

Fish Product Development - New South Wales State Fisheries and
New South Wales Fishermen's Co-operative Union Ltd.

This project was originally orientated primarily to development of suitable smoked fish products using species where supply exceeded demand but was subsequently modified with the aim of fostering the development of a viable fish processing industry by experimental production of a variety of fish products that would be competitive with imports.

With reference to fish smoking the programme logically resolved itself into two parts, firstly, the determination of those species of fish which could be satisfactorily smoked-cured taking into account the economic viability of such processing and, secondly, development of equipment and processing methods which would give consistent products.

In the years 1973-1974 two species of fish proved to have outstanding potential as the basis for a stable industry. Mullet, which is caught in quantity in the northern waters of the N.S.W. coast, and gemfish which is caught mainly on the south coast.

The fish are caught in great quantities during the spawning season, and at these times, at least in the case of mullet, the market price can drop to such a level as to make the 'catch-effort' uneconomical.

Although mullet and gem fish were seen as the basis for the industry as supplying sufficiently large quantities of raw material to justify the necessary capital expenditure on equipment, there were other species of fish which were also found to be suitable and would lend economic support as well as variation to an established operation. Tailor, mackerel, kingfish, trout, eels and carp have all been shown to be satisfactory to segments of the market. In the last two years blue grenadier, if carefully handled, has proven to be a possible challenger, along with gemfish, to the imported capecod.

When the project was originally planned a survey was made of the literature to determine the more suitable smoke-kiln available and the general concensus was in favour of the "Torry Research Station" designed kiln.

Three of these were bought and installed - one each - in Eden Fishermen's Co-operative, the Clarence River Fishermen's Co-operative and at the Gore Bay terminal of the F.R.V. "Kapala".

These kilns proved of very great value in practical terms in determining the economic visibility of forced draught smoke-curing. In general it was found that the speed of flow tended to dry the fish excessively which gave a certain 'case-hardening' to the surface of the flesh as well as a high weight loss. This could be as high as 25% for "lean" fish, i.e. fish of low fat content.

It was from these observations that the Department developed its own kiln. This kiln is of simple design and of a capacity to suit the needs of fishing co-operatives and small industry at those centres where suitable species and quantities of fish are caught.

The economic theory behind it was to distribute a finished product of consistent quality from the centre of catch rather than have the double handling of moving the raw fish to some central point, such as Sydney, to have to transport it to other centres for sale. This kiln has created wide interest both in New South Wales, Queensland, Victoria and Tasmania. Four are certainly in use, but from reports it would seem that at least three more have been built or are in the process of being built.

Undoubtedly, the most important change in the smoke-curing industry in the next years, will be the increasing use of smoke essence. Pollution of the air and even greater pollution of the waterways by very large-scale smoke-curing industries in Europe has led to strict legislation which will either force these industries to close or to develop alternative processing methods. Very considerable research effort has gone into synthesising or extracting from wood smoke those properties which are considered most closely to produce the taste and aroma associated with traditional smoke-curing.

The Department is much involved with this development. Various smoke essences are being used in new products under trial especially canned products, and as a substitute for traditional smoking.

Four papers were published on aspects of fish smoking in the N.S.W. journal the "Fisherman" and a paper on "Beche-de-mer" was published in the Australian Fisheries. A further paper on smoke-essences has been sent to the editor.

In regard to other fish products, the programme was concerned with the development of products for two different sectors of the market.

At one end of the market the objective was to make use of species of fish which, for a variety of reasons, were not considered acceptable by the public. It could be the appearance of the fish or it could be that the fishermen were not getting a viable return for the catch effort. At the other end of the market an attempt was being made to develop lines for the delicatessen trade from species of fish and shellfish which, although not caught in large quantities, would be economically viable because of the specialised demand which they invited.

The main drive at the lower end of the market was for the production of fish sausages. This proved to be an extremely complex operation for two technical reasons, firstly, the texture of the products and, secondly, the taste.

A number of species of fish were put through the boning machine including mullet, gemfish, box-fish, sea-bream, mackerel and red fish. The resultant mince was then put through a sausage machine and the results tested.

There was an extremely wide divergence in the products, particularly in regard to the texture. Some of the mince - especially the gemfish mince - had a resilience which seemed astonishing considering its origin; most of the other mince was unacceptable because the texture was of a soft almost fluid nature.

With the exception of the mince from the mackerel and mullet there was barely any taste of fish. The mullet and mackerel had a very oily taste. It is thought that the pulverising of the deboning machine causes loss of colloidal liquids and the subsequent loss of fish taste.

The most acceptable texture came from the red fish mince and work continued with this until a product with a gluten binder and pork fat was found to be generally accepted. The fish taste was mildly emphasised by the addition of a hydrolyzed vegetable protein.

This product was introduced to the Eden Fishermen's Co-operative, where through the local press and considerable coverage on Television it achieved a certain amount of acclaim. However, there was little quality control exercised at the time and batches of sausages varied considerably and production became sporadic.

Although the concept of fish sausages is still not widely accepted in Australia, circumstances in the fishing industry of northern Europe should encourage the processing industry here to persevere with this line of product as a challenge to fish fingers. Increasingly the major producers of fish fingers are having to use minced fish as the major ingredient, and the consumer is learning to accept a minced and slightly off white product instead of the original white cod of some years ago.

Of interesting though divergent possibility is the production of other delicatessen lines from fish mince. Because of the wide variety of additives in making salamis and devon type products, it is possible to bind the texture of the fish with such high protein binders as soya bean flour and mask the taste of the soya with the strong spices anticipated in such products. Although the market for these products would require some promotion our own work has shown that there may very well be sufficient demand to be of interest to some medium range producer such as a Fishermen's Co-operative.

A long established industry which could be easily expanded and which has export potential in the smoked-roe industry. Smoked mullet roe now sells at a high price and supplies rarely last from one season to another. However, work carried out by N.S.W. State Fisheries suggests that smoked silver dory roe, gem fish roe and ling roe have equal attraction to the taste panel and other sections of the public. Work is now being conducted to test the possibility of canning these roe with various brines, marinades and smoke essence. Of very great interest to the programme has been the development of products using royal red prawns.

The major problem is the physical one of water retention. The economic loss to the processor of 50% by weight is very severe and shrinkage to the prawn flesh does not give aesthetic appeal.

The approach adopted was to either develop or adapt some format which would inhibit the water loss and mask the shrinkage.

This product was called prawn balls and is directly competitive to a similar product imported from Hong Kong and Singapore.

Sodium hypophosphate was used to retain the water but it seemed to emphasise the iodine taste already in the prawn. Various meat binders which had previously been used experimentally with the fish sausages were also tried and one of these with a wheat gluten base was successful in retaining all but 20% of the water. A number of Chinese companies have

continued to show interest in this work and two small companies are currently processing prawn balls from royal reds in the Eastern Suburbs.

Although no further funds are available from F.I.R.T.A. the project will be continued by New South Wales State Fisheries.

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