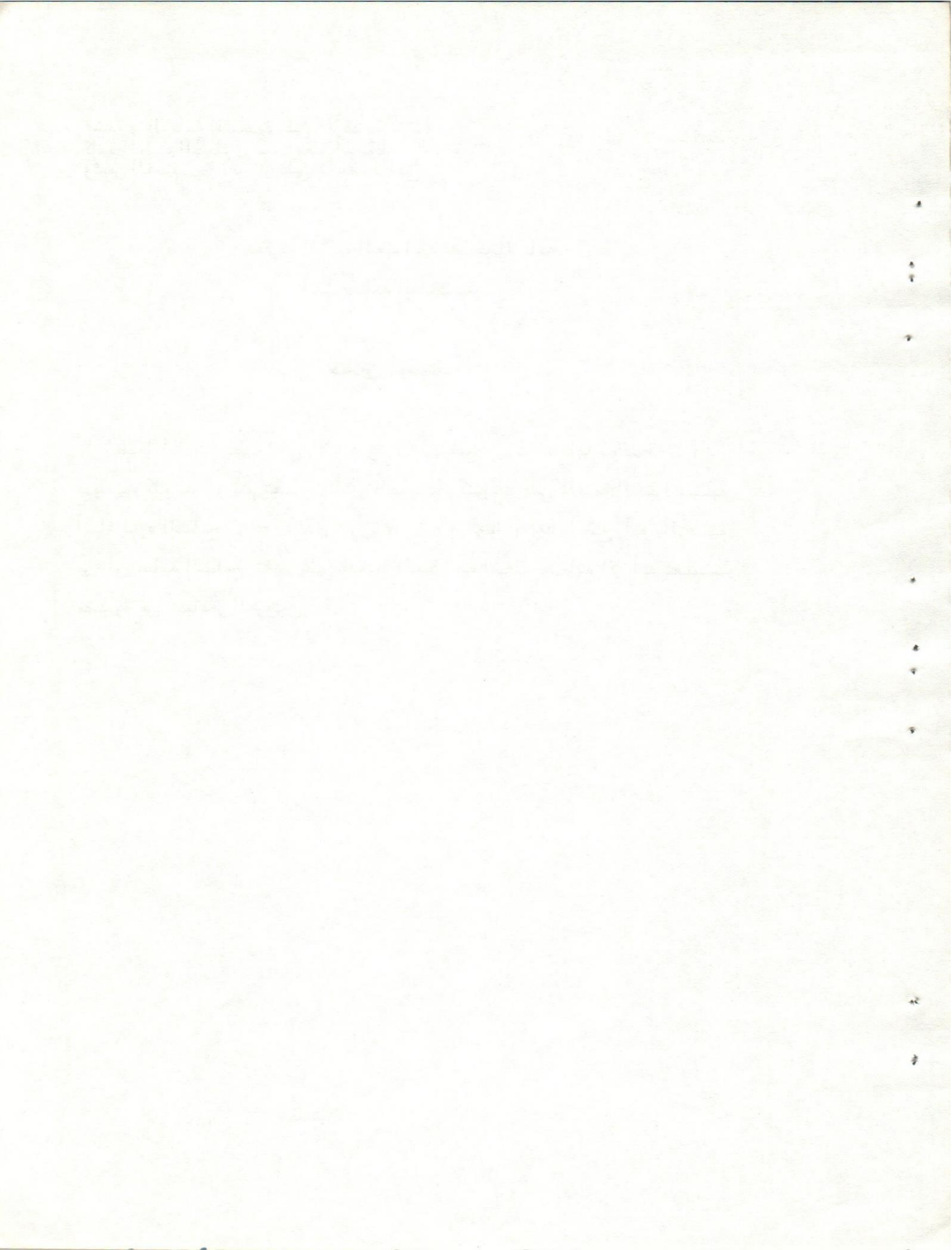


قسم : الرقابة الصحية على الأغذية
كلية الطب البيطرى - جامعة أسيوط
رئيس القسم : ا.د / على يوسف كطفى

تقدير القيمة الغذائية لسماك الأمايه
أثناء عملية التلقيح

حسين يوسف

طبقا لما هو يطبق فى الأسواق ، تم تمليح سمك الأمايه بواسطة ١٠ ٪
صود يوم كلوريد ، وتم تعيين تأثير الصود يوم كلوريد على القيمة الغذائية
أثناء فترة التمليح (٣ ، ١٠ ، ٢٠ ، ٢٥ يوما) وقد أتضح أنه بالرغم
من أن عملية التمليح تؤثر على القيمة الغذائية لسماك الأمايه الا أنه تعتبر
مصدرا من مصادر البروتين .



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Faculty of Vet. Med., Assiut University,
Head of Dept. Prof. Dr. A.Y. Lotfi.

**EVALUATION OF THE NUTRITIONAL VALUE OF
ALESTES NURSE DURING THE PROCESS OF SALTING**
(With 2 Tables)

By
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SUMMARY

According to the commercial process, fresh A.nurse was mixed with 10% NaCl. The effect of NaCl as a means of salting process on the component of the fish were determined at 3,10,20 and 25 days storage. The crude protein was affected by the salting process and decreased from 18.11% to 16.38% at the end of storage period, while the fat content increased from 6.5 to 12.5%. Salting process decreases the water content of fish and accompany by rise in NaCl, the percentage of sodium chloride in water phase and ash%. Although the salting process had a marked effect on the component of the fish, yet salted fish is considered a source of protein.

INTRODUCTION

Many types of fish loose their flavour and odour after salting, their flesh become tender, separates readily from the bones, and acquires a special pleasant taste. The matured fish becomes edible as it is, without cooking (ZAITSEV, et al. 1969).

Maturity of certain fishes are mainly attributed to certain enzymes usually as those contained in the muscular tissue in addition to those produced by microorganisms.

Alestes nurse, Alestes baremose, and Hydrocynus forskalli are the main kinds of fishes that are salted at commercial scale in Upper Egypt.

Several researchers (FOUGERE, 1952; GUNASKERA, et al. SHAHIN, 1958; KLEIMENOV, et al. 1958; SAFWAT, et al. 1967; SALAMA, 1969; SEDIK, 1971 and AHMED, 1976) reported that when salt began to diffuse within the fish, a gradual change took place within the component of the tissue.

The present study was under taken to determine the major constituents of Alestes nurse at different periods during the process of salting.

MATERIAL and METHODS

A lot of A. nurse was brought from the market to the laboratory, with minimum of delay.

According to the commercial process, the fish was mixed with 10% salt and arranged in layers in the salting tin and amount of salt were spread interchangeably among the fish layers

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as well as on the bottom of the tin as well as on the surface of the upper layer before the lid of the tin was tightly closed. Treated fishes were held at room temperature ($20\pm 5^{\circ}\text{C}$) during the experimental period.

Methods of examination:

Fresh sample was examined, as well as after salting for the prescribed periods of storage (3,10,20 and 25 days).

Determinations of protein, moisture, NaCl, and ash:

The procedure adopted is that recommended by A.O.A.C. 1975.

Determination of Fat:

The procedure adopted is that recommended by BEYTHIEN and DIEMAIR, 1963.

The percentage of sodium chloride in water phase (C%):

Was calculated according to the following formula as described by SEDIK (1971):

$$C\% = \frac{100S}{S+W} \quad (S=\text{NaCl content, } W=\text{water content in fish}).$$

RESULTS

Results are tabulated in tables 1 & 2.

Table (1)
Chemical changes in moisture, NaCl, crude protein and fat in flesh of A.nurse during salting process*

Duration of Salting	Moisture	NaCl	Crude protein	Fat
Zero	74	0.99	18.11	6.5
3 days	63	6.25	17.33	6.5
10 days	60	7.9	17.02	10.5
20 days	54	8.31	16.95	11.9
25 days	52	9.1	16.58	12.5

* The results are the average of duplicate analysis.

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Table (2)
Chemical changes in Moisture, NaCl, C% and
Ash in flesh of A.nurse during salting process*

Duration of salting	Moisture	NaCl	C %	Ash
Zero	74	0.99	1.3	1.3
3 days	63	6.25	0.05	9
10 days	60	7.9	11.6	10
20 days	54	8.31	13.4	11
25 days	52	9.1	14.9	12

* The results are the average of duplicate analysis.

DISCUSSION

In order to follow the chemical changes in the flesh of A.nurse during the salting process an experiment was conducted in which fresh A.nurse was initially brought in the market and was subjected to one of the salting treatment produced in Upper Egypt. Samples of the treated fish were with drawn at intervals 3,10,20 and 25 days where were subjected to chemical analysis.

Protein content:

The data present in table (1), showed that crude protein in fresh fishes was 18.11%. After 3,10,20 and 25 days storage, it drops to 17.33%, 17.02%, 16.95% and 16.58% respectively. The achieved results pointed that the crude protein decreased gradually in edible flesh of A.nurse during salting process and this may be attributed to proteolysis which took place in fish muscle or the escape of the water soluble protein and extratives. Similar observation was registered by SHAHIN (1958) which revealed that during the salting process of "Fessekh", the crude protein % decreased in non-eviscerated fish from 69.03 to 49.16 (on dry basis) at the end of the salting period (58 days). Moreover SALAMA (1969), proved that the salting process of sardine lead to decrease in the crude protein % from 86.45 to 51.47 (on dry basis). However, KLEIMENOV, *et al.* (1958) and VAN-KLAVERAN (1959), reported that the brine become gradually saturated with the substances which exuded from fish body, and the protein hydrolysis together with a partial release of nitrogenous substances into the brine took place during storage in brine. BILINSKI, *et al.* (1959) and WIERZCHOWKEIT, *et al.* (1962), proved that proteolysis of fish muscle protein was completely inhibited with 11-17% NaCl in fish muscle.

Fat content:

The data presented in table (1), showed that fresh fish contain 6.5% fat. After 3,10,20 and 25 days storage, the fat content increased to 7.5, 10.5, 10.9 and 12.5% respectively. The apparent rise in fat content is a result of relative loss in moisture content of the tissue undergoing salting. Result was reported by SALAMA (1969) which showed an increase of fat % from 1.8 to 2.91 (on wet basis) and is mainly attributed to loss of the moisture content. On the contrary of the achieved results were calculated on moisture free basis, the level of ether extract remain unaltered.

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Moisture and Sodium chloride:

The moisture content in the edible flesh of A.nurse was found to be 74%. A gradual decrease had occurred during the storage period until reached to 52%, while the content of salt content reached to 9.1% (table 2).

It is of interest to note that practically all the water loss from fish tissues occurred within the first three days of the start of salting, while the penteration of NaCl in the tissues was less rapid and gradually. Similar findings were reported by DUERR, et al. (1952), SCHMIDT, 1952; SHAHIN, 1958; SALAMA, 1969 and AHMED, 1976.

It is clear that dry salting causes decrease in the water content which is accompanied by a rise in its sodium chloride due to osmotic action, which in close agreement with the results obtained by OMLAND (1955); SHAHIN (1958); GRAU (1963); SALAMA (1969) and AHMED (1976).

The percentage of sodium chloride in water phase (C%):

Results reported in table (2) showed that C% 1.3% at fresh fish. A marked gradual increase in the C% to 9.05, 11.6, 13.4 and 14.9 at 3,10,20 and 25 days respectively. Nearly similar finding was reported by SEDIK (1971) and AHMED (1976).

Ash content:

The flesh of fresh fish constitutes 1.3% ash, which rose quite sharply upon saltings as a result of the penteration of the salt into the fish tissues. This could be clearly observed when NaCl in fresh A.nurse about 0.99% and rose rapidly to 6.25% on the third day of salting, this rise continued gradually until the value become 9.1% at the end of the experiment. Similar finding was recorded by SALAMA (1969).

In conclusions, although the obtained results proved that the salting process had a market effect on the major component of the fish, yet salted fish considered a food which have a good source of protein.

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