# TRADITIONAL AGRO-BASED FOODS OF MALAYSIA

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ABSTRACT

The contribution of traditional foods to the diets of the people in Asia cannot be overlooked. They provide a relatively simple and practical method of preservation to meet the increasing demands for food.

The migration of people from one country to another has resulted in the dispersal of traditional foods from their country of origin. With time, many of these foods have been assimilated into the cuisines of the countries they settled in. However, it is interesting to note and compare the changes and modifications that have evolved in the methods of processing in the different countries.

Malaysia has a rich variety of traditional foods processed from agricultural products as well as from animal and marine sources. The majority of these products are still being produced using traditional methods on a cottage industry scale. These methods are often inadequate to keep up with the pace and demands of modern consumers. This therefore pose a danger to the existence of such industries which may be abandoned for more lucrative businesses.

In recent years, scientists have shown increasing interest in traditional processed foods. The Division of Food Technology of The Malaysian Agricultural Research and Development Institute (MARDI), in particular has made research in the field of traditional foods as one of its priorities. Active research on both fermented and non fermented foods is carried out. Emphasis is given not only to achieving a better understanding of the changes that occur in the processing of these foods, but also to improving the methods of production, introducing mechanisation where relevant, and improving the quality, shelf-life, safety and packaging of these products.

This paper will review briefly some of the traditional foods of Malaysia and their methods of production. Problems face by some of these processors will also be presented. Innovations and modifications that have been made to the traditional methods to reduce or overcome some of these problems will also be highlighted.

## INTRODUCTION

Traditional foods form an important part of the rich cultural heritage that can be found in Malaysia. Foods of various origins, have blended together to form what is recognised as Malaysian food.

Most of the countries in ASEAN share foods which have common origins. It is interesting to compare the changes and modifications that have evolved in the methods of processing in the different countries. The products are known by different names and more often than not, taste different from one another and from the original product. This process of change and adaptation has contributed to the assimilation of the many ethnic foods into the cuisines of the various countries. However, while some of these foods have found widespread acceptance, others remain limited in their popularity.

Traditional foods are made from plant products as well as from those of animal or marine origin. There is a wide range of both fermented as well as non fermented products. In the context of this paper, agro-based products will be limited to only those of plant origin.

## STATUS AND PROBLEMS

The food industry in Malaysia is rapidly expanding. However it still remains small compared to the other industries. In 1980, it only accounted for 3.7% of the Gross Domestic Product and its average annual growth rate for the period 1971—1980 was only 4.0% (Fourth Malaysia Plan 1981—1985). About 80% of these industries are classified as small industries as they have capital investments of less than M$500,000/-. The sector of the food industry involved with the processing of traditional food occupies only a minor portion of the industry. Most of these industries are not even included in the Directory of Manufacturing Establishments and do not fit into the categories listed.

Thus it can be seen that the traditional food industry in Malaysia is not well developed and the majority are considered to be small scale industries or even backyard operations. As a result, it is not surprising to find that these industries face many problems.

Problems commonly encountered by these industries include those of quality, hygiene, handling, distribution, shelf life and marketing. This is partly due to the fact that most of them are family owned businesses using traditional methods of production. They are usually conservative, resistant to change and adhere strongly to cultural taboos and beliefs regarding what should or should not be done. Quality of products often varies from batch to batch, and sometimes even within the batch. In many establishments, there is an alarming lack of hygiene and sanitation resulting in short shelf-life and even spoilage of the products. To overcome this, some processors resort to adding excessive amounts of preservatives or even colour to mask the appearance.

Packaging poses another problem. Often the traditional material used is in short supply, or is unsuitable and unappealing. Another problem frequently encountered is lack of the traditional raw material and the seasonality of their availability. The traditional methods of production are usually time consuming and labour intensive; thus labour shortage is an problem. A survey conducted by the Division of Food Technology, of the Malaysian Agricultural Research and Development Institute (MARDI) showed than an alarming proportion (about 90%) of the small scale food processors have not received any formal training in food processing. This is compounded by their limited capital, ignorance of assistance available and their attitude towards modernisation. Many of the younger generation are unwilling to continue with the family businesses, preferring to seek jobs in the cities and modern factories. There is

therefore a very real danger that the traditional food industries will slowly die off in the face of other more lucrative attractions.

Efforts must therefore be made to improve the traditional food industries if they are to keep up with the pace and demands of modern consumers.

## TRADITIONAL AGRO-BASED PRODUCTS

In recent years scientists have shown increasing interest in traditional processed foods. Methods of processing are usually handed down from generation to generation by word of mouth and there is little literature available on these foods. Information on their methods of production, composition, nutritional value, and in the case of fermented foods, the microorganisms responsible and the roles they play, is scarce.

The Division of Food Technology has made research in the field of traditional food one of its priorities. Research on fermented as well as non-fermented food is carried out to obtain information on these foods and to improve the methods of production, introducing mechanisation and modern methods where relevant. Work on improving the quality, shelf-life, safety and packaging of these products is also actively conducted.

Table 1 lists some of the common traditional foods in Malaysia. Only some of the agro-based products will be discussed to highlight the research that is being carried out to improve these products.

Table 1. Common Traditional Foods of Malaysia.

| Raw Material | Products | |
|---|---|---|
| | Local Name | Common Name/Description |
| 1. Soya Beans | Susu kacang soya | Soya bean milk |
| | Tau kwa | Firm soya bean curd |
| | Tau fu | Semi firm soya bean curd |
| | Tau fu fah | Soft and sweet soya bean curd |
| | Tau fu pok | Fried soya bean curd |
| | Fuchok | Yuba, soya protein lipid film |
| | Tim chok | Sweet soya film, residue of fuchok production |
| | Chai Ak, kiam hu etc. | Vegetarian food made from fuchok |
| | Kicap | Soya sauce, thin, thick, semithick |
| | Tauchu | Soya bean paste |
| | Tempeh | Mold fermented soya bean product |
| | Sufu | Fermented soya bean curd |
| | Tim cheong | Sweet sauce |

Table 1. (continued).

| Raw Material | Products | |
|---|---|---|
| | Local Name | Common Name/Description |
| 2. Rice | Meehoon, laksa kuayteow | Rice vermicelli products |
| | Karas | Crispy fried product |
| | Dodol | Rice-coconut product |
| | Emping | Flaked rice product |
| | Samsu | Rice wine |
| | Apam | Rice cake |
| | Tapai pulut | Fermented glutinous rice |
| | Tuak | Alcoholic drink from glutinous rice |
| | Ketupat | Rice or glutinous rice packed in leaves |
| | Lemang | Rice or glutinous rice roasted in bamboo |
| | Idli, tosai | Product from rice and black dhall |
| 3. Fish and shrimps | Pekasam | Fermented whole fish |
| | Budu | Fermented fish sauce |
| | Belacan | Fermented shrimp paste |
| | Cincalok | Fermented whole shrimps |
| | Keropok | Fish, prawn or cuttlefish crackers |
| | Fish ball or cakes | Fish ball or cakes |
| | Ikan masin | Kiam hu, salted fish |
| | Ikan/Udang kering | Dried fish or prawns |
| | Petis | Prawn paste |
| | Ikan jeruk | Pickled salted fish |
| 4. Fruits, vegetables, root crops | Jeruk | Pickled fruits, vegetables and root crops |
| | Halwa | Candied fruit and root crops |
| | Tempoyak | Fermented durian |
| | Kiam chye | Salted vegetables |
| | Toddy | Fermented coconut sap |
| | Cuka | Vinegar eg nipah vinegar |
| | Gula melaka, enau, nipah, gerek | Various types of palm sugars |
| | Kerepek pisang and ubi | Banana and cassava chips |
| | Pisang salai | Smoked banana halves |
| | Tapai ubi | Fermented cassava |
| | Acar | Cooked spicy, pickled fruits and vegetables |

Table 1. (continued).

| Raw Material | Products | |
|---|---|---|
| | Local Name | Common Name/Description |
| 5. Milk | Tairu | Sour milk |
| | Dadeh | Sweet yogurt-like product |
| | Ganteh | Sweetened milk product |
| 6. Wheat flour | Mee | Noodles |
| | Kueh sepit, bahulu etc. | Traditional cakes |
| 7. Eggs | Pei tan | Century old eggs |
| | Telor masin | Salted eggs |

## STAPLE FOOD

Malaysia is basically an agricultural country and it has been estimated that about 42% of the total land area is suitable for agriculture. However, a large proportion of the cultivated land is used for plantation crops such as rubber, oil palm and cocoa. Of the remaining land, padi occupies the largest hectarage. This is not surprising as rice is the staple food in the country. The rice processing industry is relatively well developed and the country has achieved 92% self sufficiency.

### Products from Rice

Traditional products from glutinous rice include *tapai pulut* and *tuak,* while those from rice include *meehoon, laksa, kuay teow, ragi, angkak, karas, dodol, emping, apam, idli* and *tosai.* On the other hand, products from both glutinous and non-glutinous rice include *ketupat* and *lemang.*

*Tapai pulut* is a popular food in Malaysia and is commonly consumed as a desert. It is sweet yet slightly alcoholic with a fragrant, pleasant aroma. After fermentation, the rice becomes soft and juicy, and there will be some liquid produced. It is a perishable product as the fermentation continues even after the optimum stage of fermentation has been reached, resulting in a sour, alcoholic product.

In the traditional method for preparing *tapai pulut,* the *pulut* is washed and soaked overnight. The next day it is drained and cooked by steaming. When cool, it is inoculated with a starter known as *ragi,* wrapped in banana leaves and allowed to ferment at room temperature for 2-3 days. The taste of the resultant *tapai* is very much dependent on the inoculum used, the ragi, and also on the quality of the *pulut. Ragi* from different places will produce *tapai* of varying quality depending on the microorganisms present in the *ragi.* As this is not produced aseptically, and there is no selection of microorganisms, wide

variations in the microflora have been found. Research was thus carried out to identify the microorganisms essential for the fermentation of *tapai.* It was found that only 3 species of microorganisms are important for the fermentation viz. *Chlamydomucor oryzae, Endomycopsis* (*Saccharomycopsis*) *fibuliger* and *Hansenula anomala* (Merican & Yeoh, 1982). However, these organisms must be present in specific proportions to produce the desired taste and aroma. A pure culture starter in a powder form, suitable for use by the processors was thus developed. The use of pure culture starters ensures that the quality of the product remains consistent from batch to batch, reduces the fermentation period, and reduces contamination and spoilage by other micro-organisms.

The method of production was also modified so that *tapai* can be produced on a large scale. Fig. 1 shows the flow chart for the production method. In the modified method, the *pulut* is cooked rather than steamed as it

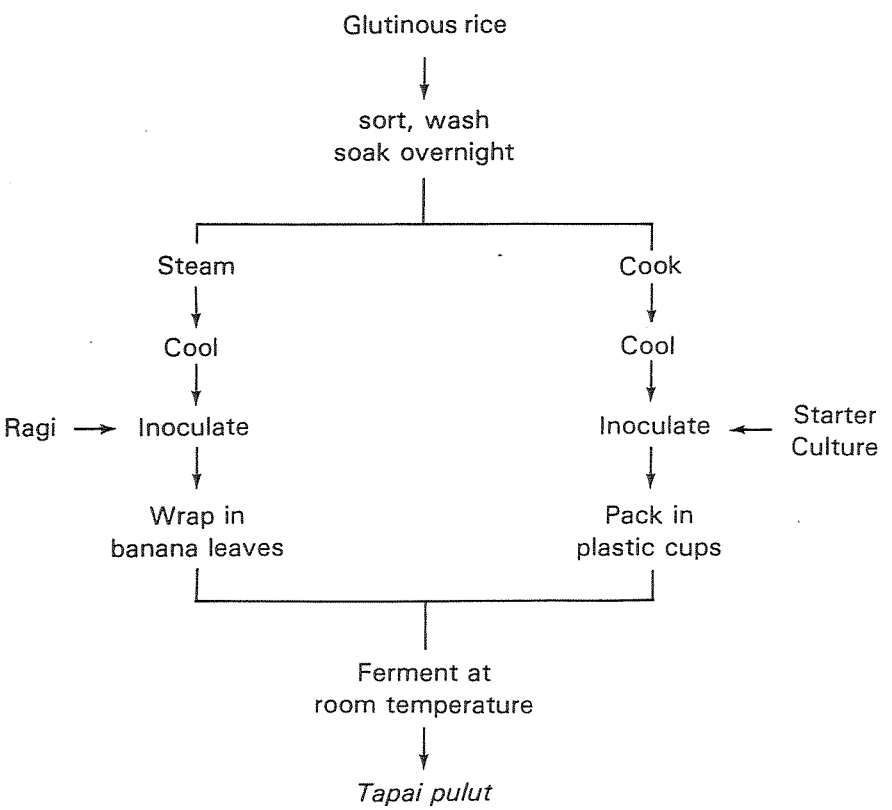


Fig. 1. Production of *Tapai Pulut.*

was found that this gives more uniform cooking. It is then inoculated with the pure culture starter and packed into plastic cups for the fermentation. It was found that the cups provide for easier handling, storage and distribution and improve the presentation and hygiene. In these cups the *tapai* can be kept for more than 2 weeks at refrigerated temperatures compared to the 2—3 days shelf-life for the traditional product. Furthermore it helps to overcome the problem of lack of banana leaves. A few processors have started producing *tapai* using this modified method and they appear to be quite successful.

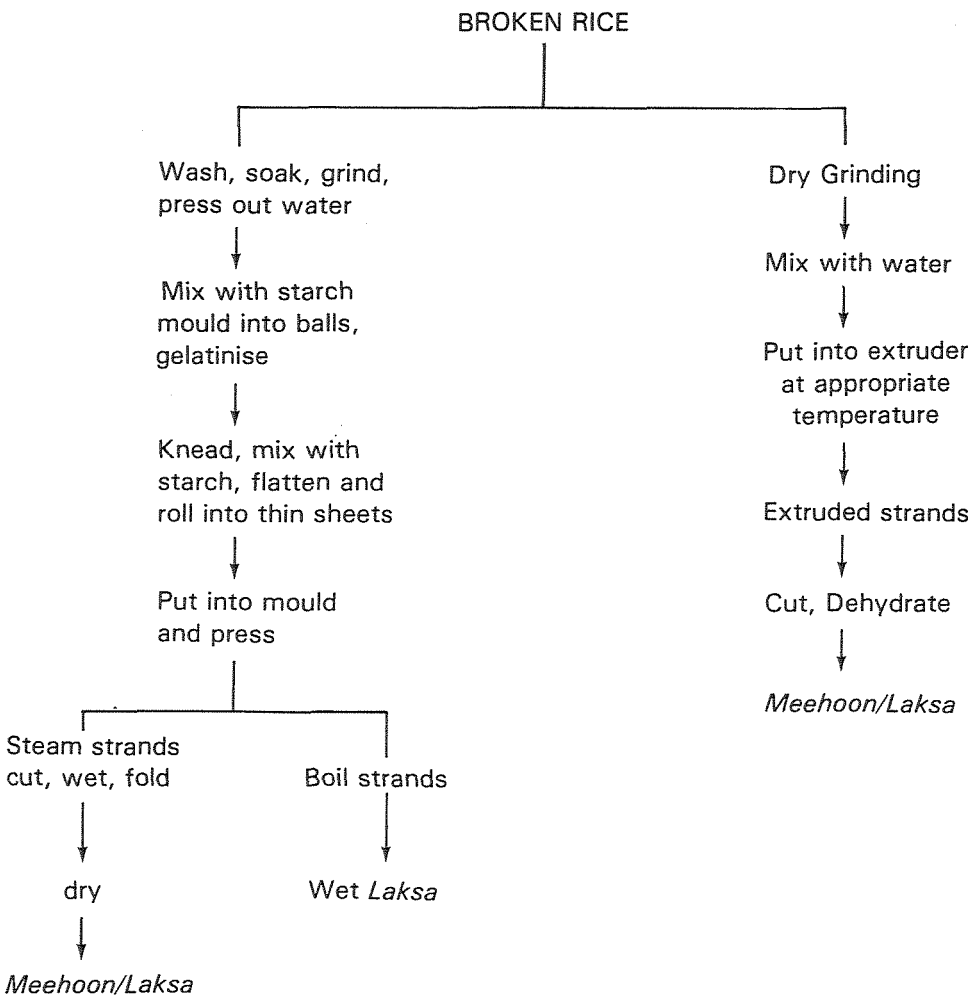


Fig. 2. Production of *Meehoon* and *Laksa* (Source: Othman Hassan, 1984).

*Mee hoon* and *laksa* are another two products from rice. They are both vermicelli products and are basically similar except for size of the strands. The quality of these two products is very much dependent on the quality of the starch in the rice powder used. In the traditional method of production, broken rice is ground and mixed with starch. This is then moulded into balls and gelatinised by cooking or steaming. This is then cooled slightly, mixed with starch, rolled into thin sheets and put into a mould to extrude the strands of *meehoon* and *laksa.* The strands are then steamed and cut into the desired length, wetted and sundried (Fig. 2). In the improved method, the dry rice powder is mixed with water, conditioned, and then put into a cooker extruder. The extruded strands are then cut and dried using a mechanical dryer (Othman, 1984). It has also been found that a solar dryer can be very effective for drying the product. Using this modern method, the scale of production can be increased and the quality improved.

Using mechanical and solar dryers, dried products with better reconstitution properties as well as appearance compared to sundrying where the rate and temperature of drying cannot be controlled are produced. It is also important to control the temperature of gelatinisation and extrusion to obtain a good product.

## PRODUCTS FROM SOYA BEAN

Soya beans are used as the raw material for a wide range of traditional products. However Malaysia does not produce very much soya bean and depends mainly on import to meet the demands of the industry.

Among the traditional non-fermented soya bean products are soya bean milk, various types of soya bean curd (*tau fu*) and soya protein lipid film (fuchok). For all these products, the basic process is the production of soya bean milk. Fig. 3 shows the flow chart for preparing these 3 products (Husin & Chuah, 1980).

For the preparation of soya bean milk, the beans are washed, soaked overnight, drained and ground, normally using a stone grinder, either operated manually or motorised. The slurry is then filtered manually or using filter bags to produce the milk. If soya bean milk is the desired end product, the milk is then sweetened and boiled. However, soya bean milk is one product that has been taken up by beverage manufacturers and is now produced on a large scale using sophisticated food processing equipment and sold in bottles and tetra paks.

For the production of *tau fu*, the raw soya bean milk is boiled and then coagulated using coagulating agents such as 'siako' or calcium sulfate. This produces the soft soya bean curd known as tau fu fah. This is sweetened with sugar and consumed as a dessert. For the firm type of tau fu, the curd is

scooped into individual moulds lined with cloth. These are then placed on wooden trays, which are stacked and pressed to squeeze water out of the curd. The pressed curd or tau fu is then placed in water to cool.

For the processing of *fuchok*, the soya bean milk is diluted to the desired soluble solids content. It is then poured into shallow metal containers with wooden dividers and placed on top of another metal trough filled with water. The trough is placed on a cement stone which is usually heated by firewood or gas. As the milk heats up, a protein lipid film (*fuchok*) eventually forms on the surface of the milk. The film is lifted manually from the milk at regular intervals and hung up to dry. The residual milk remaining at the end of the process can be further heated to form a fairly, thick film with a sweet taste known as *tim choke. Fuchok* prepared the traditional way is very brittle and this leads to substantial loss of 'fines' if not handled properly.

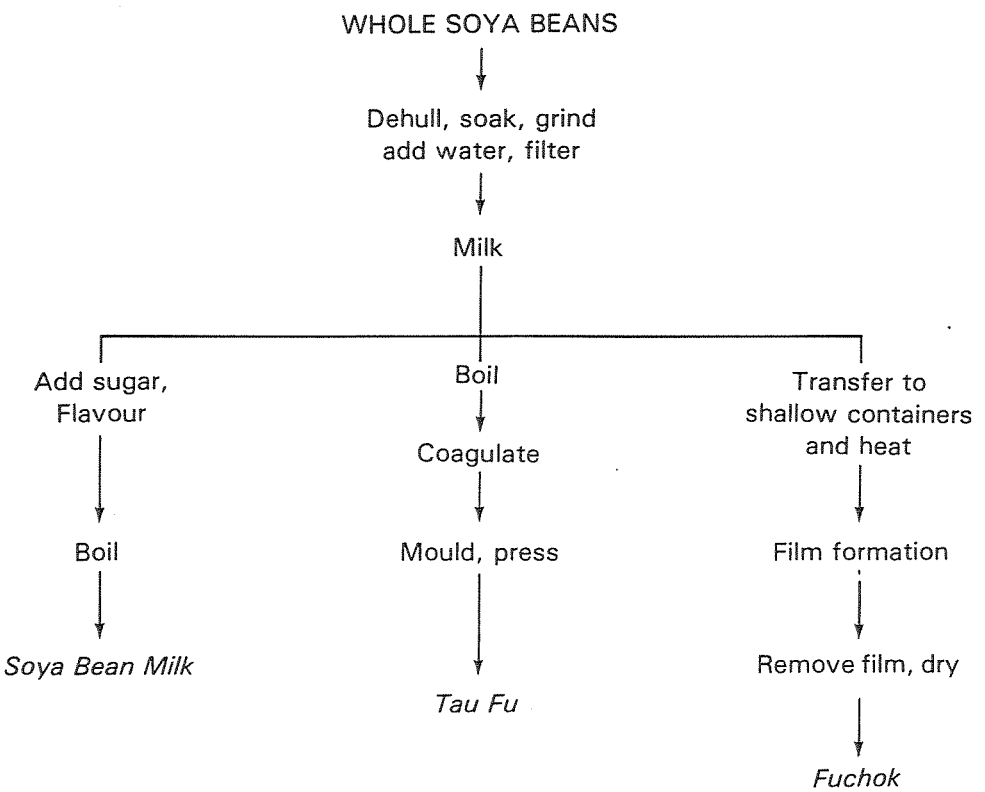


Fig. 3. Processing of *Soya Bean Milk, Tau Fu* and *Fuchok* (Source: Hussin Zakaria Chua Eng Chong, 1980).

A number of improvements can be made to the production of soya bean products on a small industry scale. This includes dehulling the beans before soaking to reduce the soaking period, and using mechanical grinders and centrifuges. For *tau fu* processing, use of direct steam injection will help to reduce the time taken for the soya bean milk to boil. The use of casts to mould the tau fu will also greatly increase the production capacity. Further more it has been found that the use of glucono-delta-lactone (GDL) as the coagulating agent gives a better product. This is a pure substance, thus better control of the coagulation process is achieved and a smoother product obtained.

In the production of *fuchok,* the process can be improved by using pumps to transfer the milk to the trays and by using direct steam injection to heat the water in the troughs. This is not only more efficient but also cleaner. Improvements could also be made to the drying process by using hot air drying rather than the conventional sun-drying. *Fuchok* is often used for the fabrication of vegetarian foods which can be considered as a form of texturised vegetable protein. For this purpose, flexibility of the film and good reconstitution properties are very important. Research carried out has shown that the addition of humectants such as glycerol, will help to overcome this problem without affecting the taste of the product.

Two fermented traditional products from soya bean are *tempeh* and soya sauce. For both these products, research was conducted to select the most suitable strains of fungus for their production. In the case of *tempeh,* the fungus selected was *Rhizopus oligosporus* and for soya sauce, it was *Aspergillus oryzae*. Starter cultures similar to the one for tapai were produced and made available to the processors. Traditionally the mold fermentation stage of the soya sauce production depended on the chance inoculation of various species of fungus from the trays used for the moulding process and from the environment. This leads to problems if the wrong types of fungus predominates. Use of a pure starter culture ensures that the fermentation will be carried out by the desired fungus and a consistently good quality product is obtained. Mixing of the cooked beans with the wheat flour and starter is usually done manually. However it was found that use of a mechanical mixer greatly facilitates this process. After the molding step, the *koji* is usually put into earthenware jars, which are topped up with brine. This brine fermentation stage requires a large area and is also laborious as each individual jar has to be opened and closed daily. It has been found that large stainless steel containers can be successfully used instead. The containers are fitted with mechanically controlled covers and pumps are used to siphon out the liquid. Pasteurisation of the final product, introduction of semi-automatic bottling and use of disposable polyester (PET) bottles have also contributed to improving the process. Use of PET bottles in particular is a definite improvement over the use of recycled bottles not only in terms of hygiene but also presentation (Fig. 4).

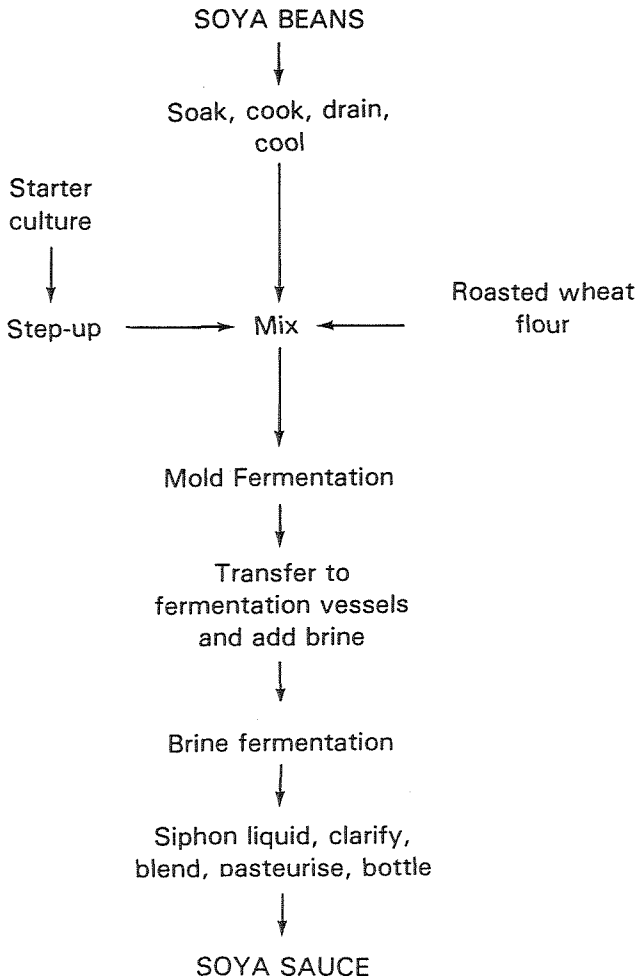


Fig. 4. Soya Sauce Production.

In the production of *tempeh,* one of the limiting steps is the dehulling of the beans after cooking. This is an important step because if the hulls are not removed, good tempeh will not be produced. Mechanical dehulling before soaking can be used to overcome this problem. In the traditional method of production some tempeh from a previous batch is dried and ground into a powder to provide the inoculum. Alternatively, the beans are wrapped in leaves with rough surfaces and left to ferment for a longer period so that the fungus sporulates. The spores adhering to the surface of the leaves are then used as inoculum. Problems of contamination and use of fungal strains which

have slow growth can be reduced by using the pure culture starter. For the fermentation step, the beans are usually wrapped in banana leaves. However this is laborious and time consuming. Furthermore with urbanisation, the supply of banana leaves has become scarce. The introduction of perforated plastic bags and block fermentation techniques has helped to overcome this problem (Fig. 5).

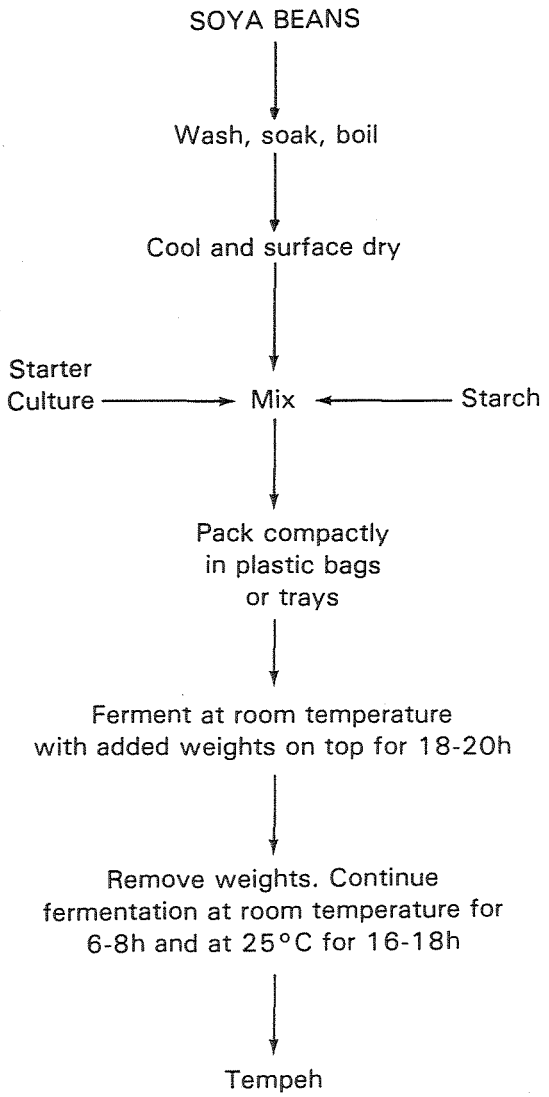


Fig. 5. Production of *Tempeh*.

**Products from Fruits and Vegetables**

Pickling is one of the oldest methods of food preservation. Like other countries, there is a wide range of fruits, vegetables and root crops that are pickled. Normally those produce that cannot be consumed directly because they are too sour, tart or bitter are pickled. Pickling also provides a good method for preserving crops in times of glut. Normally the leafy vegetables are pickled using the dry salting method, while the non-leafy types are allowed to ferment in a brine solution. Control of the salt concentration, maintainence of microaerophilic conditions and observance of hygienic practices are all important in order to obtain good quality products. Examples are salted vegetables, pickled cucumbers, chillies, ginger, bamboo shoots, mango, young papaya and various other fruits.

Candying is another traditional method of preserving fruits and root crops. Popular candied items include ginger, pineapple, lime, *buah kabong,* and coconut.

*Tempoyak* is produced by fermenting durians. This has a very strong characteristic odour and flavour which tends to limit its popularity. However it is a simple method for preserving durians and to make use of fruits which are over ripe. The durian pulp is mixed with salt and allowed to ferment for about 2 weeks. This is basically a lactic acid bacterial fermentation. Spoilage of the product usually occurs due to the growth of yeasts on the surface of the *tempoyak.* Trials carried out have shown that this can be reduced by covering the surface of the fermenting durian with a piece of plastic material. Research is on-going to study the chemical and microbiological changes occuring during fermentation.

## CONCLUSION

There is a wide variety of traditional products in Malaysia. However most of these are still being produced on a small industry or cottage industry scale. The Division of Food Technology is actively involved in carrying out research and development work to improve the traditional food industry. Some measure of success has been achieved as illustrated by the examples highlighted. It is hoped that assistance can be given to even more establishments.

## REFERENCES


HUSSIN ZAKARIA AND CHUA ENG CHONG. 1980. Improvement of Cottage Processing of Soya Bean Milk and Soya Bean Milk Products. Paper presented at Seminar on Modernisation of Malaysian Cottage Food Industries, Universiti Pertanian Malaysia, Serdang, Selangor.

MERICAN, ZAHARA AND YEOH QUEE LAN. 1982. Penyediaan Tapai Secara Modern. Teknologi Makanan Jil. 1, Bil. 1.

OTHMAN HASSAN. 1984. Kaedah Memproses Meehoon dan Laksa. Teknologi Makanan Jil. 3, Bil. 1.