STUDIES ON THE QUALITY OF DRY PRAWN

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Introduction

A very large quantity of prawn is exported from India in the dry form mostly to countries in the South-East Asia region. Of late, this product has also found an attractive market in U.S.A. and some of the European countries. Considering the fact that India is one of the few countries possessing a rich prawn fishery, this industry can look forward to a bright future. The future, however, would depend to a large measure on the maintenance of high quality of the product.

Commercial preparations of dry prawn often contain considerable quantities of shell particles and extraneous matter. They undergo rapid deterioration in both physical appearance and overall quality during storage. There is on the one hand the mite, mould and insect infestation and on the other the rapid loss in colour. Mites and insect attacks also result in the covering of the remaining portion of the pulp with the excreta of the infesting organisms in a powdery form. The nature and type of organisms that infest cured fish products and particularly dry prawn have been exhaustively dealt with by Parameswaran Pillai (1957).

The present study is aimed at collecting data on the variations in the quality of commercial samples of dry prawn and studying in detail the effect of moisture variations on the quality and shelf life of the products during storage.

Experimental

Commercial samples were collected from the various godowns in Cochin at regular intervals. These samples were analysed in the laboratory for their moisture, shell materials, broken pieces, ash, salt and insoluble matter. The results obtained from a few representative samples are given in Table I.

In order to study the storage characteristics of commercial dry prawn samples a few batches were subjected to regular examination. The samples were stored in stoppered glass containers at laboratory temperature. The storage life as determined by the appearance of discoloration or the onset

TABLE I

Variations in the essential characteristics of commercial samples of dry prawn (expressed as percentage)

	Small	Medium	Large
Moisture ..	15–25	14–33	18–35
Shell particles ..	2–40	1–36	0–15
Broken pieces ..	7–47	0–40	0–30
Ash (on D.W.B.) ..	8–28	5–25	8–24
Salt (on D.W.B.) ..	3–18	2–8·17·0	4–15
Insolubles (on D.W.B.)	0·3–5·0	0·1– 2·0	0·1–1·5

of fungal or mite infestation or both and the corresponding moisture and salt contents of the batch are tabulated in Table II.

A few samples of dry prawn were also prepared in the laboratory at controlled conditions. The raw materials were blanched each time in a boiling solution of brine (3·5% NaCl). The blanched material was dried in the sun to various moisture levels, shells removed by hand picking and stored in glass bottles. These samples were periodically examined and the storage period determined. The results obtained from five series of experiments are given in Table III.

DISCUSSION

It may be seen from Table I that the commercial samples vary very widely in all the essential constituents. Physical features like broken particles and shell materials which are important from the point of view of grading of the samples show wide fluctuation within the samples examined. In the 93 commercial samples taken up for quality assessment, broken particles varied between 7 and 47% in 'small' grade between 0 and 40% in 'medium' and between 0 and 30% in 'large'. The corresponding figures for shell particles are 2 and 40%, 1 and 36% and 0 and 15% respectively for the three grades. It may be pointed out that the majority of the samples fell within the latter half of the ranges indicated above. The batches which are deshelled and graded by hand showed less of shell particles and broken pieces.

TABLE II

Shelf life and moisture content of dry prawn pulp

S. No.	Description	Moisture %	Salt %	Storage period in weeks*
1	Small	20·4	7·9	5
2	,,	19·9	4·2	6
3	,,	24·0	6·3	4
4	,,	21·5	5·2	4
5	,,	22·1	7·7	6
6	,,	18·1	5·4	7
7	,,	16·2	2·9	4
8	,,	22·8	18·1	3
9	,,	16·7	3·7	5
10	,,	17·1	4·3	6
11	,,	16·9	3·4	8
12	,,	20·9	7·6	4
13	,,	23·6	8·2	4
14	,,	20·6	7·9	5
15	,,	25·7	9·1	3
16	,,	20·6	5·2	3
17	Medium	32·0	14·8	3
18	,,	29·3	16·7	8
19	,,	21·2	13·1	7
20	,,	16·0	2·6	9
21	,,	22·6	6·1	6
22	,,	18·3	5·6	6
23	,,	27·9	8·1	3
24	,,	28·2	12·4	6
25	,,	14·6	7·7	13
26	,,	20·0	4·3	4
27	,,	22·9	10·1	4
28	Large	28·3	9·7	9
29	,,	31·5	13·7	8
30	,,	17·1	2·3	8
31	,,	16·7	2·4	3

* Includes period of storage before the samples were received in the laboratory.

TABLE III

Observations on laboratory samples of varying moisture content during storage

S. No.	Moisture %	Salt %	1 week	5 weeks	9 weeks	15 weeks	18 weeks	28 weeks
1	41·5	3·95	Liquefaction in some pieces	Liquefaction and complete blackening	..	..	..	..
2	24·4	3·60	Colour bright	Fungus infestation started	Dim Colour powder formed	Fungal attack throughout. Uniform discolouration	..	..
3	15·8	3·6	Colour bright	No visible defect	No visible change	Slight dim colour	Fungal attack. Colour very dim	Complete discolouration. Fungal and mite attack visible
4	14·1	3·6	Colour bright	Colour bright	Colour moderately bright	No fungal or mite attack	Fungal attack in some pieces. Slight dim colour	Moderate discolouration and mite infestation
5	14·1	3·6	Colour bright	Colour bright	Colour moderately bright	No fungal or mite attack. Colour somewhat pale	Fungal attack in some pieces. Slight dim colour	Slight discolouration throughout

From the point of view of the chemical constituents also the commercial samples showed very wide fluctuations. The 'small' grade because of its small size is dried more uniformly and hence the range of moisture content is least in that group. In most of the 'medium' and 'large' grades drying was insufficient and the moisture content was well above 20%. The ash, insolubles and salt content also show similar variations. All these tend to indicate that the dry prawn producers are not strictly adhering to any set system of preparation of the product. The basic requirements of cooking the prawn, drying and deshelling are fulfilled at every centre of production. But observations show that there are wide variations in the details of the procedures adopted. The fluctuations and the irregular nature of the quality may be due to these variations.

It was observed that samples which had higher moisture content showed definite discoloration or mite and fungal attack either at the time of collection from the godowns (barely a fortnight or three weeks after actual preparation) or after a short interval. It was also observed that the maximum shelf life of such samples was not more than one to one and a half months. The data given in Table II represent an attempt to study the shelf life of different grades of commercial dry prawn samples in relation to their moisture contents. It is easily seen that samples having low moisture content had comparatively longer shelf life, although a few exceptions are found. Another interesting feature is the comparatively greater shelf life of dry prawn samples of 'medium' and 'large' grades than in the 'small' grade for identical moisture contents. This is somewhat misleading and the only probable explanation seems to be that the surface layers of the large and medium size prawns may be hard dried making it difficult for mould and mite attacks while the core of the individual pieces remains less dried. This results in high average value for the moisture content of the sample.

In the case of commercial samples there is always the possibility that factors like the condition of raw material, method of preparation, vessels used for cooking, drying conditions, etc., might influence to some extent the shelf life of the samples. However, it is apparent from Table II that moisture is the major limiting factor.

This is further proved by the data presented in Table III where periodic observations on the laboratory samples kept at various moisture levels are recorded. As uniform procedures were adopted in the preparation of these batches, the changes observed can only be due to the moisture contents of the samples.

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REFERENCE

Parameswaran Pillai, P. R. 1957 Pests of stored fish and prawns. *Bull. Cent. Res. Inst. Univ. Travancore*, **5 C** (3), 1–79.