

Promoting and protecting traditional food products



Knowledge about the production of traditional food products has been adapted over many generations. These products are often appropriate to the technical, social and economic conditions of the region in which they are made. Traditional food products are now facing severe competition from mass-produced products. There is a danger that with globalisation these traditional foods will disappear. Because of the tremendously important role traditional food products play in food security and their potential to contribute to the growing food needs of the world, it is essential that the knowledge of their production is not lost. The wealth of knowledge needs to be documented; research needs to be carried out on these products and a supportive environment needs to be built for the promotion of traditional food products.

Introduction

Agricultural crops are processed for many different reasons. These range from the removal of anti-nutritional components and increasing the storage life of the final product to adding value to increase both employment and income generating opportunities. Knowledge about food processing technologies and the production of traditional food products has been handed down from parent to child for centuries. These products have been modified and adapted over generations. Some products and practices no doubt fell by the wayside. Those that remain today have not only survived the test of time but also, more importantly, are appropriate to the technical, social and economic conditions of the region.

Food security

The production of traditional food products plays an important role in ensuring the food security of millions of people around the world particularly marginalised and vulnerable groups. This is achieved through improved food preservation, increasing the range of raw materials that can be used to produce edible food products and removing anti-nutritional factors to make food safe to eat. There are several options for preserving food including drying, freezing and canning, however many of these are inappropriate for use on the small-scale in developing countries. The technologies used to produce traditional food products have been employed for generations

to preserve food for consumption at a later date and to improve food security. Based on local resources and capabilities they are usually the most appropriate techniques for food preservation. *Gundruk* (a fermented green leaf product from Nepal) and *Madila* (a fermented milk product from Botswana) described in edition 23 of *Food Chain*, are examples of this.

Many traditional food products are made by salvaging waste food which otherwise would not be usable as food, for example products are made from bones in Sudan and from oil cake in Indonesia. Many agricultural crops contain naturally occurring toxins and anti-nutritional compounds. Over the years, people have developed ways of removing or detoxifying these crops. *Kawal* (a fermented green leaf product from Sudan) described in edition 23 of *Food Chain*, is an example of this.

Income and employment

Food processing is probably the most important source of income and employment in Africa, Asia and Latin America. Traditional food products are an important source of income and employment for millions of people around the world especially the vulnerable and marginalised. Traditional food products form a large percentage of the products made by small-scale food processors.

Health and well-being

Traditional food processing technologies can enhance the nutritional value of a food product through increasing the vitamin levels and improving the digestibility of the final product. This has been used traditionally to make weaning foods and was described in edition 22 of *Food Chain*. Traditional food processing technologies can improve the flavour and appearance of food. Many traditional food products have strong flavours which can enhance a dull, bland and starchy diet. For instance, in Asia, pickles, *gundruk* and chutneys are used as condiments to enhance the overall flavour of a meal.

Globalisation and the threat to traditional food products

Many producers of traditional food products are facing competition from mass produced products and the introduction of 'Western foods' with their glamorous image. Coca Cola is more popular than traditional fruit juices in many countries. *Muri* (puffed rice) in South Asia is being replaced by potato chips.

Keywords

Food processing, traditional food products, traditional knowledge, food security, income, employment, nutrition, quality control, *Gundruk*.



Prakesh Khanai noted in *Food Chain*, the colossal rise in the consumption of instant noodles in Nepal. Noodle manufacturers have targeted consumers with slick advertising and attractive packaging. There were door-to-door sales, gift coupons and free samples. Noodles are replacing the traditional *dhali bhat* (rice and lentil curry) and products such as *gundruk*. Due to the lower nutritional value of noodles, levels of malnutrition may increase.

Protecting and promoting traditional food products

Because of the importance of traditional food products, knowledge of their production must not be lost. If these traditional food products are to compete effectively with products made on a larger scale, it is essential that an understanding of the processes involved is developed. The knowledge of the production of traditional food products has often been passed down from parent to child (usually mother to daughter) and belongs to that undervalued body of 'indigenous knowledge'. Most of this knowledge has not been documented and is in danger of being lost as technologies evolve and families move away from traditional food preservation practices.

The art of traditional processes needs to be refined to incorporate objective methods of process control and to standardise the quality of the final product without losing its desirable attributes, such as improved keeping quality, taste and nutritional qualities. Once the details of the processes are known and understood, it is possible to begin to refine and improve them. However there is a danger of mystifying the traditional processes by enrobing them in scientific theory. What was once a simple process carried out by any family member in the confines of the household using locally available equipment and materials, could become a process to be feared. It is encouraging to note that there are traditional products competing with globalised products. Examples of this include *Dadwa* (a fermented legume product) in Nigeria and in Zimbabwe, traditional fermented milk is made industrially and sold as *Lacto*.

To help in the promotion of traditional foods, quality control procedures need to be improved. The aim of quality control is to ensure that every batch of food produced has a satisfactory and uniform quality. Inadequate quality control can have an adverse effect on

local demand for the product and this can be a problem for small-scale traditional production. In modern industrial applications, the equipment and processes are controlled using expensive technology, resulting in a consistent product of a known quality. Traditional practices take place in a less predictable environment, therefore appropriate quality control procedures need to be developed and implemented.

Research needs to be carried out on traditional products in collaboration with small-scale food processors. The results need to be disseminated widely and a supportive environment needs to be built for the promotion of traditional food products. The promotion and protection of indigenous knowledge should be of interest to governments, historians, anthropologists and scientists. Several individuals and organisations are actively involved in the collection, documentation and dissemination of information on traditional food products.

Euroterroir

The European Union established the Euroterroirs project to identify and describe food and drinks of local origin in each region of the European Union. The work was co-ordinated by the Groupement Européen d'Interet Economique. The audit of traditional food products of Europe has now been completed.



Hugh MacConville

Globalisation threatens traditional food products from Ireland to Africa, Asia and Latin America. 'Did you treat your Mary Anne to dulce and yallaman'



A shortened publication of all the findings is being published in French and a series of national publications in each country are being produced. *Ireland's Traditional Foods* was published in 1997 and the *Traditional Foods of Britain* in 1999. An article describing the findings of the work in Ireland is included in this edition of *Food Chain*. In recent years, the European Union introduced regulations for the protection of specific traditional food products through the 'protection of designations of origin' and 'certificates of special character'.

The Indian Traditional Food Products Panel

India has a wealth of traditional food products. To support and upgrade these products, the Ministry of Food Processing Industry has established a panel. The panel will study the problems faced by the producers of traditional food products and make recommendations for the development of this sector. Workshops have been held in Coimbatore, Ludhiana, Hyderabad, Mumbai and Calcutta.

Intermediate Technology

Intermediate Technology has been collecting information about traditional food products from Africa, Asia and Latin America. The first volume of products was published in 1997

and a second volume is planned for the year 2000. The objectives of the work is to document the wealth of knowledge on traditional food products. Intermediate Technology is planning to carry out a specific study on the impact of globalisation on traditional food products as part of the Department of International Development's Crop Post Harvest Programme. Workshops are being held in both the UK and Asia.

Intermediate Technology is interested to hear from other organisations who are actively involved in the promotion of traditional food products.

References

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 Fellows, P., (1997), *Traditional Foods*, Intermediate Technology Publications, UK

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Workshop on Protecting and Promoting Traditional Foods

London, United Kingdom

20 October, 1999

An IFST Appropriate Technology Special Interest Group Workshop is being held in London. The theme of the workshop is protecting and promoting traditional food products.

Date: Wednesday 20 October 1999

Time: 2 – 5pm

Venue: Friends Meeting House,
173-177 Euston Road, London, NW1 2BJ.

Cost: £5 per person to cover costs

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Ireland

Europe

Ireland's traditional foods

Everybody associates the potato with Ireland but there are also a surprising number of traditional foods and drinks associated with this island on the western edge of Europe. Cathal Cowan, co-author with Regina Sexton of a book on Ireland's Traditional Foods, discusses some of these in this article, including drisheen and soda bread.

Traditional Irish foods

A wide diversity of food has been identified as traditionally Irish. They range from buttered eggs to soda bread, blaa, simnel cake, boxty, Connemara and Wicklow lamb, mutton pie, salted ling, eels, clove rock, spiced beef, smoked salmon, kippers, apple tarts, bacon and ham, cabbage, fruit slice (gurcake), red lemonade, brawn, yellowman, oatcake, pin-head oatmeal, buttermilk potatoes, carrageen, stout and tea. Some of these foods are native and others have, through time, become established as popular or occasional foods in Ireland.

Many originally started as farm or cottage foods and, in time, became industrially produced. Food manufacturing companies were the first to introduce a number of products including cream crackers, fig rolls, iced caramels and Irish crumpets which were produced by the old Boland's Bakery in Dublin. Iced caramels were also first produced in Dublin when one of the workers had the idea of dipping the toffee caramel in icing.

There are products from Cork, including tripe and drisheen, as well as ling which is still available in the Cork Covered Market and was a staple food for the poor in former

times. Some of the interesting foods with a northern background are potato apple cake and another confectionery item is yellowman. The potato apple is distinguished by the inclusion of an apple filling in the potato bread, while yellowman has romantic associations with the Lammas Fair in Ballycastle in county Antrim.

Drisheen

Drisheen is a unique preparation of animal bloods, made only in Cork and surrounding counties. The exact quantity of each blood used is critical. The product is too light and fragile if too much sheep blood is used and it is too heavy if too much beef blood is used. Drisheen is traditionally served with tripe. The drisheen and tripe are almost invariably served with a rich buttery white sauce which is seasoned with plenty of pepper. Drisheen can also be sliced and fried lightly in butter and is usually eaten with a thick slice of heavily buttered white bread.

In Cork, as it is rather tasteless, drisheen is sometimes served with tansy sauce. Tansy is an herb with yellow flowers and finely toothed bitter aromatic leaves. It is added for flavour, either as an ingredient, or as a sauce (thyme is more readily available and can be used instead of tansy).

Drisheen is recommended as a highly nutritious dish for the elderly and for pregnant women. It is also claimed to be very good for people with stomach complaints, as it is easy to digest. Its shape resembles an inflated bicycle tube. Its colour is a brownish-grey and it has a distinctive blancmange like texture.

The tradition of blood consumption was due to the commercial development of Cork City between 1680 and 1825 when it became the largest and most important port in Britain, Europe and America and as a by-product, the city's slaughterhouses were producing large quantities of beef blood.

Today, the beef and sheep blood is blended in a tank and a little salt is added. It is left to solidify and once coagulated, the blood is scored with a knife and left over night. By morning, the mixture has separated into blood serum and coagulated blood residue, with the original blood mixture rendering about one fifth of its original volume in usable serum. The serum is drawn off and carefully poured into prepared beef

Catherine MacConville



*Soda bread and Farls
traditional Irish food*



Ireland

Europe

casings. The puddings are then boiled for about five minutes and are ready for sale needing no further cooking.

The drisheen is sold to local butchers, hospitals and hotels, and it is also delivered to the city stalls and shops and must be kept under water. It is sold loose and cut to order. It is highly perishable and not suitable for freezing. O'Reilly's are the only commercial producer in Cork. Demand is good and all production is sold readily.

Soda bread

Typical soda bread is round in shape and usually produced with a cross so that it can be broken into quarters. It weighs between 300 and 400 grams and is coloured brown with a yellow tinge throughout due to the soda. The texture is coarse and the product is firm to the touch. In Northern Ireland, soda bread is called soda cake.

Soda bread can be made using bicarbonate of soda as the raising agent and buttermilk as an ingredient, or baking powder and buttermilk. Other ingredients include wheat flour, salt, sugar, animal and vegetable fat, or various combinations of raising agents and ingredients. The buttermilk available in the 1930s was so acidic that there was no need for baking powder to be added because the bicarbonate of soda was sufficient. Today, the buttermilk is more neutral so baking powder, which contains sodium bicarbonate as well as an acid powder (in addition to sodium bicarbonate and a starch filler, such as wheatflour or cornflour, baking powder contains any one of the following acids – sodium acid pyrophosphate, sodium acid aluminium phosphate, acid calcium phosphate, tartaric acid or cream of tartar, or ammonium bicarbonate) which helps the raising process, is needed and used instead of sodium bicarbonate. All ready-to-use powders release an amount of carbon dioxide which is not less than 8 per cent by weight of the powder. White soda bread is also available and is produced with white flour.

The leavening agent, bicarbonate of soda was first introduced into Ireland in the first half of the nineteenth century. The National Folklore Archive indicates that its use was commonplace by the 1840s and by the second half of the nineteenth century, soda bread had gained widespread popularity throughout the country. Its popularity may, in part, be attributed to the fact that when soda is combined with sour milk or buttermilk, it produces a light and palatable leavened wheat bread that

can be quickly and successfully produced in the domestic setting.

Soda bread is particularly popular with butter as a snack in restaurants and with smoked salmon as an entrée.

Yellowman (also Yallaman)

Yellowman was popularly sold at Irish fairs all over the north east of the country. It has a particular romantic association with the Lamas Fair in Ballycastle, County Antrim which is over 350 years old. The sheep and pony fair is held on the last Tuesday in August and everyone in the community attends. Young boys used to wear elaborate and delicately fashioned plaits of corn straw in their buttonholes, designed to win the attention of girls. If successful, they might express their affection further by treating their new found love to some yellowman.

The current sweet may well hail from the first introduction of sodium bicarbonate into Ireland in the early nineteenth century. It is a unique, golden yellow, hard, brittle, boiled toffee, made with soda to achieve an airy texture. The confection is presented in a large block and the vendor simply hits the block with a small hammer to produce suitably sized pieces. The most usual and traditional way to hold loose sweets in Ireland is in a paper cone, known as a 'tomashin'. Yellowman can also be sold in bars or sticks weighing about 75g. It is mostly sold loose but it can be wrapped in transparent cellophane.

Yellowman is traditionally made up of butter, baking soda, brown sugar, vinegar and golden or corn syrup. The ingredients are melted and boiled to 285°C at which point the baking soda is added which causes foaming. The mixture is poured onto a greased dish and pulled on a machine where it changes colour from dark yellow to pale yellow as it is stretched. It is then poured onto a cold slab and marked into blocks or made into sticks.

Cathal Cowan is a Principal Research Officer in Food Marketing Research at the National Food Centre of Teagasc, Castleknock Dublin 15, Ireland and Regina Sexton is a free lance food historian, based in Co. Cork. Ireland. The book, Ireland's Traditional Foods - an Exploration of Irish Local & Typical Foods & Drinks by C. Cowan and R. Sexton is published by the National Food Centre. Tel: +353-1-805 9500 Fax: +353-1-805 9550. Price: Irish £14.99.



Russia

Europe

Old skills, new opportunities: small-scale food processing in Russia.

Godfrey Cromwell, of GECCO, has spent the last six years working in Russia. In this article he describes how many people rely on the diversity of small scale food processing as a family survival strategy. This article gives a taste of the style and diversity of local, small scale processing that can be found even in the Moscow suburbs, in the middle of the Russian winter.

Ask most people what food products they associate with Russia and few people can think of more than caviar and vodka. In fact, Russia and its neighbours in Central Asia, have a rich and varied culture of traditional processed foods. These range from on-farm pressed sunflower oil to fermented mare's milk yoghurt; from pickled salads, such as cabbage, in plastic bags to home produced honey; from dried fruits and mushrooms to numerous varieties of smoked, salted, frozen and canned fish. Drinks are just as varied with kvas (non alcoholic summer drink) made from rye or black bread, honey wine, and numerous tonics and health drinks extracted from berries and herbs.

The economic and political changes of the last decade have led to an increase in smaller-scale and fragmented production and processing. As the region moves away from massive scale production units, there is keen demand for small-scale food processing. This

is, in part, a reaction to the collapse and mismanagement of the large processing facilities and, in part, the desire by smaller producers to add value to their products through processing.

Sales in sunflower oil

Once or twice a month Katerina Sidenov and her husband, Ivan, make the 1300 kilometre train trip to Moscow from their home in Krasnodar, near the Black Sea. Each of them carries four 10 litre plastic containers of sunflower oil to sell in the open-air Bibireva market in North Moscow.

'We sell from early morning until the market closes,' says 38 year old Katerina 'and we sleep in a cheap dormitory nearby. We usually sell everything in a week and return home.'

Many enterprising Russians are seeking new ways to supplement their household income. Both Katerina and Ivan have jobs in Krasnodar, but since even their modest salaries often go unpaid for months at a time they are turning to alternative means to survive and generate an income.

'We were lucky,' says Ivan 'My parents had a small oil press and this helped us to get started. We tried to get a co-operative group together to buy new equipment but small-scale presses are not available here.'

In Russia, many oil-bearing crops are bought up by processing companies from

Godfrey Cromwell



Activities in a Moscow market



Russia

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Holland and other EU countries. The crops are processed outside Russia and then re-imported as oil, at a price that still competes against the crumbling former state processing enterprises. The Sidenovs sell their oil at about half the price of shop bought oil and have a ready market among local customers, most of whom bring their own containers.

Herbs, honey and traditional remedies

Natasha Fedoseeva stands alone at her market stall selling dried herbs and traditional remedies in Danielevsky market but it is a family business.

'My children and grandchildren work through the spring and summer to stockpile the herbs we need' she explains. 'In the autumn, we dry and pack them at home in Tambov (2,000 kilometres from Moscow) and each week in winter my husband comes to Moscow with supplies for me to sell.'

The Fedoseeva family make a living by selling some 25 varieties of herbs, many gathered from the vast Russian forests. For some long-standing clients, the Fedoseevas make specific herb mixes and for others, they provide home produced honey and medicines made from honeycomb that Natasha says will cure 'almost anything'. 'I had a medical education,' she adds.

Oriental influences

Russia's extensive food processing heritage holds many surprises - some very old and some more recent. Ho Shu Lee is from the substantial Korean community that arrived during Soviet times. She, along with a team of other 'Korean' women, sells pickled 'oriental' foods from a long trestle table in the market.

'Try some!' she says, holding out a sample of pickled squid and spicy grated carrot between gleaming hospital tweezers. A range of such products is on display for sale in plastic bags and the women act as a sales team for a group who buy raw materials in bulk and process and store them jointly before selling on the city markets.

'We each work one day on and two days off in a rota system.' Ho Shu Lee adds 'It's my only source of income and we worry now because the supermarkets with middle class customers are beginning to sell similar products to ours.'

Fish and beer

'Beer tastes much better with salted fish,' says 46 year old Evgent, with a shrewd smile. He

should know. By day he sells three types of salted fish on the market and in the evening he sets up near to the beer bars where the traditional Muscovite enjoyment of salted fish and beer brings him a steady supply of customers.

He has a job as a street sweeper for the city council but the income this generates is not enough to live on. He regularly fishes in the river for two types of fish and buys supplies of a third type from a fish farming co-operative. 'I dry and salt the fish myself at home,' he explains. 'My family don't complain. We need the money' he adds.

Marinated mushrooms and fruit jams

Every autumn Vassili and Elena Tchenova marinate and pickle mushrooms and make jams and 'compote' from berries gathered in the forest. During the winter, they sell these door-to-door in the high-rise housing area where they live.

'We make about one hundred 200 gram jars and keep them hidden in a shed' says Vassili. 'In the winter the money from sales keeps us alive. The only people who turn us away are people who have not tried our products for themselves' he adds proudly.

A view confirmed by Anna, who has been buying from them for three years. 'Their pickled mushrooms are the best I know of, they are affordable and they bring them to your door.'



Godfrey Crumwell

Oriental influences in the Russian markets



Russia

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Dairy products

'They have no money to pay us, so we get milk instead' says Tanya, a worker on a collective farm. 'In the summer, the weather is hot and I cannot store the milk so I sell it here in town with the milk I get from my own two cows. In the winter, I make cottage cheese and some sour cream if the milk has enough fat in it.'

She sells about a kilo of sour cream and five kilos of cottage cheese each weekend in the winter. There is a lot of competition for stall space at weekends so she has to come very early. During the week, the competition is less but there is also much less demand.

'I can make sour cream and cottage cheese at home with no special equipment. No-one asks me for pasteurised milk, we have not got used to it here yet' she adds.

Processed fruit and vegetables

An upturned cardboard box on the pavement acts as a convenient shop display counter for Antonina Petrovna as she stands outside the metro station exit selling polythene bags of dried mushrooms, pickled cabbage, 'wet apples' (pickled apples) and gherkins. Wrapped in her coat and scarf against the minus 15 degrees air temperature she knows some of her customers by name.

'It's a good spot to catch people on their way home in the evening' she explains.

'They get to know you after a while and if they like your product they will even look out for you.'

She makes a week's supply in a 10 litre bucket and keeps it in the sub-zero temperatures of the tiny balcony of her 8th floor flat. 'A Russian winter is the best refrigerator' she smiles.

Food processing and selling is not her only source of income but as she explains 'Few people can live on their pensions these days and we have to find other ways to survive.'

Surviving using traditional food processing skills

The people described above are all real although their names have been altered. In every metro station, market, apartment block and busy street corner in Moscow such people can be found.

Reviving traditional food processing skills and putting them to work is a means of survival for many Russian families. Their skills in adding value through processing, storing and marketing food products often means the difference between going hungry and being fed.

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Launch of a Global Post Harvest Forum

A new global post harvest forum has been officially launched at the Natural Resources Institute, part of the University of Greenwich. PhAction was established through discussions between members of the group for Assistance on Systems relating to Grain After Harvest and five International Agricultural Research Centres.

The role of the new forum will be to raise the profile of post harvest research and development, and accomplish greater impact in the post harvest sector. This will be achieved through the development and delivery of innovative post harvest systems in collaboration with a range of public and private sector partners, in developing countries. By fostering better links between farmers and markets, PhAction will enhance rural

livelihoods and secure access to safe food supplies for all.

The forum seeks to expand the level of representation by including major regional research bodies, key NGOs, agribusiness centres and entrepreneurs to gain a more global membership and include partners with a range of skills that are required to meet the post harvest challenges into the millennium.

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New use for Panela



This article on the production of a sugar product called 'panela' was written by Carla Veldhuyzen van Zanten of the Panela Pulverizada Project in Colombia. It describes the production, marketing and quality control issues faced by the sugar cane farmers producing panela in Colombia.

is often dried and used as fuel for the heating process. The remaining syrup is then cooled in moulds until it sets into solid blocks. This is known by various names such as jaggery in Africa, gur in India and Bangladesh, desi in Pakistan, chancaca in Peru and panela in Colombia.

Production of unrefined cane sugar

Sugar cane should be fresh and fully mature to give a good yield of juice. When it is fully mature, sugar cane has the highest grade of sucrose which inverts (breaks down) after harvest. Therefore, the cane should be harvested at its precise moment of ripeness and be processed directly afterwards. The first stage in the process involves crushing the cane in order to extract the juice. There are two basic types of crusher - roller mills, which are the most common, and screw expellers. The crushing process flattens the cane and breaks up the cells in the cane to release the sweet juice.

The juice, released by the crushing process, is collected and then filtered to remove any cane residue (bagasse – the fibrous residue of sugar cane which remains after the crushing operation) and other impurities that would lower the quality of the final product. Filtering can be achieved by passing the juice through a cloth or fine mesh. In some cases, the juice may be allowed to stand for a few hours before filtering so that the bulk of the bagasse and other particles settle to the bottom of the container.

The filtered juice is then heated slowly in an open pan, so driving off excess water and concentrating the juice to a thick syrup. The heating stage also helps to preserve the end product, as the high temperatures inactivate enzymes and destroy micro-organisms that may otherwise spoil the product. The bagasse

Characteristics of lump sugars

Lump sugars, such as panela, are the product of concentrating cane juice and are produced in many countries for direct use as a sweetener. In such products, the dark coloured molasses (a syrup by-product from the manufacture of sugar, containing sucrose, invert sugars, moisture, ash and other insoluble matter) and crystals of sugar have not been separated. They vary from yellowish brown to



Carla Veldhuyzen van Zanten

Beating the panela

Table 1: Process Flow Diagram for Unrefined Sugar Production

| Process | Notes |
|---------|---|
| Mill | Crush the sugar cane in a roller mill to release the juice |
| Extract | Collect the juice |
| Filter | Filter the juice (through cloth, mesh or by precipitation) to remove extraneous material |
| Heat | Heat slowly over a low heat and stir regularly, to avoid burning, until the liquid thickens to a syrup. The concentration is correct when a sample solidifies when dropped into cold water. |
| Cool | Pour syrup into moulds and leave undisturbed to set. |
| Pack | Pack into large polythene bags or waterproof containers. |
| Store | Store in a cool, dry place. |

**Table 2: Process Flow Diagram for Panela Pulverizada**

| Process | Notes |
|-----------------|--|
| Mill | Crush the sugar cane in a roller mill to release the juice |
| Extract | Collect the juice |
| Filter | Filter the juice (through cloth, mesh or by precipitation) to remove extraneous material |
| Clarify | Add clarifying agents (e.g. special tree barks, calcium oxide/lime) to the juice to 'trap' particles and contaminants during the boiling stage and hold them at the surface as a layer of scum. The lime also reduces the acidity of the juice and the tendency for the sucrose to invert. |
| Heat | Heat slowly over a low heat without stirring, to allow the clarificants to work. Remove the scum by passing a fine cloth through the juice or by ladling the scum off the surface. Continue to heat until the temperature reaches between 125°C and 130°C and then stir the liquid until it thickens to a syrup. |
| Crystallisation | Take the syrup off the heat and beat it whilst it cools so as to promote even cooling and more uniform crystal formation. As it is beaten, the syrup starts to rise which allows the excess humidity to evaporate. Crystals will form as the syrup cools, suspended in the molasses. |
| Sun-drying | The granulate can be spread out onto a table to accelerate the cooling down. Sun-dry the wet crystals to produce a dry, crystalline product. |
| Sieve | Sieve the crystal suspension through a fine mesh to collect the crystals and discard the molasses which can be reprocessed with fresh juice or sold separately. |
| Package | Pack the dried product in polythene bags, or in polypropylene in humid areas. |
| Store | Store in a cool, dry place. |

dark brown in colour. Lump sugars can be produced using relatively low cost equipment consisting of a crusher and furnace with a boiling pan and moulds.

Panela production in the Colombian Andes

Some 70,000 sugar cane farmers on the slopes of the Colombian Andes make a living out of producing panela, (Rodriguez, Gonzalo. 1997. *La Panela en Colombia: Un Analisis de la Cadena Agroindustrial*. CORPOICA. Tibaita) as a small-scale alternative to the white cane sugar produced in large refineries. Nowadays, however, refined sugar is considered the more modern sweetener and the cheaper panela has lost its markets, especially in cities, where it is identified as poor man's food for those who cannot afford 'real' sugar.

To try and improve the panela market situation, a new product has been developed, called 'panela pulverizada' or granulated panela, which allows panela farmers to better compete with white refined sugar producers. Unlike the traditional product, panela pulverizada does not need to be broken up into smaller pieces with a heavy stone before being used. It can be put into hot or cold drinks using a teaspoon. It also makes a tasty natural lemonade! Panela is a

good alternative to sugar because it is more nutritious as it contains important minerals, such as iron, and is additive free.

Processing of panela pulverizada

The first three processing steps are the same as those followed when processing unrefined sugar: mill; extract; filter. After filtering, the juice is clarified by the addition of a small amount of quicklime (calcium oxide) or extracts from local tree barks. The choice of clarificant used depends upon local availability. The clarificants do not react with the juice but cause fine particles of bagasse and other impurities to clump together (flocculate) during the heating process. Impurities are trapped by the floc and form a scum on the surface of the liquid. The scum can then be removed with fine-mesh ladles, or by passing a fine, clean cloth through the liquid.

After clarifying, the juice is heated further until it thickens and crystals are beginning to form. It is then beaten to agitate it as it cools. This helps the liquid to cool evenly which in turn promotes more even crystal formation. Once the liquid is sufficiently cooled to enable the crystals to form, the beating is stopped. Crystals of different grain sizes are formed, suspended in the molasses.



The crystal suspension is then sieved to separate the crystals from the molasses, and the crystals are sun-dried to evaporate any remaining moisture, leaving a dry, granular product. This is then packaged in polythene or polypropylene bags and stored in a cool, dry place.

The processing of panela pulverizada is quite simple to carry out. The processing equipment needed is the same as that used in traditional panela production. At the moment, new technologies are being developed to facilitate the manual granulating process of panela. As it leaves a relatively high percentage (some 30%) of undesired coarse grains, a mill has been designed to pulverise this part. Also, for drying and packing, more efficient solutions are being sought. Nevertheless, in order to make farmers change their age-old tradition of producing panela-brick a lot of influencing needs to be carried out.

Marketing

Farmers have always preferred to sell their products to intermediaries and to fix the price with them rather than having to deal directly with consumers. So, as well as teaching the granulating process, short marketing courses have been given to groups of farmers, who have ended up doing surveys, designing new packaging, handing out free samples and conducting other promotional activities at village level. In this way, the farmers are gradually becoming familiar with marketing elements. Four years of work have resulted in one small group of eight farmers producing and marketing panela pulverizada regularly on a commercial basis, but there are plenty of onlookers willing to copy.

Uses for panela pulverizada

Workshops teaching rural women new uses for panela pulverizada, such as jam, canned fruits, drinks, porridges, sweets, cakes and biscuits, have been set up and the women have learned to appreciate panela pulverizada as a nutritious, healthy sweetener that is a perfect substitute for sugar. A panela cooking competition compiled 40 delicious recipes, from the old-and-forgotten to the curiously innovative which were collected in a booklet and distributed amongst housewives. Some women have started to make even more profit out of panela by producing sweets as a small-scale enterprise. Birthday or first communion parties can be celebrated with panela cakes and at village fiestas a wide range of panela sweets are being sold.

Hygiene and quality control

The traditional processing of sugar cane is marked by a certain lack of hygiene. In the past, it was not unusual to find sediment or an unidentified insect at the bottom of a cup of panela. Nowadays, however, customers will not tolerate panela products containing foreign matter. Ultimately, this could destroy the panela business unless the quality of panela and hygiene during its production is improved.

Simple aids, such as a sieve to filter impurities and special netting to enclose the moulding area, have been introduced to improve the hygienic conditions. Training in quality control has also created more hygiene awareness amongst workers in the trapiche (a traditional small-scale sugar cane processing plant) where it was not uncommon to find dogs peeing, chickens pecking and cockroaches running all over the place, as well as workers smoking cigarettes above the boiling juices.

All of this positive action has contributed to a higher quality of panela and greater self esteem for its producers. The panela once found piled up on a shop floor without any wrapping covering it, now appears decently and hygienically packed on the shelves. Farmers proudly show off their product with its quality-logo on the plastic bags. With the production of panela pulverizada, the farmers have gained a stronger market position and they are determining the price of panela themselves. The farmers are reaping higher profits and, consequently, they are creating a new future for themselves and their families.

For more information on the Panela Pulverizada Project, please contact Carla Veldhuyzen van Zanten, Comit 6 de Cafeteros, Cr.7#72-13 piso 10, Bogot, Colombia. E-mail: carla@coll.telecom.com.co

Cooking workshop with panela



Carla Veldhuyzen van Zanten



Armenia

Asia

Solar drying of fruits and vegetables in Armenia

In the first article *Food Chain* has received from Armenia, Dr Gegham Snappyan describes the application of solar dryers in his country. Dr Gegham is head of the food section of the Paran industrial and project enterprise.

A considerable amount of energy is required to dry foods. In order to dry 1000kg of fruit and vegetables to a final moisture low enough to assure stability (generally about 16%) between 750 and 930kg of moisture has to be evaporated. This requires between 525 and 650 kilowatts of energy. In Armenia, electricity costs 25 drams per kilowatt an hour which means that it costs between US\$26 and US\$32 to dry each tonne of produce. The energy cost to produce 1000kg of dry fruit would be about US\$160 because between 5 and 6kg of fresh material is required to produce 1kg of dried fruit. In the case of tomatoes which have a higher moisture content and have to be dried to a lower moisture content of 6%, between 16 and 18kg of raw material is needed to produce each kilogram of dry product. In the case of dried tomato the energy cost thus rises to US\$580.

When using artificial dryers, these high energy costs have a major impact on the price of the final product. The use of solar dryers has thus been investigated and applied to produce commercial quantities of dry fruits and vegetables at lower cost and with less negative environmental impact than when gas, oil or coal fired dryers are used.

Solar dryers

The open air sun drying of foods goes back far into human history. Solar dryers use some form of simple structure to use the

sun's energy more efficiently. They are commonly classified as direct or indirect solar dryers. In a direct dryer, the air in the drying chamber is heated by the sun's rays passing through a transparent roof. Indirect dryers use a collector to heat the air which then passes to the drying chamber. In some cases, part of the sun's energy may be stored in stones or other material to extend drying overnight.

Most simple solar dryers take the form of a box or tent covered with transparent polythene sheeting. The sun's rays pass through the plastic and heat the air in the chamber. The principle problem with such dryers relates to the weakness of the film used which can be easily damaged by strong winds or punctured by sharp objects. The film also tends to become opaque due to exposure to sunlight. While such dryers are very cheap, the disadvantages of damage far outweighs the cost benefit.

In Armenia, the average daily solar radiation is about 200 Watts/m² or 4.8 kW.hr/m²/day which although slightly lower than some parts of Africa, Mexico and Central Australia is still a very good level for solar drying. During the fruit harvest period (June to September), the climate and long eleven hour days in the Ararat valley, and other parts of Armenia, is ideal for solar drying.

Development of the dryers

The dryers used have a glazed transparent roof facing south and are inclined at 30°C (Figure 1). This angle was calculated based on the latitude of Armenia. In order to store heat so that drying could continue after dark, the floor of the drying chamber was filled with a 400mm bed of black basalt stones

with a diameter of 25mm. The dryers were field tested over three seasons and demonstrated many advantages over simple sun drying. The principal advantage was quicker drying, in fact between 3 and 3.5 times faster. In addition, the product was completely protected from dust, insects and rodents. The main disadvan-

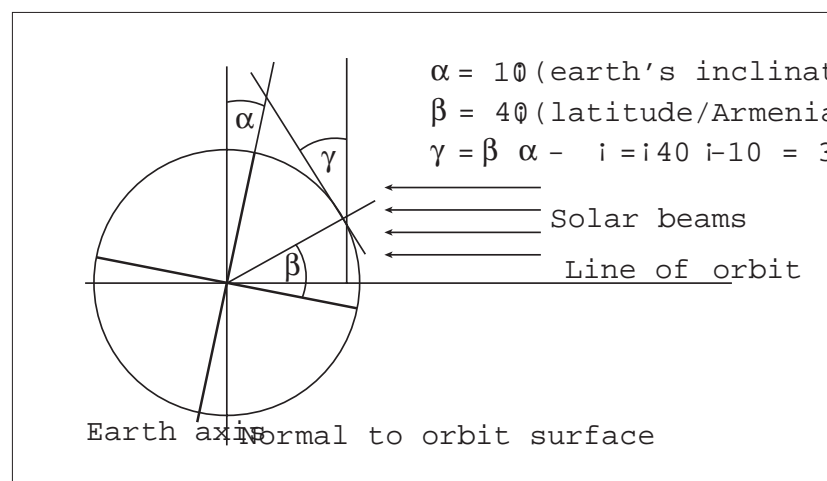


Figure 1: Determining the angle of the roof according to the geographical zone and the slope of the Earth's axis.



Armenia

Asia

Water filled solar collector

Gegham Snapyan



tage was the increase in labour required to manage the dryers.

At this stage a new model was constructed as shown in Figure 2. In this model, heat storage was achieved by using a water filled collector. Water has a heat capacity about five times greater than stones thus the overall size of the collector could be reduced. Water is also of minimal cost. It was found that the stored heat in the water filled collector was sufficient to keep the temperature in the dryer above 35°C for between 8 to 10 hours after dark.

An NGO called Shen, with funding from Christian Aid, constructed 5 dryers in 1998. These were able to produce excellent quality dried apricots, peaches, apples, pears, plums and tomatoes.

Problems

More work is required to determine the ratio of the amount of heat to be used for direct drying and that to be stored in the water collector so that the dryers will be suitable for other areas of the country.

Drying rates fall during humid and cloudy days and at such times it has been necessary to heat the water collectors with electricity.

The current cost of the stainless steel mesh drying trays is high. It is planned to standardise the trays for mass production using a food grade plastic mesh.

Finally, small dryers are less effective than large ones. A system has been designed using five dryers with a common area for preparation, washing and peel-

ing, together with a unit for making jams. Each system can produce 25 tonnes of dried fruit and vegetables (apricot, pear, peach, apple, plum, egg plant, green beans, tomato, garlic and onion) and 100 tonnes of jam per season. The units are also capable of producing 200 tonnes of salted or picked vegetable products.

*For further information about the technologies described in this article, please contact Dr Gegham Snapyan at 'Paren', 375023 RA, Gorvetca str.4, Yerevan, Armenia.
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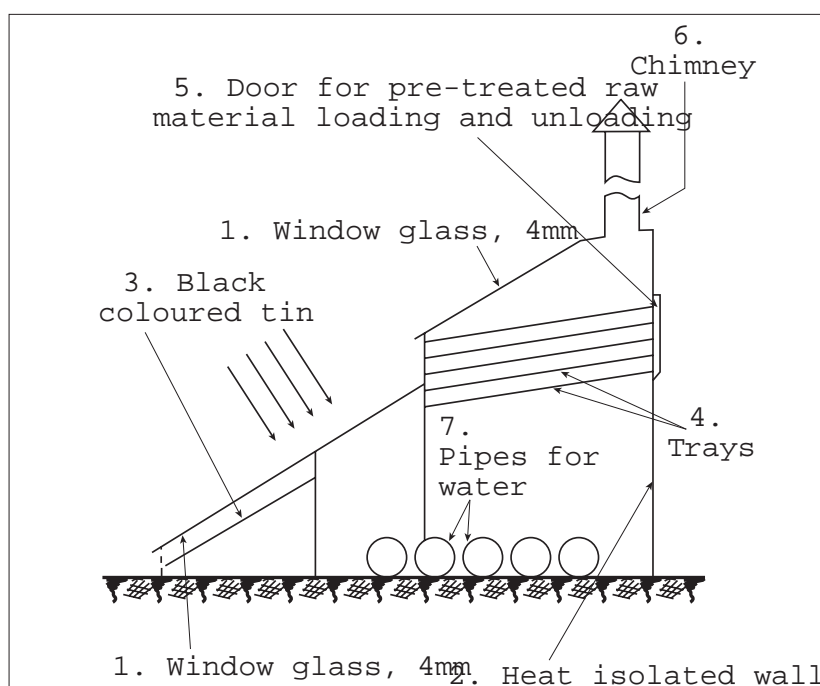


Figure 2: Diagram of a water filled solar collector



Women mean business in Sudan

Introduction

The Sudan is the largest country in Africa at 2.5 million square kilometres. It has a population of 25 million people of whom 25% live in urban areas and 75% in rural areas. The country is considered to be amongst the poorest in the world, despite a wealth of human and natural resources. There is also a great level of retention of traditional rural knowledge and skills, particularly among the poorer communities. Sudan has a rich heritage in the field of food processing with a variety of sophisticated and interesting food products, especially fermented products.

Employment opportunities in the formal production and government sectors are very limited, and the most hopeful opportunity for absorbing the growing labour force is in the small-scale productive sector. Food processing is particularly suited to small-scale production and women already play an important role in this sector.

Eastern Sudan is considered one of the poorest parts of the country. This region comprises three states: Red Sea, Kassala and

Gedaref. The programme work of Intermediate Technology (ITDG) is concentrated in the two southern states, Kassala and Gedaref.

The need

Small-scale food processors in Sudan, who are often women, are responsible for the majority of food products produced and sold in the country. The large scale formal food production sector is not well developed and the few imported products are expensive. The bulk of food products, particularly those consumed by poorer people, are from the small-scale sector. This has led to a high degree of versatility and innovation. However, the small producers are relatively isolated, not only from the other producers in Sudan but also from information and innovation occurring elsewhere in the world. Investigations by ITDG have identified the key constraints which limit the access of marginalised and vulnerable groups to income and employment opportunities:

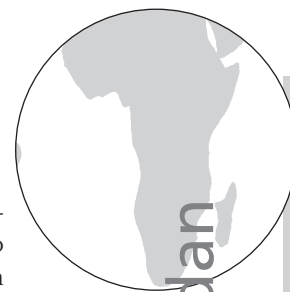
- **Technical skills:** While skills are well developed in specific areas, they are limited to a range of traditional food products. For product quality to be improved or product diversity to be increased, new skills are required including: selection of raw material, drying techniques, packaging, quality control and food safety and hygiene.
- **Management skills:** Small-scale food processing enterprises require competency in a range of management skills in order to survive and grow. The food processing sector is undergoing considerable changes and new entrants often lack the necessary business management skills. Weaknesses have been identified as financial management (costing, accounts and credit management), time management, marketing and managing the production process.
- **Availability of information:** There is a shortage of information for planning or taking decisions on new food products or expansion of production e.g. prices, markets, products, processes and equipment. Such information would be useful for development organisations and government departments.
- **Finance:** Access to capital is limited for small businesses. Although some banks do provide credit for small business, many do not. Some government agencies (e.g. Takaful, Zakat) provide support in the form of grants, as do some development organisations (e.g. Human Appeal).

Ms Sanaa

Sanaa is 29 years old and has completed high school education. She works as an assistant accountant where she earns 10,000 Sudanese pounds (ls) (US\$8) per month. Sanaa is part of a large family of ten of whom five are still at school. Her father is a pensioner with a monthly income of ls 7,000 (US\$6) which is inadequate to support his family and Sanaa therefore has to contribute to the household expenses. She was nominated to attend the ITDG course to improve the quality of production. As a result of the training, she has now established her own business making processed fruits, jams, dried meat, onion and granulated fruit juice drinks. Her original profession helped her to plan and identify market needs before production. Sanaa started her business with a loan of ls 15,000 (US\$12.5). She now earns about ls 25,000 (US\$20) each month from the sale of mixed fruit jams and dried fruit juice granules. Her products are of a high quality and she has no problems in marketing them. The majority are sold to colleagues, neighbours and traditional retailers. Sanaa is planning to produce granulated dried fruit juice and dried lentil soup for sale to prisoners in Kassala during Ramadan. Her ambition is to see her business develop to a larger scale.

Keywords

training, Sudan, food processing



Development of the training programme

In response to specific requests by partner organisations, ITDG initiated food processing training activities. The overall objective of the training courses is to improve the livelihoods of poor families in Eastern Sudan through improved incomes, employment and food security. This will be achieved by enabling women to establish successful small businesses making food products and increasing the domestic processing of food for improved food security

Participant selection

The selection of participants for training courses is carried out jointly by ITDG and the project partners. A variety of criteria is used:

- participants are serious about establishing a small business
- women are from one of the poorer families in the village
- there is a commitment from the sending organisation to support the participant after they receive training.
- participants must be literate if they are being trained as trainers

Course content

Suaad El Bagir Ahmed of the Khartoum Food Research Centre carried out an evaluation of the raw materials available in Eastern Sudan and the market potential of the products produced. Following the evaluation, the course was developed. The first course in January 1994 was to train trainers and 27 female field workers from 9 development organisations were trained. The course lasted one month and covered a range of fruit and vegetable drying technologies. These women have then been the trainers for later IT Sudan food processing training courses. The courses cover the following areas:

- Introduction to food processing
- Solar dehydration
- Preservation techniques
- Packaging
- Storage
- Hygiene
- Marketing
- Business development

Participants are formed into work teams and work together through-out the course. This provides an opportunity for the women to gain skills of working together to produce food products to a deadline and an opportunity to gain experience managing a team of people.

Dried fruits and vegetables have a high market demand and are a popular product to make on the course. IT Sudan has produced an illustrated booklet in Arabic covering the technical aspects of producing a high quality packaged dried product. As new products have been identified by the trainees they have been added to the course. The products being considered for future courses include halva, pastries, juices, toffees and peanut brittle. There has been one special course run by the training manager from Intermediate Technology Bangladesh introducing a range of Bangladeshi food products to the Sudanese trainers.

During follow up visits to the trainers, marketing was identified as a key constraint. In response to this, a special refresher course on marketing was held in 1996. This course included pricing the product, promotion, distribution and simple marketing techniques.

Follow up

On most of the courses, two or three field workers from the partner organisation are trained alongside the women beneficiaries. These field workers will then be able to provide long term follow up for the women.

ITDG has worked with the women trained to establish mutually supportive groups. The Kassala Women's Development Society was



IT/Mohammed Majzoub

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established in 1995, the Hawatta Women's Development Society in 1996 and the Gedaref Women's Development Society in 1996. These groups carry out a variety of activities ranging from accessing raw materials and identifying new products to improving marketing knowledge and skills. The women have carried out a survey of market traders to identify the different food products on sale, packaging materials used and the product quality. These surveys resulted in strong linkages between the society and women market traders.

Monitoring and evaluation

At the end of each course, there is a short examination to find out how much of the technical information the participants have learnt. There is also a short questionnaire to elicit the participants views of the course. Both the project partners and IT Sudan follow this up after a year with evaluations.

Project impact

The training is now well established and respected in the area. Many courses have been held passing on skills to over 300 women. The field workers trained have themselves trained over 1,000 women. The training team have been requested to run a training course in Western Sudan.

The direct beneficiaries of the training courses are marginalised and vulnerable women. Before the course most of the

Ms Neimat Zein Elabdeen

Neimat is a housewife and mother of five children. Her husband is an agricultural worker earning 10,000 (8US\$) per month which is insufficient to support his family. Neimat tried tailoring to supplement the family income but faced several difficulties. She attended the ITDG food processing training course which has made a difference to her life. Neimat buys fruit and vegetables when they are readily available and cheap, dries them and then sells them for a higher price when availability is low. She usually produces dried onion, tomato and fruit juice granules. At the moment, Neimat is not keeping accounts and cannot determine the exact income generated from this work. However, the income she gains is used for basic family needs and to send the children to school. The impact the project has had can be summed up in her own words 'Thanks to God and ITDG administration who make my life tolerable'.

women were unemployed or earning less than 19,000 Sudanese Pounds (1s) (16US\$) per month which is less than the average civil servant salary which is regarded as poor. The number of people that have indirectly benefited from the course is estimated at 100 per course. Indirect beneficiaries include the poor communities in Kassala and Gedaref that benefit from the provision of high quality low cost, safe, food products.

After the fifth training course, the project was evaluated to determine its relevance, effectiveness and impact on the lives of the recipients. This was carried out by external independent consultants – Mustasharat Group. The following is a summary of their findings.

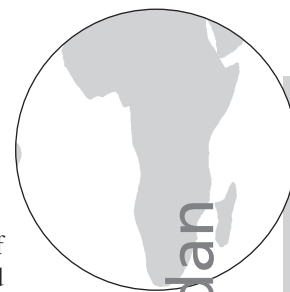
Food security

Over 50% of the women trained now feel that they are food secure. The quality of existing preserved foods was improved and methods of preservation were applied to foods not previously preserved. The training project had a significant impact on preparation, preservation practices and on food expenditure. After the training, women spent less of their income on food because they used more preserved, processed food. The income saved is available for other expenditure.

Incomes and employment

Of the trainees interviewed, 37% had increased their incomes as a result of the training course. Increases in employment were seen in a number of ways: through the creation of new opportunities, self-employment and part time employment. Those that were not successful at improving their employment opportunities were hampered by financial, marketing and industrial constraints.

One of the main aims of the training course is to create economic independence. To achieve this, it is essential that the women are linked to micro lending institutions which have a genuine interest in small-scale businesses. The majority of women interviewed in the evaluation had not noticed a significant increase in income following the training course. However, there were notable exceptions. Members of the Takaful organisation who had the back-up of credit to assist with implementation of the training witnessed increased incomes. Prior to the training, nine out of ten trainees had no source of income. However after training, those without an income were halved and the remainder earned between 10,000 and 19,000 1s (8-16US\$) per month. Income was generally spent on basic needs such as food, education and health.



There is no indication of whether these priorities changed as a result of the training. As the project is still in its infancy, there is still tremendous scope for improvement.

An indirect benefit of the training courses was the institutional strengthening of local organisations. For example, both Takaful Fund and Human Appeal International have included development issues in their strategies in addition to the provision of financial aid. The training syllabus was included in the curriculum of the Department of Nutrition and School Gardening.

Lessons learned

Follow up and support in the field

The trainers trained need technical follow-up visits to help overcome problems they face. Trainers who work for well-organised and resourced organisations are more likely to receive this sort of support. The ability of an organisation to offer follow up support should be a criteria for selection of participants.

The mutual support provided by the Women's Development Societies has proved a very successful way of providing support in the field. These umbrella organisations take the responsibility for organising credit and savings schemes, providing production information and marketing back-up with training and development programmes.

Participation in the development of the course

The participants need to be involved in the development of the course design and schedule. This ensures that the courses directly meet the needs of the people they are intended for. Because trainers and trainees will have different needs, it is advisable to devise two types of training rather than trying to combine the two.

Balance of technical and business aspects

There needs to be a balance between subjects. Technical process-orientated as well as business-orientated subjects are all essential components of a successful small enterprise. Where appropriate, the business sessions should be related to a food product and complemented by a practical session. In all the modules, a mixture of practical and theoretical sessions will greatly improve the acceptability of the course.

Organisation

There needs to be sufficient raw materials and equipment for the practical sessions. Good organisation before the course is essential.

Clear goals

It is important to formulate the objectives of the course with easily identifiable goals and indicators.

The trainers

Plenty of spare time is required so training and follow up can be carried out effectively. Trainers should preferably be trained in nutrition education, extension work or social advice and should be given extensive training on methods of food preservation so they are in a position to advise.

The beneficiaries

Most of the beneficiaries are aged between 15 and 55 years and preferably from a female headed household. It is essential that they have access to credit and other back-up support (e.g. production, marketing) and spending power to purchase raw materials either in the form of credit or their own savings.

Conclusion

The approach to training should be a holistic one. Training cannot exist on its own – it should be one element of a larger package. It should be a package of modules relevant to development of small businesses including access to credit, consistent supply of raw materials and equipment, access to a suitable place for production and the existence of a buoyant market for the products.

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Food Processing Training





Mumu – a traditional method of cooking foods in Papua New Guinea

Mumu is an earth oven that operates by heating stones which are subsequently put into or arranged around and on the food. The heat in the stones is transferred to the food and cooks it. In this article, Dr P A Sopade describes the different types of mumu found in Papua New Guinea.

The need to convert varied and diverse food materials into palatable forms for maximum nutrient assimilation has led to the development of various cooking techniques. These techniques can be traditional or conventional. In Papua New Guinea, one of the traditional techniques is mumu. The earth oven is known by various names amongst the South Pacific Islanders:

- in Samoa, Tonga and Cook Islands, it is umu
- in Tahiti, it is ahimaa
- in Fiji, it is lovo
- in Solomon Islands, it is moto
- in New Zealand, it is hangi

Generally, black river stones are used and should be heated by hard firewood for the best results. Any type of food can be cooked in the mumu and foods can be combined (root crops, vegetables, meat etc.) with the sweeter and more delicate ones being placed on top. Depending on the quantity of food, the duration of 'mumurisation' can be for one, two or several hours and, in some cases, it can be carried out overnight. Mumu is often used during ceremonies and despite the advent of modern ovens in Papua New Guinea, it is still popular at the household level.

Types of Mumu

Papua New Guinea is a land of great physical variation from vast swampy plains on the coast to high alpine mountains and broad upland valleys. There are 20 provinces in the country but not all of them use the mumu. It appears to be more common in the highlands where pottery is very limited. The way in which the stones are arranged and the mumu is made vary from one part of Papua New Guinea to another.

Rabaul

Rabaul is the provincial headquarters of the East New Britain Province. A pit is dug and then black river stones are heated in it. The

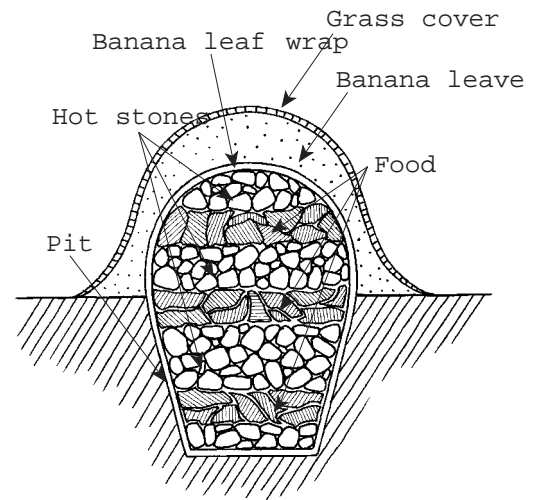


Figure 1: Rabaul

size of the pit and the amount of stones and firewood used depend on the quantity of food to be 'mumurised'. This is true of all types of mumu. While the stones are being heated, the food is prepared with coconut cream and wrapped in banana leaves. The banana leaves are usually conditioned over the fire that heats the stones. The charcoal is removed from the heated stones and the wrapped food is placed on some of the hot stones. The remaining stones are then placed onto the wrapped food before being covered with more banana leaves and jute bags (sand and earth are not used as a covering for the mumu). The mumu is usually left for about four hours with the temperature around the food as high as 250°C. All the foods are cooked together with baking being the predominant method of cooking because steaming is limited to the moisture in the leaves and foods.

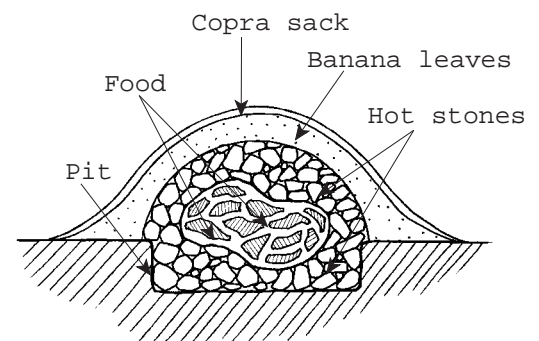


Figure 2: Alotau



A similar type of mumu was observed in the Western Province (Daru) but no pit was dug and tree barks were used to cover the mumu instead of banana leaves.

Alotau

The provincial headquarters of Milne Bay Province is located in Alotau. The mumu found here is called dry mumu because even though the foods are wrapped and cooked together, coconut cream is not normally used. A pit is dug and when the stones are heated, the charcoal is left amongst them. The food is wrapped in the same way as the Rabaul type of mumu and put onto the hot stones. More hot stones are placed on the food and more leaves are used to cover it. The dug earth is then used to complete the covering and retain the heat within the mumu. Smouldering firewood is placed on the earth cover to keep the top layer hot.

The additional heat transfer from the top ensures that a high temperature (more than 200°C) is maintained in the mumu throughout the duration of cooking. This relatively constant high temperature is needed to ensure that the food is properly cooked in view of the limited moisture content because of the lack of coconut cream. As with the Rabaul type of mumu, baking is the predominant process used.

Mount Hagen

In Mount Hagen, in the Western Highlands Province, a typical mumu is made from a relatively deep pit which is conical in shape and has its bottom and sides lined with banana leaves. The stones are heated on the ground away from the pit before they are

put into it. Foods are transferred separately into the pit and the hot stones are put directly in with the food. In this type of mumu, no coconut cream is used, no water is poured onto the hot stones and food segments are not wrapped in banana leaves. Instead, when all the foods have been put into the pit, the protruding leaves from the sides of it are used in the final food wrapping. Grasses and additional banana leaves are used for the final covering to retain the heat. Baking is the more predominant cooking process.

The temperature in the mumu can be as high as 250°C and because of the stone-food contact, the food also approaches this temperature. The high food temperature demands that the mumu is uncovered within a short time to prevent over-cooking. It is unusual to leave the Mount Hagen mumu cooking overnight. A similar type of mumu was observed in Western Samoa where coconut cream was used but no pit was dug.

Concerns

Mumu is part of the culture in PNG and the field study revealed that mumu is cherished by the people. 'Mumurised' foods are reportedly rich in flavour and this makes them preferable to foods from conventional ovens. Cooking foods in mumu seems convenient to the practitioners but it is labour intensive. Concerns have been raised as to the fire hazard and environmental implications of the mumu materials, such as banana leaves and firewood. However, the major concern is in the likelihood of over or under cooking foods and post cooking contamination, as well as the migration of materials from the stones to the foods.

Acknowledgement

The financial assistance of the International Foundation for Sciences is gratefully acknowledged. Dr Sopade can be contacted at the Food Technology Section of the Department of Applied Sciences at the University of Technology in Lae, Papua New Guinea. Demonstrations of the types of mumu are documented in a video and the author's laboratory is studying the temperature distributions in these types of mumu and associated microbiological issues.

Similar cooking where the oven is closed with earth is practiced in Peru and is called a pachamanka.

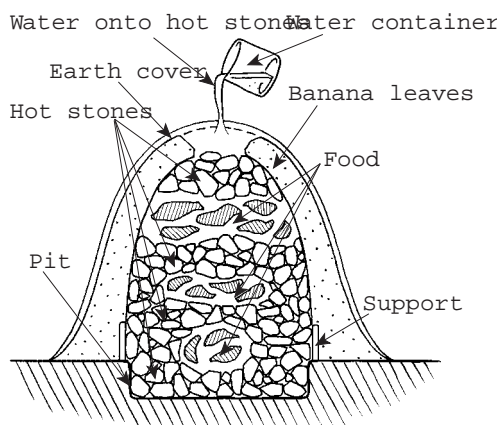


Figure 3: Mount Hagen

Drawings by Matt Whitton



Street Foods: Urban Food and Employment in Developing Countries

Irene Tinker (1998) ISBN: 1 85339 425 4, 152 pp, £9.95

Fifteen years ago, street foods were regarded as economically unimportant, nutritionally insignificant, unhygienic and unsafe. These assumptions have been challenged by studies carried out by the Equity Policy Centre (EPOC) of Washington, USA. Street foods provide employment and incomes to millions of people around the world. They provide low cost affordable food to low income people and are no more a risk to health than food sold from permanent outlets.

Street food enterprises are an important part of many economies. For instance, in Manikganj, Bangladesh (a city of 38,000), 4% of the work force are involved in street food enterprises which have an aggregate sales value of 2 million US dollars a year. The aggregate sales figures for Bogor in Indonesia are over 67 million US dollars each year and 17% of the work force are employed in street food businesses.

Street food vendors earn a reasonable income, especially compared to other available alternatives. In Manikganj, in Bangladesh, the incomes were twice the incomes of unskilled agricultural workers. 58% of the street food vendors in Chonburi, in Thailand, had incomes equivalent to the wages of captains in the army.

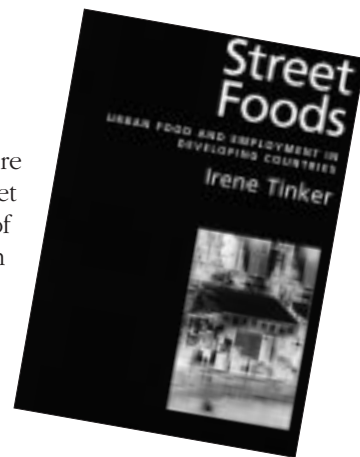
Street foods are important as a source of low cost food for people around the world. These studies have shown that street foods are frequently cheaper than home-prepared foods. In many cities, street foods are a major source of food. In Iloilo, in the Philippines, 30% of food

costs were spent on street foods. 25% of the population of Minia in Egypt ate street foods each day.

This research on street foods, which was initiated by EPOC and expanded extensively by the Food and Agriculture Organisation of the United Nations, has compelled government authorities and development planners to recognise the trade as an essential and useful part of urban food provisioning. This has changed attitudes and responses to street foods. Rather than banning street foods and driving them off the streets, local authorities are working with the street food vendors to improve quality and conditions.

The book is clear and understandable with information on studies from the Philippines, Thailand, Indonesia, Bangladesh, Egypt, Nigeria and Senegal. The results have been analysed and implications for research, planning and policy change drawn out. This is an important book and will hopefully affect change for street food vendors around the world.

Mike Battcock, Senior Specialist, Agro-processing, Intermediate Technology.



Camel Milk: Properties and Products

Zakaria Farah, SKAT. (1996) ISBN 3-908001-52-8 £8.95, 91 pp

This is the first book we have seen exclusively dealing with camel milk. While the majority of the book deals with aspects such as yields and properties of the milk, the final chapter on camel milk products will be of interest to those living in areas where camels are common. The production of traditional fermented milk, or 'Susa', is described at scales of 500 and 1000 litres of milk per day. Camel milk butter production is also briefly described.



Chocolate coated coconut delight candy bar

This recipe has been taken from a paper on small-scale processing techniques of nutritious chocolate coated coconut delight candy bars by Dr. Bellal Hossain from Dhaka University in Bangladesh.

The ingredients used for producing chocolate coated coconut delight candy bar are sugar, liquid glucose, egg albumin, dessicated and defatted coconut kernel, skimmed milk powder, condensed milk, butter fat, vitamin E and beta carotene.

Coconut delight is produced from a boiled mixture of sugar, liquid glucose, cream and defatted coconut kernel which is poured into a flat stainless steel tray mould and layered with caramel. It is stored at 20°C overnight and when it has set, it is coated with liquid chocolate and cut into pieces. Each 40g bar of chocolate coated coconut delight supplies about 145 Kcal.

Hygiene

Normal hygiene rules for safe food handling should be followed at all stages of preparation for candy bars.

Packaging and storage

The product should be properly cooled before each individual bar is wrapped in aluminium foil because surface moisture encourages contamination. The aluminium foil provides protection against insects and soil contamination etc. The product should be stored in a cool, dry, shaded place, away from direct sunlight which accelerates the rancidity of oil in products. Mixing a biological antioxidant with the defatted coconut kernel can help slow down the rate of fat rancidity.

Note: The nougat mixture should be deposited into the stainless steel tray mould at a temperature between 65 and 75°C.

The amount of egg albumin used can be increased to improve the texture of the cream.

Recipe

| Raw materials | | Process | Notes |
|---------------|------------------------------------|--------------------|--|
| 30kg | sugar | Mix | Dissolve the sugar, liquid glucose and water by heating in an open pan and then mix together. |
| 20kg | liquid glucose | | |
| 5kg | skimmed milk powder | Prepare cream | Mix the skimmed milk powder, egg albumin and icing sugar together. The skimmed milk should be added gradually (about 5% each time) to give a more tender product and to ensure that the ingredients are fully incorporated together. |
| 8kg | condensed milk powder | | |
| 19kg | dessicated defatted coconut kernel | | |
| 15kg | chocolate | Nougat preparation | Mix cream and coconut kernel in an open pan over heat to make nougat. |
| 3kg | butter fat | | |
| 300g | egg albumin | Prepare caramel | Heat together condensed milk, liquid glucose, butter and water stirring continuously until thoroughly mixed. |
| 1 or 2 drops | beta carotene | | |
| 1 drop | vitamin E | Mould | Pour nougat mixture into moulding tray and layer with the caramel. Leave to set overnight at a temperature of 20°C. |
| | water | | |
| | | Cut and coat | Cut the moulded candy into bars and coat with liquid chocolate. |
| | | Pack | Pack the candy bars in aluminium foil and then wrap them in paper. Store in a cool, dry place. |