6
Sohag	C.	14	15	15	17	20	16.2
	D.	15	14	17	15	14	15

A = First store in Assiut. C = First store in Sohag.
B = Second store in Assiut. D = Second store in Sohag.

The isolated organisms were identified and are collectively shown in Table (2) which illustrates that 9 different strains were isolated. The most predominant strains isolated from fresh hides were coagulase positive staph. 21; Coagulase negative staph 32; Proteus vulgaris 17; Pseudomonas spp. 14; Escherichia coli 10; Strept. Pyogenes 8; Shigella Flexneri 6; Strept. Faecalis 4 and Proteus morganii 4; On the other hand these strains were isolated from the salted hides in the incidence of 14, 11, 4, 3, 2, 3, 1, 2 &2 respectively. The same strains were isolated by MAIBACH and HILDICK (1965) and HALLIWEL and IHRKE (1975).

From Table (2) it was found that the incidence of microorganisms isolated from salted hides are much less than those of fresh hides, 1:2.8. So it ascertain that salting process is very essential step to avoid hide spoilage before tannary process.

It is also observed that the incidence of microorganisms isolated from cut edges are much higher than those isolated from the center point (Table 2), this may be attributed to the chance of contamination of the cut edges is more than that of the center point of the hide.

Among the object of the present study, was to determine the frequency of fungal microflora, some of them has a proteolytic properties resulting in a process of decomposition of hides specially during their manufacturing.

113 fungal isolates of 14 different strains were isolated from fresh hides, they are sharply decreased to 34 isolates after green salting process.

Table (3) illustrated that the most predominant fungal strains isolated from fresh hides were Aspergillus spp. 32; Penicillum spp. 23; Mucor spp. 15; Rhizopus spp. 12; Paecilomyces spp. 9; Geotrichum spp. 8; Absidia spp. 6; Cladosporum spp. 5 and Fusarium spp. 3; On the other hand these strains were isolated from the salted hides in the incidence of 14, 10, 0, 0, 3, 3, 0, 2 and 2 respectively.

From the public health point of view Aspergillus species has been often incriminated as a causative agent in many infections in man and animals involving the ethamoid maxillary, sphenoid sinuces, the orbit, pulmonary infection and skin infection (ADEM et al., 1965; JANKE, 1965 and SKOBEL, 1965). The inhalation of fungal spores may lead to aspergillosis in animals or allergic broncho-pulmonary disease due to penicillus spp. (VILLER, 1973).

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Table (2): Incidence of Microorganisms Isolated from Fresh and Salted Hides

Types of isolates	Fresh hides													Salted hides											
	A		B		C		D		Total		C		E	A		B		C		D		Total		C		E	
	C	E	C	E	C	E	C	E	No.	%	No.	%	No.	%	C	E	C	E	C	E	C	E	No.	%	No.	%	No.	%
Coagulase positive staph	3	5	1	4	-	4	1	3	21	18.1	5	12.8	16	20.8	1	3	-	3	-	4	-	3	14	33.3	1	11.1	13	39.4
Coagulase negative staph	5	5	4	4	3	5	3	3	32	27.6	15	38.5	17	22.1	2	2	1	2	2	1	1	-	11	26.2	6	66.6	5	15.1
Streptococcus faecalis	2	-	1	1	-	-	-	-	4	3.4	3	7.7	1	1.3	1	-	-	1	-	-	-	-	2	4.8	1	11.1	1	3.0
Streptococcus pyogenes	1	2	1	-	1	1	-	2	8	6.9	3	7.7	5	6.5	-	1	-	-	-	1	-	1	3	7.1	-	-	3	9.1
Escherichia coli	-	3	-	2	-	3	-	2	10	8.6	-	-	10	13.0	-	1	-	-	-	1	-	-	2	4.8	-	-	2	6.1
Shigella flexneri type(6)	1	2	-	1	-	1	-	1	6	5.2	1	2.6	5	6.5	-	1	-	-	-	-	-	-	1	2.4	-	-	1	3.0
Proteus vulgaris	2	4	1	3	1	2	2	2	17	14.6	6	15.3	11	14.3	-	2	-	1	-	-	-	1	4	9.5	-	-	4	12.1
Proteus morganii	1	1	-	1	-	1	-	-	4	3.4	1	2.6	3	3.9	-	1	-	-	-	1	-	-	2	4.8	-	-	2	6.1
Pseudomonas spp.	3	3	1	2	1	2	-	2	14	12.0	5	12.8	9	11.6	1	-	-	1	-	-	-	1	3	7.1	1	11.1	2	6.1
Total	18	25	9	18	6	19	6	15	116		39		77		5	11	1	8	2	8	1	6	42		9		33	

A = First store in Assiut.
B = Second store in Assiut.
C = First store in Sohag.
D = Second store in Sohag.

C = Center of hide.
E = Cut edges of hide.
- = No isolation.

Table (3): Incidence of Fungi Isolated from Fresh and Salted Hides.

Types of isolates	Fresh hides														Salted hides													
	A		B		C		D		Total		C		E		A		B		C		D		Total		C		E	
	C	E	C	E	C	E	C	E	No.	%	No.	%	No.	%	C	E	C	E	C	E	C	E	No.	%	No.	%	No.	%
Aspergillus niger	3	2	2	1	3	2	3	-	16	14.1	11	18.3	5	9.4	1	-	1	1	2	1	1	-	7	20.6	5	27.8	2	12.5
Aspergillus flavus	1	1	1	-	1	-	2	-	6	5.3	5	8.3	1	1.9	-	-	1	-	-	-	1	-	2	5.9	2	11.1	-	-
Aspergillus amstelodami	1	1	-	1	-	-	-	1	4	3.5	1	1.7	3	5.7	1	1	-	1	-	-	-	1	4	11.8	1	5.5	3	18.7
Aspergillus candidus	1	-	1	1	1	-	1	1	6	5.3	4	6.7	2	3.8	-	-	1	-	-	-	-	-	1	2.9	1	5.5	-	-
Penicillum capsulatum	2	3	1	2	1	1	1	1	12	10.6	5	8.3	7	13.2	1	1	1	1	-	1	-	1	6	17.6	2	11.1	4	25.0
Penicillum citrinum	2	2	-	1	-	1	-	-	6	5.3	2	3.3	4	7.5	1	-	-	-	-	-	-	-	1	2.9	1	5.5	-	-
Penicillum frequentans	1	1	1	-	1	1	-	-	5	4.4	3	5.0	2	3.8	-	1	-	-	1	1	-	-	3	8.8	1	5.5	2	12.5
Cladosporum spp.	1	1	1	-	1	-	-	1	5	4.4	3	5.0	2	3.8	1	-	1	-	-	-	-	-	2	5.9	2	11.1	-	-
Paecilomyces spp.	1	-	2	-	2	1	1	2	9	8.0	6	10.0	3	5.7	-	-	1	-	1	1	-	-	3	8.8	2	11.1	1	6.2
Mucor spp.	3	1	2	1	3	1	2	2	15	13.3	10	16.7	5	9.4	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Rhizopus spp.	2	2	1	2	1	1	1	2	12	10.6	5	8.3	7	13.2	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Absidia spp.	1	2	-	-	1	-	-	2	6	5.3	2	3.3	4	7.5	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Geotrichum spp.	1	1	1	2	-	2	-	1	8	7.1	2	3.3	6	11.3	-	1	-	1	-	1	-	-	3	8.8	-	-	3	18.7
Fusarium spp.	1	-	-	1	-	1	-	-	3	2.6	1	1.7	2	3.8	1	-	-	-	-	1	-	-	2	5.9	1	5.5	1	6.2
Total	21	17	13	12	15	11	11	13	113		60		53		6	4	6	4	4	6	2	2	34		18		16	

A = First store in Assiut.
B = Second store in Assiut.
C = First store in Sohag.
D = Second store in Sohag.

C = Center of hide.
E = Cut edges of hide.
- = No isolation.