

NOTE II

PRICES OF INDIAN FROZEN SHRIMP IN U. S. MARKET- A NOTE ON SEASONAL VARIATION

The supply and consumption of shrimp follow a more or less regular seasonal pattern. Like agricultural products, fishery products have also their period of heavy and less productions on which depend their price movements. The prices of shrimp in any particular market reflect this seasonal behaviour quite often. The supply position of the material also undergoes a corresponding variation. For instance, the monthly cold storage holdings of frozen shrimp in U. S. have shown strikingly uniform pattern over the past several years, the holdings gradually declining during the first half of the year, when domestic supplies are slack and most sales are made from inventories accumulated during the peak production months and from imports. The July-November period, when the cold storage holdings register a gradual increase month after month, is stated to be one of heavy production and imports.

To understand how seasonal variation is reflected in the prices of the Indian frozen shrimp in U. S. Market, corresponding indices for January through December were worked out for the size grades of 16/20, 31/35, 71/90 and 130 up of peeled and deveined shrimp and 26/30 of headless shell on shrimp. These size-grades were selected here to represent the different size ranges, such as big, medium and small. The data considered here pertain to the six year period of 1966-1971 which was treated as equal to 100. The weekly price data are published by the U. S. Department of Commerce in their Fishery Market News Reports, and the same are

consolidated and published as average monthly prices by the Marine products Export Promotion Council. With a few exceptions, the smaller size grades of peeled and deveined shrimp considered here viz. 71/90 and 130 up show price increase during the first half of the year which falls off towards the latter half. The larger size grades of peeled and deveined shrimp and that of headless shell on shrimp considered here appear to be following a reverse type of price movement, lower during the first half and gradually improving in the latter half of the year. These price variations reflect in the seasonal indices of prices mentioned in the table. The table also gives the standard deviations, denoting the extent of variation observed in the indices over the period of study.

The seasonal indices for the prices of frozen headless shrimp, the ex-vessel prices and prices paid to 26-30 count brown shrimp, all in U. S., follow nearly uniform type of movement viz. high during the first five months and gradually declining towards the latter half of the year (Anon, 1967 and 1968). The higher prices during the first half are attributed not only to less production, but to the availability of larger size grade shrimp during this part of the year. As domestic fishing picks up and new crop of small shrimp start appearing, the prices go down. The indices were prepared with 1957-1966 = 100. The price movement of smaller size-grades Indian Shrimp is similar to that of U. S. Shrimp while the large size grades of Indian Shrimp do not behave in the same pattern.

The variation between the maximum and minimum indices for the Indian Shrimp is around 8% in all size grades of peeled and deveined variety and about 10% in the case of 26/30, headless shell on variety. As compared to the indices of frozen shrimp which show less than 3% in the case of domestic market in U. S., the indices for Indian frozen shrimp vary much. The price variation during any particular year may be high, but the indices show less variation as they are based on the entire period.

The standard deviations, given in the table, can be seen to be quite high in the case of small size grades. This can be attributed to the high price fluctuations commonly observed in the smaller size grades. Also the period considered here is quite short. The standard deviations can be brought down substantially, when a longer period (at least ten year data) is

covered under this study. The indices arrived at on such data will give a more definite picture of seasonal variation. Meanwhile the indices mentioned in this can be considered as preliminary estimates of the seasonal variation.

The authors are thankful to Dr. V. K. Pillai, Director, Central Institute of Fisheries Technology for the interest he has shown in the work and for permitting to publish this note:

REFERENCES

- Anon, 1967 Shell Fish Situation and Outlook, June-United States Department of Commerce.
- Anon, 1968 Ibid, December.
- Anon, 1971 'Statistics of Marine Products Exports, 1971, Marine Products Export Promotion Council, Cochin-16.

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TABLE

SEASONAL VARIATION IN THE PRICES OF INDIAN FROZEN SHRIMP IN U. S.

	<i>Peeled and deveined</i>				<i>Headless shell on</i>					
	16/20 Seasonal variation	Standard deviation	31/35 Seasonal variation	Standard deviation	71/90 Seasonal variation	Standard deviation	130 up Seasonal variation	Standard deviation	26/30 Seasonal variation	Standard deviation
January	97.2	3.2	96.8	3.2	98.6	9.2	99.5	14.2	95.1	8.4
February	97.2	2.1	95.8	5.0	99.9	8.4	101.0	11.9	95.7	7.8
March	97.1	3.1	96.6	4.3	101.0	7.4	102.7	11.5	97.0	5.4
April	98.2	2.8	99.3	1.4	102.7	7.0	103.5	11.8	100.3	5.3
May	98.6	1.9	99.0	1.4	101.4	5.1	101.9	9.6	101.6	4.3
June	99.4	1.5	99.6	1.6	99.9	3.2	99.0	7.6	104.8	4.4
July	100.1	1.0	100.1	1.9	97.3	4.2	95.9	4.6	100.2	3.6
August	99.9	1.4	99.9	3.0	96.0	5.6	96.4	5.4	98.0	8.6
September	102.2	3.0	102.1	3.6	99.4	5.8	96.7	9.1	102.0	7.2
October	103.3	3.8	102.2	3.4	99.9	7.4	97.4	13.6	103.5	7.7
November	103.9	3.9	102.3	3.6	98.6	7.9	98.3	16.9	101.3	5.6
December	103.5	5.6	103.2	5.8	103.0	11.2	103.0	21.2	101.9	3.6

ABSTRACTS

Amino acid and fatty acid composition of tissue of the Dungeness crab (*Cancer magister*). Allen, W. V., 1971. *J. Fish. Res. Bd. Canada.*, 28 (8), 1191.

Tissues of the Dungeness crab (*Cancer magister*) were analysed for total lipid, protein, amino acids, fatty acids and glucosamine. Ovaries and hepatopancreas were the major lipid storage organs. Gonads (ovaries and testes) and skeletal muscle contained substantially more proteins than the other tissues. All tissues except the exoskeleton had balanced amino acid composition. The exoskeletal protein was deficient in arginine and lysine. Glucosamine was a prominent constituent of the exoskeleton and of the gills and the gastric apparatus. Palmitic, palmitoleic, oleic, eicosapentaenoic and docosahexaenoic acids were the major fatty acids found in all tissues.

Polyphosphate treatment of fish. Gorden, A., 1971. *Food. Mfr.*, 46 (7), 57.

Loss of fluid from fish can be arrested by applying a triphosphate dip; the polyphosphate presumably modifies the surface layer of the protein and thereby prevents the escape of fluid from the interior of the muscle. Treated fish keep better. The polyphosphate can be applied as a hand or automatic dip, but spraying into fillets has several advantages. Loss of drip in fresh refrigerated fillets was effectively reduced by spraying a 7.5 to 10% polyphosphate solution containing 20% salt. Maximum drip loss during effective refrigerated shelf-life was 1% compared to losses as high as 6% in untreated fish. Application of polyphosphate to shell fish and delicatessen fish products is also discussed.

Isobutanol as solvent for FPC production. Hevia, Patricio, Acevedo Fernando, Kaiser, Sergio, 1971. *J. Food Sci.*, 36 (4), 708.

Whole raw fish (*Chitean hake*) was washed with fresh water, comminuted and extracted with ISO BuOH for 30 min. at room temperature and then 4 hours at 90° C. Water was continuously removed by isozotropic distillation, along with volatile compounds. The product was washed with pure solvent, dried 18 hours at 25 mm Hg, 60 to 65° C and ground. A flour was obtained with a light yellow grey colour, no odour and only a slightly fishy taste. It showed excellent stability. The protein efficiency ratio (ratios) was equal to that of a casein control and values for pepsin digestibility and available lysine were satisfactory. The values for these three parameters of nutritive value were like those obtained with FPC obtained by other processes.

Studies on gel components in fish muscle protein extracts - I., Shigeru Umemoto and Koichikanna, 1971. *Bull. Tokai. Reg. Fish. Res. Lab.*, 65, 81

Protein extracts from fish muscle, using neutral salt solutions of ionic strength 0.5 to 0.6 sometimes appear turbid and contain a gel component sedimented by centrifugation. This paper reports the results of a preliminary study of this gel component. Frozen or ice stored muscles of flat fish or Alaskapollack were used for the study and the extractant used was either 0.6 M KCl or KCl-phosphate buffer $\mu=0.5$ pH 7.2. After the muscle protein extracts were centrifuged at 4×10^4 G for 30 min., a white turbid sediment was formed below

a clear supernatant. The sediment was rich in protein. Sedimenting process of the turbid substance during centrifuging was observed using an analytical ultra-centrifuge equipped with schleiren optical device. Resulting sedimentation patterns showed that the turbid substance corresponded to the so called gel component. This gel component could be readily redispersed in the extractant to give a turbid solution. The muscle proteins were fractionated into sarcoplasmic, myofibrillar and gel components by usual methods. The values for myofibrillar protein fraction were found to include values for both myofibrillar and gel components. In view of the results, the authors conclude that a study of this gel component may provide useful information on fish muscle protein denaturation.

On the nature of altered protein in cod muscle stored at -29°C after aging in ice., Anderson, M. L. and Elinor, M. Ravesi, 1970. *J. Food. Sci.* 35 (3), 199.

Earlier the authors found that there was a decrease in the extractability of protein when cod muscle was stored in ice and that this phenomenon involved the formation of a complex with protein and f. f. a. The formation of this complex is favoured when the iced fish is subsequently frozen. The decrease in the amount of extractable protein is larger at the expense of actomyosin. Just why the actomyosin component becomes inextractable is not clear and studies to determine the reason have been hampered because methods to extract the altered protein were not available. The authors however discovered that the altered protein could be extracted if the homogenized muscle were exposed to neutral salt solution overnight and then rehomogenized. They used this technique in the present study to extract altered protein from cod muscle that had been stored in ice and then held at -29°C . They examined the composition of the extractable protein in ultracentrifugal pattern of

protein extracts and the nature of fragments in the residul of the centrifugal muscle extractant homogenates on revealed in phase contrast micrographs.

The ultracentrifugal patterns revealed that the altered protein was aggregated and polydisperse. The sedimentation behaviour also was similar to that of aggregated protein in extracts of cod muscle in which protein-f. f. a. is interaction occurred during prolonged ice storage. The linkages responsible for the decreased extractability appeared to be salt sensitive.

The connective tissue of fish-III. The effect of pH on gaping in cod entering rigor mortis at different temperatures. Love, R. M. and Haq, M. A., 1970. *J. Food. Technol.* 5 (3), 241.

Gaping is a phenomenon that occurs in the musculature of fish. It involves the development of holes or slits between the muscle segments (*myotomes*) of fish fillets because of the breaking of the minute tubes of connective tissue that come from the connective tissue sheets (*myocommata*) and run between and around the muscle cells. The paper reports preliminary investigations on the causes of gaping. Even though gaping generally increased with temperature, a few fillets always remained intact, presumably depending upon the nutritional state of the fish. The nutritional state of the fish is usually found to show good correlation with the pH and water content of fish muscle. So the effect of pH on gaping in cod entering rigor mortis at different temperatures was studied. At low pH considerable gaping occurred at all temperatures tested; at high pH a relative small amount of gaping occurred. Gaping increased with the time, the fish were held at the test temperature a resnd subsequent freezing further increased the gaping. pH is found to be of equal importance as temperature at which rigor begins in gaping. This suggests a new possibility for control of gaping in fish in industrial practice.

Effects of Gamma irradiation on *Salmonella* spp. in smoked lake white fish (*Coregonus clupeaformis*). Ostovar, K., Perieva, R. R. and Gallop, R. A., 1971. *J. Fish. Res. Bd., Canada*, 28 (51), 643.

A dosage of 0.5 Mrad was found sufficient to eliminate three species of *Salmonella* in smoked lake white fish (*Coregonus clupeaformis*) regardless of the stage of processing at which steaks were inoculated with the bacteria. All three species survived smoking at temperatures upto 167°C. The dosages required for the elimination of the bacteria when steaks were inoculated at various stages of processing were: before freezing at 0°F for 48 hours, 0.4 Mrad for *S. give*, 0.3 for *S. typhimurium* and 0.2 for *S. java*; before brining at 60 salometer for 25 min., 0.4, & 0.3; after smoking, 0.5, 0.4 and 0.35. *Salmonella give* was more resistant to heat than the other two species.

Effects of washing fresh water fish on keeping quality. Gillespe, D. C., and Kurosh Ostover., 1971. *J. Fish. Res. Bd. Canada*, 28 (5), 783.

Slime from several fresh water fish species was a good bacteriological medium and supported growth of 10^9 to 10^{10} organisms per gram. Fish stored at 3°C became inedible after several days even though the flesh contained few bacteria. Diffusion of metabolic products resulting from bacterial growth on the slime produced strong odours and flavours in the flesh. Under commercial conditions, washed lake white fish *Coregonus (clupeaformis)* had lower bacterial numbers and coliform counts and higher organoleptic ratings than unwashed samples.

Effect of certain preservatives on the shelf-life of fish sausage. Krishnaswamy, M. A. and Patel, T. D. 1970. *J. Food. Sci. & Technol.*, 9 (1), 10.

Shelf-life studies conducted at room temperature and at 37°C of fish sausage manufactured on a semi-pilot plant scale,

indicated that furyl furamide in combination with potassium sorbate conferred longest shelf-life to fish sausage, followed by furyl furamide used alone. Potassium sorbate alone or in combination with sodium benzoate gave limited shelf-life to the product. Shelf-life of fish sausage preserved at room temperature with furyl furamide in combination with potassium sorbate was 50 days and that with furyl-furamide alone was 30 days. At 37°C, the shelf-life of fish sausage with the above combination of preservatives was comparatively shorter (20 to 25 days).

Bacteria active in the spoilage of certain sea foods. Herbert, R., Margaret S. Hendrie, Gribson, D. M., and Shewan, J. M., 1971. Symposium on Microbial changes in foods. paper IV-J. *Appl. Bact.* 34 (1), 41.

Spoilage of certain sea foods is caused by the activities of some groups of gram negative bacteria. The characteristic off odours and flavours of naturally spoiling cod and haddock have been reproduced in blocks of sterile cod muscle by organisms identified as *Pseudomonas putida*, *ps. fragi*, *ps. putrefaciens* and other *Pseudomonas* species.

Survival of *Vibrio parahaemolyticus* in fish homogenate during storage at low temperatures. Jack, R. Matches Liston, J. and Louis, P. Daneault., 1971. *Appl. Microbiol.*, 21 (5), 951.

Fish homogenate inoculated with Japanese strains of *Vibrio parahaemolyticus* were either stored at 0.6°C or frozen and stored at -18°C. and -34°C. Greater survival of the organisms was obtained at 0.6°C than at the lower temperatures. This finding is important from two points of view: stock cultures held at 0.6°C or higher may survive for longer periods of time between transfers than when held frozen. Second, food samples to be tested for the presence of *Vibrio* may show a reduction in numbers of *Vibrio* cells when held frozen.

Microbial flora of pond-reared brown shrimp (*penaeus aztecus*). Vanderzant C., Nickelson, R. and Judkins, P. W., 1971. *Appl. Microbiol.* 21 (5), 916.

Agar plate counts and microbial type are reported for brown shrimp reared in 2acre natural marshland and in 0.5 acre artificial ponds during June to October, 1970. Bacterial counts of pond-reared shrimp ranged from 5.0×10^4 to 5.5×10^6 /g. At final harvest in October, bacterial counts ranged from 2.0×10^5 to 5.5×10^6 /g. In marsh ponds, bacterial counts of shrimp and pond water were lowest in August when both temperature and salinity were high. *Coryneform* bacteria and to a lesser extent *Vibrio* were the predominant isolates from fresh pond shrimp. shrimp stored at 3°C to 5°C for 7 days were acceptable as judged by appearance and odour. Between 7 and 14 days of refrigerated storage, bacterial counts increased sharply and about 50% of the samples became unacceptable. Refrigerated storage of pond shrimp caused increases in *coryneform* bacteria and *micrococci* and decreases in *Vibrio*, *Flavobacterium*, *Moraxella* and *Bacillus* species. *Pseudomonas* species were not significant in fresh or stored pond shrimp. The microbial flora of pond water usually was dominated by *Coryneform* bacteria, *Flavobacterium*, *Moraxella* and *Bacillus* species.

Improved polyvalent trawl doors. Jean Morgere. *World Fishing*, 20 (7) 1971 15.

Jean Morgere is the inventor and Manufacturer of the polyvalent trawl door. These have alternative towing point for pelagic or bottom and semi-pelagic trawling and are modified on the centre web.

The high degree of stability claimed for these doors is the reason for their success with the French fleet. They maintain a correct angle when not in contact with the bottom and can therefore be used when fishing for high swimming cod or

haddock for pelagic fish without the need to carry alternative trawl doors.

Pairtrawling with outboard motors. *World Fishing*, 20 (8), 1971, 8-10.

14 ft. flat bottomed boats powered by 3-5 hp British Sea Gull outboard motors were used for pair trawling in Lake Chilwa of Malawi. The effective type of trawl used was 68' HR and FR length, the design details of which are shown in the *World Fishing*. As the fishing trials were successful two new 17' boats have been constructed to continue the fishing with different designs of trawls. The catch per hour of fish comes to 50-60 Kg. during the initial trials.

Working of Pelagic Trawls. Peter D. Chaplin *World Fishing* 21 (3), 1972 13-17

Over the last few years distant water stern trawlers have begun employing very large pelagic trawls. These trawls were originally designed for the exploitation of pelagic fish such as herring and were generally worked well clear of the bottom. More recently, however, it has been found that such trawls can capture demersal fish which swims within a few fathoms off the seabed. To use a large fragile trawl in this manner calls for great care since extensive damage can result if the trawl comes in to contact with the ground. Consequently it is important to know how best the trawl can be raised or lowered so as to avoid obstructions or to follow the contours of an undulating seabed.

Gear studies at Aberdeen Laboratory. J. J. Foster, *World Fishing* 20 (10) 1971, 12-15.

Work undertaken at Aberdeen Marine laboratory to elucidate the principle and fish behaviour factors governing the efficiency of fishing operations is given with discussion on points like different types of spreading devices for demersal and pelagic trawls, electrical fishing and observation of

seine net in operation. Merits and disadvantages of flat, cambered, Honk Kong diverter, polyvalent, V-form and suberkurb trawl doors by practical tests are enumerated. The pulsation movement of trawl during tow has been studied with respect to two concepts of trawl designs. The potential use of electrical fishing equipment in association with nephrops trawl and the behaviour pattern of fish in the seine net fishing operations are also embodied.

Preliminary notes on the development of an electrical tickler chain for Sole (*Solea Solea* L.) de Gwot, S. J. and Bousha G. P. International Council for the Exploration of the Sea, Gear and Behavior Committee. C. M. B.4, 4 pp. 1970.

Double rigged beam trawls, with tickler chains are extensively used by the Dutch to fish the sole, their most important commercial fishery. Due to the introduction of powerful engines (800 hp. is common) trawlers are now towing heavier chains - as much as 2000 Kg. of chain in front of the foot ropes of trawls. This increase in the weight of chains has in consequence, increased the damage to immature fish. The aim of the investigation was to examine whether the heavy chains can be successfully replaced by light electrical ticklers. The behaviour of Soles to electrical stimuli in a temperature range of 6°-20° was also investigated.

The tickler consisted of an electrode array mounted on a 2 by 2 M frame. The electrodes were spaced 35 cm. apart and were alternatively positive and negative. During tests in the laboratory, the pulse generator produced pulses of capacitor discharge shape. During trials conducted earlier in a former Oyster basin in the Scheldt estuary, the pulse shape was found to be a quarter Sine shape. It was not possible to establish the pulse length in the investigation. The pulse frequency could be regulated continuously between 1 and 50 i. p. s., the pulse cycle could be interrupted

in a frequency of $\frac{1}{2}$ to 10 Hz. Peak voltage could be regulated in steps between 2.5 and 60 V. Total capacity of the discharge capacitors was 9520 μ F, regulated in steps 2 x 34, 9 x 68 and 13 x 680 μ f. Results of laboratory trials were confirmed by results in the estuary. It was observed that the "Omega jump" of the sole could be induced by a voltage not greater than 8v, a pulse repetition rate of 40-50 per sec. an interrupted pulse cycle of about $\frac{1}{2}$ Hz and a pulse length of about 0.7 m. sec. It is very likely that in actual commercial fishing, the electrical stimuli could probably be continuous, since with a moving net, the electrodes passing over the fish would provide the needed interruption.

It was observed that temperature had no effect on the reaction of the sole to electrical stimuli.

Report on the development of an electrified shrimp trawl in the Nether lands. Bousha G. P. and de Gwot S. J. International Council for the exploration of the Sea, Gear and Behaviour committee. C. M. B. 5-6 pp. 1970.

The authors using an electrified trawl developed by them earlier conducted a series of experiments in a former oyster basin in the Scheldt estuary and from a commercial vessel fishing on shrimp ground. The investigation has proved that in clearer waters, the commercial catches with the electrified trawl were 50% more than those with nonelectrified trawl. However, in very turbid waters catches with electrified trawls were not better and sometimes even poorer than those with the regular trawl. The authors are of opinion that this is due to the fact that the jumping behaviour of the shrimp due to the electrical stimuli, helps them to escape the electrified trawl, the electrified of which extends in front of the ground rope and warns them of approaching danger sooner than the ground rope of the un electrified trawl.

Northern prawn Fishing-Gear, boats and methods - W. D. Hughes. Australian Fisheries. 31, (2) 1972.

A descriptive account of the vessels and gear and auxiliary equipments used in the North Australian Prawn Fishery together with the nature of the banana prawn and

tiger prawn Fishery in these waters.

The design details of some of the standard trawl gear used are also indicated. An attempt has also been made to arrive at certain empirical relationships between engine power, total headline length and otter trawl sizes.

NEWS

The Marine products Export Development Authority will be formally inaugurated on the 7th September 1972 with head quarters at Cochin.

The Marine Products Export Development Authority Act 1972 provides for establishment of an Authority for the Development of marine products industry under the control of the Indian union and for matters connected therewith.

The authority will be a corporate body consisting of representatives of the Government of India. From the Ministries of Foreign Trade, Agriculture, Finance, Industrial Development, Shipping and Transport representatives of the Government of maritime states, and members representing the marine products industry, trade, labour, and similar interests, Fisherman and other interests connected with the industry. The union territories having a Coast line will be represented by notation.

The main functions of the Authority are:

a. Development of off-shore and deep sea fishing in all its aspects for commercial operation.

b. Regulation of off-shore and deep sea fishing relatively to standards and specifications of items of equipment on Board the Fishing vessels and handling of the producers with regard to quality control.

c. Regulations connected with conservation and management of off-shore and deep sea fisheries on the basis of recommendations made by the Ministry of Agriculture on the results of investigations.

d. Registration of Fishing vessels, processing plants, storage premises and conveyances relating to the marine products industry as it is necessary to have a uniform approach for registration with special reference to exports and also the need to regulate the capacities in different areas and a uniform pattern has to be introduced on an All India basis. Such registration is to regulate and promote a healthy development and not to impose undue restrictions. It will also help in rendering financial or other assistance including relief and subsidy entrusted to the Authority and other assistance.

The functions will be organised and under taken wherever possible or feasible through and or with the association of the State Governments, or any other Central or State agencies. The authority will act as an agency for extension of relief and subsidy as may be entrusted by the Government. The Authority will render other types of assistance and service to the industry in relation to market intelligence, export promotion, trade enquiries, and group marketing of small scale operators for developing a few common brand names for projecting a bright image of the Indian products.

The Authority will have adequate powers for effective implementation of

the various functions and will frame rules and regulations for achieving this purpose.

The Authority will have regional offices in Bombay and Madras. Later when export activities increase regional offices will be established in new centres.

New Editor for "Fishery Technology":—

Consequent on the appointment of Shri T. K. Govindan as Technologist under the All India co-ordinated project on Transportation of Fish, he has relinquished the post of Editor of the journal. We wish to express our sincere thanks to Shri Govindan for the valuable services rendered by him as Editor. Shri S. Gopalan Nayar, Junior Fishery Scientist (Craft and Gear) has taken over as Editor of the Journal.