قســـــــــم : الصحـة والطب الوقائـى - كلية الطب البيطرى - جامعة الزقازيق - جامعة القاهرة
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الفحص البكتريولوجى للأسماك المملحة بأسواق محافظـة الشرقيـــة

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أجـــرى الفحص على ٥٠ عينـة من أسماك البورى وكلب السمك المملحة والتى أخـذت عشـوائيا من أسـواق البيـع بمحافظـــة الشـــرقية . وتم عـزل ميكروبات الانتروبكتريا سـز والهالوفيلز وكذلك الميكروكوكاى والباسيلس السـالب والسراتا والانتيروبكتر والكثير من الانتروبكتر الخاصـة بالانسان والحيوان . وقد تكون الميكروكوكاى والسراتا والسـرسـينا والهالوفيلز هى المسببة للون الأحمر الملاحـظ على سـطح بعض الأســـماك .

وتســتطيع الخـمائر والفطـريات التكاثر فى نسـب الملح المرتفعـة بغزارة بكلـب السـمك أكثر من البـورى وهـذه تسبب مـع الميكروبات الموجبة الجرام فساد الأسماك المملحة .

وتبـين أن العدد الكلى للفطـريات ٢٫٥٥ × ١٠ ^٣ ، ٤٫٨٦ × ١٠ ^٣ فى لحـم سـمك البورى وكلب السمك على التـوالـــى وتصنيفها وأمكن عزل الاسبيرجلس والبنسليوم .

وقـد أثبتت الدراســـة مدى تعـــرض هـــذه الأسماك للتلوث بشـتى الميكروبات المرضيـة وكذلك التى تسبب فساد الأسماك .

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BACTERIOLOGICAL EVALUATION OF SALTED FISHES MARKETED IN SHARKIA PROVINCE

(With 2 Tables)

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SUMMARY

50 Fishes each of Mugil cephalus and Hydrocyon forskallii were subjected to bacteriological examination.
Isolation of Entersbacteriaceae organisms, halophiles, yeast and mould count were determined.
Micrococci, gram-ve bacilli, serrata, enterobacter and citrobacter were isolated from muscles of M. cephalus and H. forskallii.
Many of enterobacter belonging to bacterial flora of animal and man cause food poisoning, others lead to food spoilage.
Micrococci, serrata, sarcina and halophilic bacteria may be responsible for red coloration noticed on the surface of some fishes.
Mould and yeast can grow and tolerate high percentage of salt. Their count is higher in H. forskallii than in M. cephalus. They cause, together with gram+ve bacteria, putrifaction of salt meat.

INTRODUCTION

Fish, being a perishable food is easily attacked by microorgansims and consequantly a lot of it is considered as unfit for human consumption. One of the commen method of preservation conducted in Egypt is salting.

Contaminated salted fish may constitute at times public health hazard. The aim of this investigation is to carry out a further work on the incidence of enterobacteriaceae, halophiles, yeast & moulds in two commen species of salted fish marekted in Sharkia, namely the Mugil cephalus and Hydrocyanus forskallii.

MATERIAL AND METHODES

Random samples of salted fishes, collected from different shops at Sharkia Province and evaluated microbiologically (Morshdy et al. 1980), constitute the material for this work. 50 fishes each of Mugil cephalus and Hydrocyon forskallii were examined.

Isolation of enterobacteriaceae, halophiles, yeast and mould as well as their counts were performed.

Isolation of entirobacteriaceae: loops of inoculated tetrathionate and selenite broth incubated for 24 hrs at 37°C were streaked on two plates of MacConkey and brilliant green phenol red lactose agar (Cruickshank, 1962). Inoculated plates were incubuted at 37°C for 48 hrs. Suspected colonies were purified and subjected to biochemical and serological examination for further identification (Cruickshank, 1962).

Halophiles: Loops of the prepared muscle samples were spread over salt agar plates (10% sod.chloride), then incubated at room temprature for up to 2 weeks. By bacterial growth, the identification was determined according to CruicksShank, (1962).

Yeast and Mould: Dilutions of muscles and brine were used for the identification of yeast and mould using Sabaurouds medsim (Bally and Scott, 1974). Inoculated plates were incubated at 25°C for 5 days before being examined. The first examination of plates was done after three days incubation to determine the degree of mould growth and, if large numbers are visible, counting the colonies was done and repeated on the fifth day. The average total yeast and mould count/g sample as well as/ml brine was calculated.

RESULTS

Table (1): Shows the results of the isolated organisms.
Table (2): Summerized the results of the total and yeast count in the examined samples.

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DISCUSSION

Enterobacteriaceae:

It is evident from results given in (Table 1) that Proteus vulgaris, Proteus marganii, Proteus mirabilis, Proteus rettgerii, Klebsiella aerogenes, Serratia marscens, Enterobacter aerogenes and Citrobacter freudenii were isolated from the muscles of each of Mugil cephalus and Hydrocynon forskallii, in varying percentages. The findings were in agreement with that of Dussault (1953 & 1958).

In fact some of the isolated microorganisms, namely, Citrobacter, Klebsiella, Proteus and Enterobacter belong to the normal flora of animal and man and many of them appear as a food contaminant. However, certain members of citrobacter, were suspected to cause enteric infection (Shönberg, 1967 and Bryan, 1969). Moreover, some species of Enterobacter aerogenes have been complicated in cases of enteritis and are considered as potential food poisoning organisms; nevertheless may lead to food spoilage.

The results recorded in (Table 1) showed that micrococci were isolated from muscles of all examined samples of both species. Gram + ve bacilli were isolated from 38 samples of Mugil cephalus and from 43 samples of Hydrocyon forskallii constituting an incidence of 76% and 86% respectively. Both results agree with the findings of Dussault (1935) and Sedik (1971). These organisms exhibit a high a salt tolerance (Elias, 1968).

The red colour noticed in the previous investigation (Morshdy, 1980) among some fishes may be explained on the fact that Micrococci induce acid proteolysis while some others are pigmented and lead to discolouration of the surface of the food on which they grow. In this respect, Tarr (1954) memtioned that the red discolouration of salted fish is caused by development of salt members of the Serratia and Sarcina genera. Shewan (1971) offered another explanation, that salted fish undergoes a type of spoilage known as pink which is due to a group of halophilic becteria, rods, cocci and some yeasts.

Mould and Yeast:

The results pointed out that the average total mould and yeast count (Table 11) in Mugil cephalus muscles was (2.55×10^3/g). Slightly higher count was noticed in H. forskallii (4.86×10^3/g). In the brine the respective average counts were 5.88×10^3/ml and 5.14×10^3/ml.

These results agree with the findings of Tanner (1946). It seemed that yeast and mould can grow and tolerate high percentage of salt and as a general behaviour, gram + ve microbes are more adapted to the development at high osmotic pressure. The putrifaction of the salt meat result from the development of gram + ve bacteria, yeasts and moulds.

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Table 1

Incidence of isolated organisms

M. organism	Mugil cephalus		Hydrocynus forskallii	
	Frequency No. of sample	%	Frequency No. of sample	%
Micrococci	50	100	50	100
Gm + ve bacilli	38	76	43	86
Proteus vulgaris	22	44	30	60
Proteus morgani	7	14	3	6
Proteus mirabilis	5	10	9	18
Proteus rettgeri	4	8	5	10
Klebsiella aerogenes	8	16	11	22
Citrobacter freudenii	1	2	8	16
Enterobacter aerogenes	10	20	18	36
Serratia marscens	6	12	3	6

Table 2

Summarized results of total mould and yeast count in examined samples

Fish spp.	Total Mould Count					
	Brine/ml.			Muscle/gm.		
	Minimum	Maximum	average	Minimum	Maximum	average
Mugil cephalus	2×10^3	12×10^3	5.88×10^3	2×10^3	16×10^3	2.55×10^3
Hydrocynus forskallii	2×10^3	11×10^3	5.14×10^3	1×10^3	10×10^3	4.86×10^3