

Chepangs and Chiuri – the use of non timber forest products in Nepal



This article has been written by Megha Ratna Shakya who is the Programme Manager of Agro Processing at ITDG Nepal. It describes the use of non-timber forest products, in particular, chiuri, by the Chepangs – an indigenous group of people living in the Chitwan district of Nepal.

Introduction

Chepang or *Praja* is an indigenous ethnic group of people living in the dense forests along the rugged terrain areas of the mid-Southern Chitwan district of Nepal. Their settlements are very sparse and they are scattered to the extent that in some places a single cottage represents a village! They have lived in the jungle for centuries by hunting, fishing and extracting edible items from the forests. The land they have is poor quality and virtually infertile. In recent years, they have adopted some very basic and crude farming, but overall, their livelihoods have not changed in hundreds of years. The Chepangs are recognised as one of the most marginalised people and hence can be considered to be among the poorest of the poor.

Chiuri

A non-timber forest product that is important to the Chepangs socially, culturally and economically is chiuri (*Bassia butyracea*) – *yoshi* in their language. It is one of the very popular multipurpose plant seeds belonging to the family of Sapotaceae and is found in abundance in the mid-hills throughout Nepal. This species of tree is considered to be of high value to the Hill economy of Nepal and is therefore favoured by the common people in the rural areas and the foresters alike for its wider exploitation.

The seed of the chiuri fruit contains a fairly high percentage of fat that is used by the Chepangs for cooking. This fat is often called chiuri butter. Some also use it as hair oil and it is an excellent raw material for quality toilet soap. The pulp of the fruit is edible. This product is used in Nepalese urban areas as butter for oil lamps that generously light temples and other places of worship. The

Santa Praja, aged 32, looks in his mid 40s. His wife, Chandi, is only 24 but looks in her early 30s. They have four children – three sons and one daughter. They own a small plot of land with stones and boulders that produces such little maize and millet that the entire family has to look for alternatives to cover the food deficit for at least four months in a year. So Santa and Chandi rely on the forests for the supplementary income to feed the family. Chiuri is one product that they have been traditionally known to extract. This wild fruit has saved their family year in and year out from starvation. But collection and processing of chiuri has been so cumbersome and uneconomical that the entire family feels tense and hence has lived very precariously. 'Ke Garne, fate has cheated us!', Shanta always tells the family to underline his helplessness.

residue or cake of the seeds after the oil has been extracted is used as farm manure, as a toxicant for fishing and as a pesticide for maize and paddy fields. The fruit peel is used as feed for pigs.

The physical composition of the chiuri fruit per 100 kg

fruit pulp	48 kg
fruit peel	26 kg
seed coat	6 kg
seed kernel	20 kg – contains 55% fat (i.e. 11 kg)

Some local NGOs have experimented in the production of various products using chiuri as a base, such as chiuri jam, chiuri squash, chi-

Keywords

Underutilised, chiuri, Nepal, processing, oil extraction, indigenous, traditional



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A typical Chepang family



uri syrup from its nectar and chiuri cream for cracked skin and candles. However, there remains much scope for improving the quality of the products as well as for developing new products. Some potential uses of chiuri are fat requirements of confectionery, pharmaceuticals, soap, candles, vegetable ghee (butter) and hosts of other industries.

The Chepangs have found ways to make the best use of chiuri for their livelihood. Collection of the fruits is a very precarious operation – they are picked from very slippery trees on the slopes of mountains during monsoon time. The trees are highly infested by leeches which adds to the unpleasantness and poses a considerable risk to life and limb. Because of the difficult conditions, a large volume of chiuri fruits remain unpicked from the trees and much of it is left to rot. This represents a big loss of economic opportunities for the Chepangs and for the country as well.

Processing of chiuri

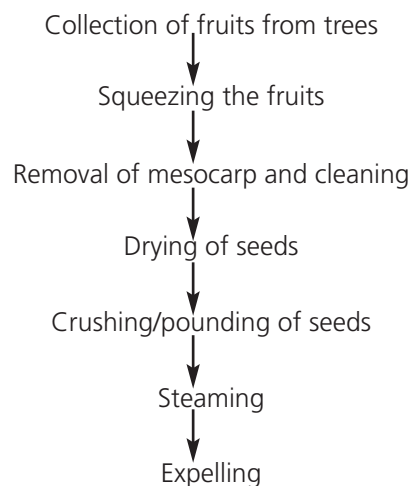
The production process is very traditional and is carried out manually. The ripe chiuri fruits are squeezed by hand and foot – a very laborious process. The pulp serves as meal but much gets thrown away as there is no knowledge of safe storage for later use. The seeds that are separated are cleaned and stored for 24 hours and dried in an open fire using a wooden grid, locally known as *sarang*. This process consumes excessive amounts of firewood that is collected by women. Since the drying process takes place inside the cottage, women and children are exposed to thick smoke – a potential health hazard. It is estimated that only 3 litres of

chiuri is obtained from 55 kg of chiuri seeds. The 3 litres of chiuri fetches about 180 Nepalese Rupees from the traders (GBP £1 = 108.34 NR @ March 2000).

The dried seeds are then pounded in the traditional foot rice huller known as a *dbiki*. This is

Wooden oil expeller used for 'Chiuri' extraction by 'Chepangs'

Production process of chiuri



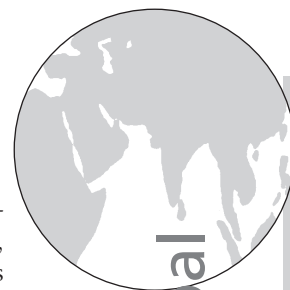
also equally laborious work. The flour is then steamed in a perforated bamboo basket called *thunshe*. The *thunshe* is placed over a boiling metal pot in batches of about 12 kg at a time. The steamed flour is then kept in a special bamboo basket and the oil is expelled from a crude wooden oil press called *chepuwa* or *ghani*.

The principal market for chiuri is industries that use fat as a base material, such as soap and vegetable ghee (butter) productions. Due to its bitter taste and poor presentation, chiuri does not attract consumers using it for cooking purpose. The absence of proper packaging in air tight containers itself distracts the consumers and contributes to the poor quality of the product. The Chepangs are known to carry chiuri on their back in *thunshe* – bamboo basket – to the market centres.

A full evaluation of the whole process of chiuri production has been carried out. It has



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Asia Nepal

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are virtually unaccounted for. As a result, the price of chiuri is often fixed and dictated by traders. ITDG Nepal is about to commence action research on the areas where technological intervention is easily attainable and to provide technical and marketing assistance to these marginalised communities.

How is ITDG Nepal going to bring changes in the economics of production and marketing of chiuri, and in the lives of the Chepangs?

ITDG Nepal will form groups of Chepang chiuri producers from among the most affected people, particu-

The residue of Chiuri seeds after the oil has been extracted

larly women, to work with new processes and techniques of production. Throughout, the aims will be to ensure the following:

larly women, to work with new processes and techniques of production. Throughout, the aims will be to ensure the following:

- To save labour while at the same time increasing productivity.
- To cut down on the requirements for fuel energy used for drying and steaming.
- To increase and optimise the extraction of oil from the seeds.
- To produce a finished product that is ready to use raw material for other industries.

been found that the existing production and extraction process is uneconomical, risky to life and limb, and a potential health hazard. There are several areas where improvements can be made.

Improvements in the techniques and technology of fruit collection, drying, storage, pounding, steaming and expelling are needed in order to reduce drudgery and make the chiuri processing economically worthy for people who are already most disadvantaged. There has to be easy technological solutions to the above problems. Furthermore, the Chepangs have little knowledge of how to market the product. They are so naïve that they have no idea of chiuri costing and pricing and their labour inputs

One very badly understood subject in rural communities in Nepal is the marketing concept. The Chepangs are no exception to this. ITDG Nepal will train the Chepangs in marketing skills so that they can sell and get better prices for their products in the market. The end result of ITDG Nepal's proposed intervention in the chiuri production and marketing is a discernible change in the economic life of the Chepang community.

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Wooden oil expeller



Kenya

Africa

Using tree species to treat milk for palatability and preservation

Milk is a major source of food, especially for pastoralist people. However, it is also one of the most perishable food stuffs and requires processing, both to improve the palatability and to preserve for use at a later date. In this article, Christoffell den Biggelaar, Department of Agricultural Extension Education, Michigan State University, USA and William Mueithi, Department of Forestry, Moi University, Eldoret, Kenya describe the use of trees in milk treatment which is a common practice amongst farmers in the Trans-Nozia District in western Kenya. It is a technology that has been practised by pastoralists for hundreds of years and has since been adopted by non-pastoralists.

Introduction

Milk is one of the most nutritious and also most perishable foods. Unless it is preserved or stored under cool conditions, it rapidly deteriorates and becomes either unfit or unsafe for human consumption. Several basic methods of processing, such as conversion into butter, cheese or yoghurt, are widely practised around the world and have been for centuries. In addition, many Africans find fresh milk to be unpalatable, mainly due to intolerance to the milk sugar lactose. The processing of milk increases the digestibility and palatability at the same time as preserving it for later use.

Pastoralist farmers in Kenya have been using indigenous knowledge and locally available tree species for the preservation of milk for hundreds of years. A group of Kalenjin farmers traced the use of trees back to over three hundred years ago, when it was adopted for a number of reasons:

Although milk is a major source of food, especially for pastoralists, the taste, colour and

odour of fresh milk are not appealing to the consumers. Moreover, the majority of Africans find the fresh milk difficult to digest due to lactose intolerance and need to process it before consumption.

Lack of a market may make it necessary to store excess milk for use during the drought season. For example, the Pokot prepare chekha mwaka, a treated milk that can be stored for over a year without spoilage and is vital to their household food security.

Gourds are one of the most traditional and cheapest means of storing milk. However, gourds impart a bitter taste to the milk stored in them and are difficult to clean, thus proving to be a health hazard. Stale milk remains in the gourd and thus causes the fresh milk to deteriorate and to take on a bad taste. Alternative methods of storage, that remain cheap and easily accessible to farmers, were therefore required.

Treatment of milk by tree barks

The first stage of the preservation process is to remove the bark from a small branch of a selected tree species and leave it to dry. One end of the dried piece of wood is then placed in the fire and completely burnt. The burnt wood is then gently squeezed on the side and bottom of a milk storage gourd to crush it into charcoal dust. This process is repeated several times until the gourd is completely coated on the inside. The excess dust is removed using a brush made from the nerve of palm leaves. The gourd is then ready for milk storage.

The treated milk obtained after storage in the treated gourd is known as mursik. The quality of mursik depends on the tree species used and is evaluated according to the colour, smell and taste of the final product. Farmers claim that their traditionally treated milk is superior in taste and palatability to both raw milk and milk that has been processed by dairy plants.

Tree identification and selection procedure

It is intriguing to know how the past generations knew that tree species could be used to preserve and increase the palatability of the milk. According to anecdotal evidence, it was a lengthy process of trial and error, involving the participation of both men and women. The role of men in the process varied considerably between communities. For example, among the Kikuyus, a traditional farming community, men were involved in both the

Keywords

Milk preservation, indigenous knowledge, Kenya, palatability, mursik

ITD/G/John Young



For pastoralists, milk is a major source of food

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identification of suitable species and the actual treatment of the milk. In traditionally pastoral communities, for example the Kalenjin and Pokot, both men and women were originally involved in the identification of suitable tree species but only women would do the actual milk treatment. Over time, the role of men in the exercise has gradually declined in the pastoral communities and women have become solely responsible for the development, implementation and maintenance of the technology.

The choice of species to be used is based on the availability of the species and a knowledge of the medicinal properties of specific species. The selection process of potential milk treatment tree species is an art that is based on experience and one or both of the following:

- Smelling the leaves of the tree and/or the smoke produced when burning a branch of the tree
- Chewing specific parts of the tree such as leaves, stems and bark
- Species that produce a pleasant smell and have a good taste, are easy to burn and produce a porous charcoal that is easy to crush, will be tested on milk for their suitability as a preservative. The taste, colour and smell of the treated milk will be assessed following treatment and whether the tree will be adopted for use as a preservative, depends on the outcome of the initial trials.

Milk treatment species

The tree species used for milk treatment have changed over time within and between communities based on the availability of trees and taste preferences. Presently, farmers use the following species for milk treatment: *Cassia didymobotrya*, *Olea africana*, *O.capensis*, *Lan-*

tana kitu, *Rhus natalensis*, *Prunus africana*, *Euclea divinorum*, *Dombeya goetzenii*, *Bridelia micrantha*, *Croton macrostachyus* and *Acacia gerardi*. In recent years, a few exotic species (*Acacia mearnsii* and *Eucalyptus* Spp.) have been tested by Kalenjin farmers. The former was found to cause a urinary tract blockage in men and the latter was ineffective as it gave the milk a bad taste.

Most of the above species are grown on farms, but some can only be found in the dwindling natural forests of the district, especially in the forests on Mount Elgon. The management techniques used to maintain the various species include protection from livestock, planting using seeds, pollarding and thinning to control overcrowding.

Farmers experimentation with milk treatment

Farmers revealed that the procedures for treatment of milk have not changed much during the last 300 years and little innovation has taken place to improve the methods. It remains largely a case of trial and error, in which the final result is not known until the milk is ready for drinking. This is expensive in terms of time, money and milk, since the milk is frequently spoilt and has to be discarded.

Research needs

Farmers continue to experiment with different species, in isolation, unaware of other informal research that is being carried out in neighbouring countries.

Other pastoralist tribes in Kenya and other parts of Africa, for instance, the Maasai, Turkana and Samburu, Karamajong and Bayankole in Uganda, and Peul, Touareg, Tutsi and Somali, practice the art of milk preservation. It would be greatly beneficial for all the communities to network and exchange information and ideas about species and methods used for preservation. Because many of the favoured species are becoming rare, farmers are also experimenting with the propagation and cultivation of seedlings and cuttings. The success rates are varied and again would benefit from a structured approach to sharing knowledge and information.

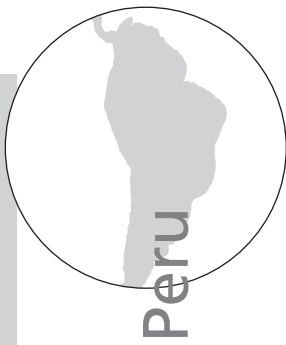
Several opportunities exist for formal research to work with farmers to propagate the favoured tree species and to raise their own supply of seedlings. The possibilities for expanding the scale of mursik production and marketing should also be investigated, paying attention to the quality, food safety and storage qualities of the product.

Traditional methods of milk preservation using gourds



ITDG/John Young

383/22



Peru

The processing and sustainable management of amazonian medicinal plants

This article describes the history of medicinal plants in Peru. It discusses the uses of medicinal plants and how they are processed in the native communities. It has been written by Jorge Elliot, who is a Forest Engineer, and Chief of the Conservation and Community Management of Tropical Forests in the Alto Mayo Region of Peru.

.Historical background

Medicinal plants have been used in Peru for centuries. Researchers have been investigating the properties of plant and vegetable species for many years and have discovered many different uses for the native biodiversity. One of the main uses found for the diverse flora was, and still is, medicinal use.

Historically, one of the most important medicinal plants in Peru is the *Cinchona*, commonly known as *quina* or *cascarilla*,¹ which has been used since pre-hispanic times as a cure for different illnesses. Jesuit Missionaries introduced this natural medicine into Europe around 1640 as a cure for malaria and it became one of the most important export products in the Peruvian Amazon between 1880 and 1990. Nevertheless, the Peruvian presence in the market decreased as competitors appeared in the market and *quinine*² started to be synthesised in laboratories. *Quina* trees started to lose importance and the old forests that produced the famous bark were used as coffee or cocoa cultivation sites. Today, in Peru the *quina* species is almost extinct.

After the Second World War, the development of rubber and synthetics made from

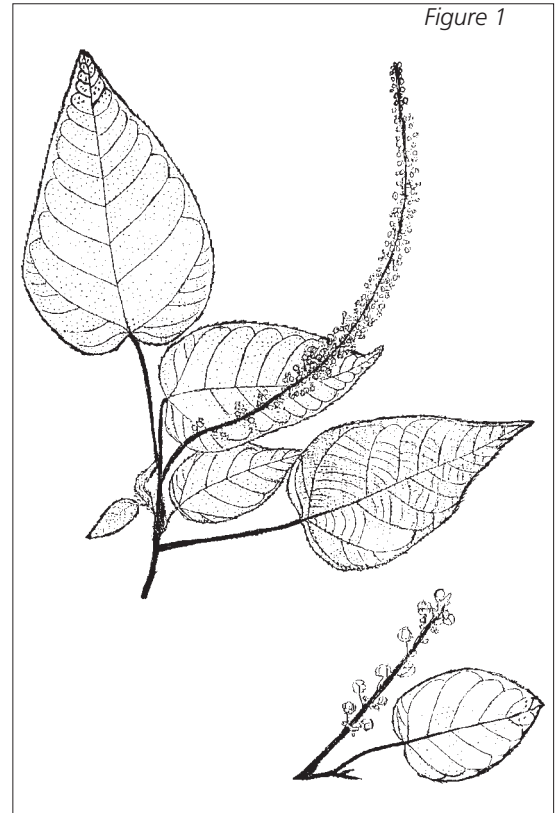


Figure 1

ingredients of different plants caused a fall in the consumption of forest products. By 1956, medicinal plants represented only 10.3% of the total export value for Peru. Therefore, during a fifty year period, medicinal plants went from being the star product of the Amazonian region to a product with only a marginal value for the economy.

During the 1990s, the appearance of the 'green market' generated a return to the use of medicinal plants. The level of demand for

medicinal plants has been steadily increasing in the national and the export market. This has encouraged many small and large entrepreneurs to enter the Peruvian market. There are many small informal producers of medicinal plants in the urban areas (particularly in Lima) and there are also laboratories in the pharmaceutical industry obtaining medicinal plant extracts using

Figure 1: Leaves from Sangre de Grado plant

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Cat's claw found growing in the tropical forests of Peru

At Peru X2.0007

sophisticated methods, such as freeze-drying and vacuum extraction, to produce a range of natural products.

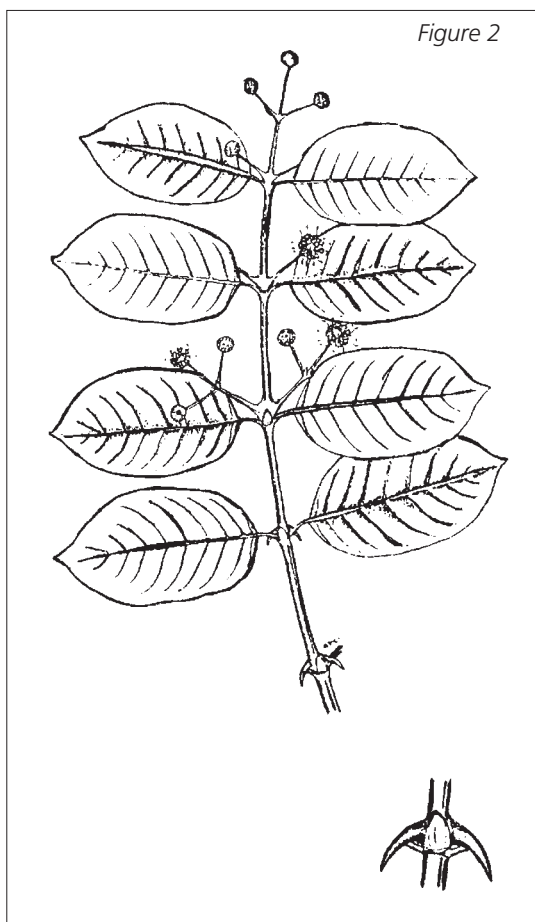
Cat's claw

'Ajagke' (*Unicaria tomentosa*) is a climbing or twisting plant of the tropical forest in Peru. It is found in all the indigenous communities of the Alto Mayo where it is known as 'garamato'. In Lima, it is called 'cat's claw' or 'uña de gato'. Two species are especially prominent – one with long thorns and the other with coiled thorns. Traditionally, cat's claw is used as a medicine.

Cat's claw is usually sold as dried bark or powder although it is also marketed in the form of tablets, sweets, capsules and syrup, crushed, freeze-dried or in filter bags. The demand for the roots and leaves of the cat's claw plant has recently begun but it is still not as high as the demand for the bark.

The bark is processed by cutting pieces from the climbing stems of the cat's claw plant and stripping them. The bark is cleaned and cut into 10 centimetre strips before it is dried and bagged. The dried bark can then be ground in a corn mill to make powdered cat's claw.

In order to sell the processed cat's claw, stringent botanical and chemical practices must be adhered to and a forest permit is required to show that the cat's claw has not been stolen. It can be sold to storehouses, laboratories, exporters, private shops or directly to the consumer. Around 700 tonnes of cat's claw are sold each year in Peru and about 100 tonnes are exported every month.



Prices vary substantially between the local communities where the cost is about US\$0.50 per kilo and in Lima, where the cost is between US\$1 and US\$12 per kilo depending upon the amount being bought.

There are favourable prospects for the exportation of cat's claw because of its cura-

Experiences of the indigenous people in the processing of medicinal plants

For many centuries the Aguaruna people have lived by using the many natural resources existing within their communities, and in particular within the forest. They have more knowledge than anyone about these resources and their uses. They can benefit from them directly by producing them in a marketable way and ensuring that they do not exhaust the supply of them.

Bajo Naranjillo is a native community populated by the Aguarunas. The community is located in the tropical forests of the San Martin Estate in Peru. Since 1998, ITDG has supported the efforts of the natives to take advantage of the forest resources in an appropriate way. The community has gathered together and established a productive reservoir in the forests. A group from the community was chosen to manage the trade and transformation of the forests.

Luciano Majuash is a young Aguaruna in the group. He had no land to work, but much aptitude to learn. With the support of the project, Luciano has been trained in the production and sale of medicinal plants. He started with no working capital but through organising a series of activities, such as local fairs, he managed to make some profit. He now benefits from monthly sales of US\$300 with a profitability of 30%, which represents around US\$100 in profits. The business has grown thanks to the initiatives of Luciano and others like him. The market is mainly local but there is an interest for the product in nearby cities.

Figure 2: Leaves from Cat's Claw plant (Unia de gato)



Peru

Latin America



tive, therapeutic and preventative properties which have been recognised by scientists throughout the world. The native people living in the Peruvian jungle have used this plant to cure different diseases and afflictions. The boiled or macerated bark has been used to cure arthritis and as an anti-rheumatic and anti-inflammatory medicine. It has even been advertised as a cure for cancer and AIDS.³

Sangre de grado

During the last few years, there has also been a growing demand for *Croton lechleri*, more commonly known as 'sangre de grado' or locally as 'ujushnum'. This is a small tree with heart shaped leaves which generally grows in open areas where there is plenty of sun. When the stem is cut, it exudes a red, bitter tasting liquid. It is a medicinal plant that contains a chemical compound called 'taspina' which is used for healing wounds and scars, and curing stomach upsets and ulcers.

Sangre de grado is sold either as a liquid, as it comes out of the tree, or as the bark. The liquid is extracted by making a spiral or 'v' shaped cuts with a scraper and collecting it into a container.

The availability of medicinal plants in tropical forests

An important aspect of the modern production of medicinal plants is sustainability. ITDG has been working in the development of appropriate technologies for proper forestry management which will allow communities to incorporate medicinal plants into their family life. With this in mind, the knowledge of local biodiversity as well as market requirements and technical productive aspect of forests in a context of respect for indigenous culture and conservation of the tropical forests needs to be evaluated.

A novel application of medicinal plants is as a food supplement, in particular in those species that have antioxidants or restorative properties. Cat's claw is an excellent food supplement. It can be used directly as an infusion or prepared as an ingredient in drinks, candies and nectars.

Processing of cat's claw

Primary processing comprises the selection, classification, bark stripping, cutting and drying that take place after harvesting in the forest. All of these stages are generally conducted in the same extraction area but due to the care that needs to be taken and to ensure a better handling of the product, it is recommended that these operations take place within an appropriate environment. Once this group of operations has been successfully completed, the gathering, storage and transportation to the processing plant takes place.

Secondary processing is the processes that will give a higher added value to the cat's claw. For example, water extraction of all the water-soluble components to find the active ingredients of the cat's claw plant. The amount of bark per litre of water can vary between 300 and 500 grams. Once obtained, the water extract should be kept refrigerated to avoid fermentation. The bark can also be extracted in a mixture of alcohol and water. Cutting, shaving and pulverising allows for a better finish of the cat's claw plant in case it is used for trading.

Quality control should take place at the same time as the production process to ensure that a pure product is extracted. Unfortunately, the rural settlers have little experience in trading outside their own area and, in particular, trading with manufactured products. This has determined the slow pace in which the constant growth of these productive units occurs.

It is important to mention that the lucrative activities with indigenous medicinal plants have raised an interest around the rest of the Aguaruna people and there are other communities currently looking to copy the work of Bajo Naranjillo. Likewise, the business experience with medicinal plants is opening new horizons for the Aguaruna people, who, for the first time, have traded products manufactured locally:

- Confectionery products, for example, boiled sweets, filled sweets, chewing gum, marshmallows and toffees etc.

Products made from
uña de gato



- Products enriched with 'uña de gato' extract, for example, honey with extract and fruit nectar with extract.
- Capsules and pills
- Diluted extracts
- Syrups
- Liqueurs
- Dyes

The processing of medicinal plants brings new potential for generating employment as well as income in both rural and urban areas. In the rural areas, it is particularly important to organise enterprises responsible for the management of forests and small plants after harvesting. The development of packed and primary transformation products will bring

new sources of income and a revaluation of forests. In the urban areas, medicinal plant products create an opportunity for development and growth of micro-enterprises, with only a small investment and the use of appropriate technologies.

References

1. The same is part of the national coat of arms (it represents the floral biodiversity)
2. Quinine is the active principle of *Chinchona*
3. There are testimonies of the curative powers for such diseases (cancer and AIDS). However, these powers have not been scientifically proven.

Medicinal plants help combat climate change

In this short article, Norbert Glaser of GATE reports on two initiatives that have been supported by the European Climate Alliance, a coalition of local authorities interested in reducing the impact of climate change and safeguarding the earth's atmosphere and biodiversity.

The first of these is an initiative in Venezuela to establish a garden for the cultivation of medicinal plants. The reasons for establishing the garden were various:

- Ecologically appropriate cultivation of native medicinal plants helps conserve the rainforest and its biodiversity
- With a knowledge of the healing properties of these traditional plants, the local communities have a viable alternative to expensive western medicines
- Sale of the excess produce provides an attractive source of income for the local communities.

Growing medicinal plants is a suitable form of income generation because it does not require a large investment. The elders of the community, who have a knowledge of the plants and their healing properties, collected them from the wild and re-planted them in the garden. The plants were classified by a botanist to ensure that they were being cultivated in

appropriate sites and conditions. At the same time, the two villages tried growing medicinal plants from other zones.

The villagers received assistance from a health expert from AIDSESEP, the national organisation of the Amazon Indians in Peru. He knew a great deal about both traditional treatments and western medicine and was able to advise on the healing properties and applications of the plants.

This exchange of information between cultures and between the older and younger generations has ensured that the traditional knowledge and cultural values have been recovered and preserved. It has also rekindled many of the ancient practices and ways of life that remain appropriate to the conditions of the rainforest.

The second initiative is in Bolivia, where the State of Bolivar (FIEB) sought support for a project to improve the living conditions of people whose land and environment is under threat. They proposed to achieve this through the cultivation of medicinal plants. The other benefits of the project were to protect the climate by sustainable use of the jungle resources and prevent destruction from logging companies.

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Global

Conference announcement

The first regional conference on Medicinal Plants, Traditional Medicines and Local Communities in Africa: The Challenges and Opportunities of the new Millennium, is being held in Nairobi, Kenya in parallel to the Conference of Parties-5 of the Convention on Biological Diversity.

Dates: 16-19 May, 2000

Venue: International Centre for Research in Agroforestry (ICRAF), United Nations Avenue, Nairobi, Kenya.

Main conveners:

Environment Liaison Centre International (ELCI), Nairobi, Kenya

Global Initiative For Traditional Systems of Health (GIFTS of HEALTH), University of Oxford, United Kingdom

In collaboration with the Rainforest Medical Foundation, Amsterdam, The Netherlands.

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Equipment, packaging and information

Midway Technology is a small company dedicated to assisting the small-scale food processing sector in developing countries by offering training and information.

One serious constraint faced by many small-scale processors is access to, and availability of, ingredients, small items of processing equipment, technical books, packaging materials and equipment. Many of these are not available locally and most companies in Europe and the United States are unwilling to service very small orders to clients overseas.

For the last three years, Midway Technology has been developing and testing a supply mechanism with agencies in Tanzania and Uganda. Local processors contact their in-country agent, who places a bulk order with Midway. Midway purchases and packs the order for shipping. This trial scheme has

proved to be extremely successful in the two countries mentioned above.

Midway Technology is now considering expanding the service to include a wider number of agencies in other countries. However, before this goes ahead, we need to ensure that there is a demand for the service. If you feel that your organisation would benefit from such a service, please contact us at the following address:

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Call for papers for 'Cashing in on Cashew', an international workshop, in Sri Lanka, November 2000



Intermediate Technology Development Group – Sri Lanka (ITDG) is a development organisation working towards identifying suitable technology choices for development. The cashew industry is an important export crop with multiple stakeholders, inclusive of small producers. For the past 5 years, ITDG has been working with small-scale cashew processors to pilot test suitable technologies and methodologies that can be adopted by resource poor families as an income generating enterprise.

Cashew is a crop with global demand and much of the supply is met by developing countries. It is a crop that grows in dry/arid conditions, therefore invariably it is found in areas with limited economic options. It contributes to the national economy and has potential to reduce poverty. The promotion of production and processing was conventionally carried out by government institutions. Using alternative methods can complement and enhance the cashew industry and increase its outreach and target groups. ITDG is hosting this workshop to promote and share these alternative approaches and to form links with stakeholders internationally to develop the industry as a whole.

The workshop aims to:

- Share information and experience on innovative techniques for increased production of cashew and efficient methodologies for processing cashew nuts and apples
- Explore the role of cashew in the future

We invite you to submit papers on the following themes:

Theme 1: Technology development for processing and production

Processing cashew nuts and apples; agronomy; high yielding varieties; plant protection; and environmental implications.

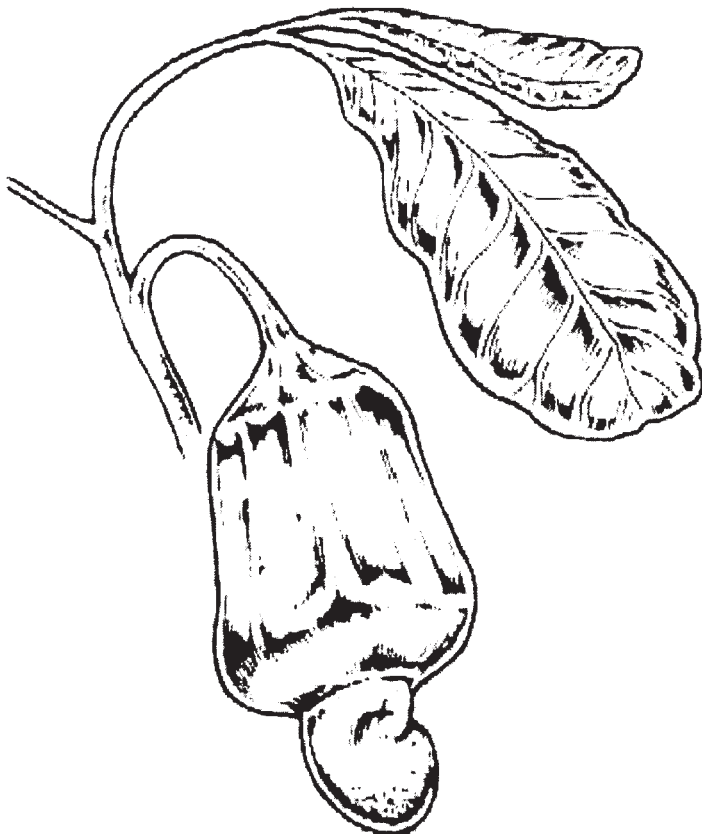
Theme 2: Effective approaches for small scale cashew processing

Community based projects; management of cashew ventures; potential for income and employment generation; and risk reduction.

Theme 3: The global cashew trade – current situation and future trends

Theme 4: Role of cashew in a national economy

The deadline for receiving abstracts is 30th June 2000. The abstract should not exceed 250 words (Times New Roman-11). Please include name of author(s), affiliation, contact address, phone, fax, e-mail details etc.



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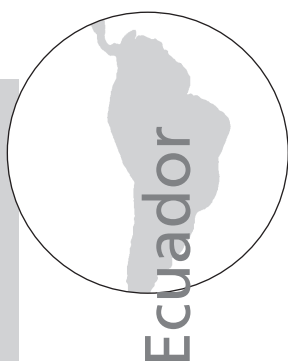
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Cashew fruit



Some kind of a nut – you can make snacks, cosmetics and cooking oil out of inchi

Mathias Kircher is a qualified agroforester working with PROFORS/GTZ-INEFAN in Ecuador. This article was reproduced from an article he wrote that appeared in Gate 3/98. In the lowlands of Sucumbios in Ecuador, a project run by the Programa Forestal Sucumbios (PROFORS), Gesellschaft für Technische Zusammenarbeit (GTZ) and the forestry authority, INEFAN, investigated the commercial potential of the inchi tree nut. The article describes how the harvesting, distribution and marketing structures for this non-timber forest product are being supported and developed.

Introduction

In Sucumbios in Ecuador, settlers are clearing large expanses of forest. Faced with a lack of other sources of employment and income generation, and a recent decline in prices of traditional crops, such as coffee, banana and cocoa, more and more families are opting for extensive livestock farming. This is resulting in the steady loss of many natural resources in the area.

As a result, GTZ and INEFAN, in collaboration with PROFORS, have been promoting the sustainable harvesting and marketing potential of non-timber forest products (NTFPs) that are currently rarely, or never, used in a hope that this would alleviate the pressures on the remaining forest areas. A native species of the Ecuadorian forests – the inchi tree – was studied for its marketing and processing potential. The study revealed that inchi trees are relatively common in the area and belong exclusively to the natural tree stand, i.e. they are not planted. They usually grow in groups, with a distribution of one in every five hectares.

The local population has traditionally made use of non-timber forest products for several purposes. Local produce, including meat from wild animals, fruit products, the sap or bark of medical plants, such as sangre de drago (dragons blood) and uña de gato (cat's claw) are sold in the weekly market and in the provincial capital. Inchi nuts are used at the family enterprise level but are not traded at the market.

Suitability of the nut

On average, inchi nuts have a fat content of 52%. They also contain a high proportion

The inchi tree (*Caryodendron orinocense Karsten*) belongs to the family of euphorbiaceae. It is a deciduous evergreen tree that reaches a height of between 15 and 30 metres. From September onwards, the female trees develop fruits in a ripening process that takes three months. The fruits have a hard kernel, similar to nuts, that is covered with a fleshy protein rich fruit wall. The kernel contains three seeds which are 1.5cm long and 0.5cm wide. The seed husk is brown, while the nut is white. The tasty nuts can be eaten without any further treatment and are used locally for food and vegetable oil. Inchi fruit harvesting takes place between November and May. The trees have an annual mast bearing cycle and the average fruiting period per tree is five weeks.

(about 75%) of polyunsaturated fatty acids. Nutritionally, this is very valuable, since polyunsaturated fatty acids are the most desirable types of fatty acid to consume.

Furthermore, the oil extracted from inchi nuts produces a high quality cooking oil.

Inchi nuts have also been checked for levels of carcinogenic and cyanide producing substrates because these compounds can occur in euphorbiaceae. No carcinogenic compounds were found in the nuts but traces of cyanogenic compounds were detected. However, such low levels do not pose a threat to human health and the nut and the extracted oil have started to be marketed at trade fairs. The oil can be used for cooking and cosmetic purposes and GTZ is supporting the marketing of inchi nut oil.

Harvesting and processing of inchi nuts

The management and implementation of inchi nut harvesting has been assigned to the local non-governmental organisation (NGO) FUNDAFOR (Fundacion Agroforestal Oriente). They have to follow very strict guidelines with respect to harvesting schedule, purchasing prices, deadlines and the delivery quality of the product, to ensure that the nut and the oil are suitable for the export market. It is important to ensure that old fruits are not added to the harvest as these have a bitter taste that can ruin the quality of the oil.



Once harvesting begins, the inchi fruit is gathered by the settlers every two days. The harvest is quality controlled and then purchased at agreed collecting points. The fruits are broken open, artificially dried and then transported to the highlands for further processing. The nuts have to be dried straight after purchase, in order to terminate the germination process. If they are not dried immediately, they can develop a bitter taste.

The temperature for drying the inchi nuts needs to be maintained at 60° C over a three day period which gives the nuts a final moisture content of 2%. The temperature can be accurately controlled with the aid of a built in thermostat. When drying the inchi nuts for oil pressing purposes, it is essential that the temperature does not exceed 60°C otherwise discoloration and spoilage will occur due to overheating.

To improve on the quality of the product, much of the processing is carried out in the Andes highlands where the temperature and humidity are lower than in the Amazon lowlands. A local organisation called MCCH (Movimiento maquita Cuschunchic Comercializando como Hermanos) is responsible for the processing. They have warehousing, processing and drying facilities, and transport both in the Amazon region and in Quito.

The nuts are shelled by groups of women who are either directly employed by MCCH or work for MCCH in service co-operatives. Although it is more time consuming than mechanical shelling, hand shelling is the preferred method because this is the only sure way of removing the thin third husk from the nut and of producing a higher quality product. After shelling, the nuts are roasted and salted, or coated with chocolate all of which increase their value.

Cost of inchi nuts

The costs per kilogram of inchi nut are relatively high because of the long travelling times required to reach the farms which compares unfavourably with plantation production. One kilogram of processed and packed, shelled, roasted and salted nuts costs about US\$7.50. If the nuts are being used to produce oil, the cost-intensive work such as peeling and roasting is not necessary and the price is reduced. One kilogram of dried inchi nuts in their husks costs around US\$4.

Who benefits from harvesting inchi?

Because the fruit was not widely used in the past, making use of the inchi nut has created

a new source of income for the farms. The main positive aspect is that the harvesting takes place at a time of year when the family enterprises receive no income from coffee or other crops. Even if export marketing of inchi does not succeed, and the nuts are only marketed locally, the small holders would still have a product that is nutritionally valuable for their own consumption and as fodder for their small livestock.

The project has stimulated several small-holders to launch their own initiatives to commercialise the nut, either through planting trees at the farm level or by buying grafted inchi trees that are on sale at local tree nurseries.

Profits depend largely on the number of trees per farm and the volume of fruit they produce. The average farm with one to two trees makes a profit of between US\$28 and US\$56. One factor that made matters simpler was that in the past the trees had only seldom been used commercially and therefore the property relations were straight forward. The settler families receive about US\$1 for one kilogram of nuts.

The future

Whether the marketing and processing of the inchi nut oil can have a real positive impact on the living conditions of the settlers and on the prevention of degradation of the forests, depends to a large extent on the consumer. Consumers have to want to buy the product and be willing to pay a higher price on a lasting basis. It is envisaged that in the long term, costs will become more favourable as more trees are planted and the harvests improve. Inchi nut oil will only be able to achieve a genuine market launch when the scale of harvesting is in terms of tonnes and the oil can meet the high quality demands of the consumers.

An important long term approach to ensuring sustainability would be to apply the instrument of ecological and social certification to non-timber forest products. There is also scope for the use of the inchi tree in the preservation of forest ecosystems. The planting of inchi trees and development of plantations will help to safeguard the forest areas against erosion and the degradation of the soil.



BOOKS

Non-timber Forest Products: Value, use and management issues in Africa, including examples from Latin America.

Ed. S.A.Crafter, J.Awimbo and A.J.Broekhoven. IUCN Forest Conservation Programme, IUCN, Eastern Africa Regional Office, Nairobi, Kenya. ISBN 2 8317 0317 4 pp167; available from IUCN, Kenya and Geneva.

This book, produced by IUCN, reports on a workshop held in Africa in 1994 that explored the viability of the extraction of non-timber forest products (NTFPs) in Africa. It consists of three parts: a summary of the workshop discussions; a selection from the papers on thematic topics that were presented at the workshop; and 15 country overviews covering crucial issues related to NTFPs, including maps of the forest reserves where the information was available.

The first section covers various themes that were discussed at the workshop, including the values, valuation and impact of NTFPs; approaches to sustainable use and conservation of NTFPs; policy, legal and institutional issues; and opportunities for follow up.

In the next section there are 11 case studies from Africa and 4 from Latin America. These look at household issues of NTFPs, such as employment opportunities and income generation, domestic and subsistence use, medicinal values, and use for food, fibre and fodder. Different policies that are in place to promote and

protect NTFPs are discussed.

Examples include that of CAMP-FIRE in Zimbabwe and the Soil and Water Conservation Project (HIMA) in Tanzania. Other issues that are discussed include the economic value of NTFPs and the management of forests. NTFPs that are discussed include honey and products from bees, meats, fruit and vegetables, fuelwood, herbs and medicinal plants, baskets and handcraft materials, farm implements and domestic tools. This wide range of products and their potential uses demonstrates the extent to which NTFPs play an important role in the livelihoods of forest people.

The final section has country overviews from 15 African countries and a list of participants and organisations involved in work with NTFPs. It is a very useful book for those involved and interested in forestry conservation issues and projects.



Where there is no Vet

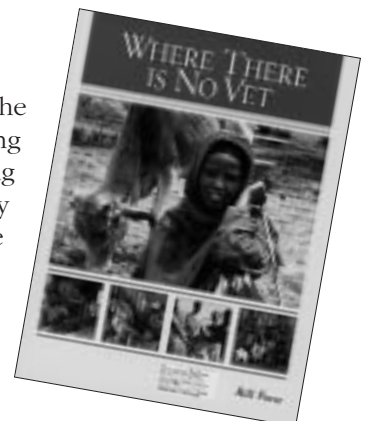
Bill Forse, CTA, Macmillan and Oxfam Publications, Macmillan Press, London and Oxford. ISBN 0 85598 409 0 pp 368 Price £14.95 (US\$24.95)

Where there is no Vet is essential for anyone in the tropics who keeps animals and for people around the world who help, advise or teach others who keep animals. It has been designed to teach about health care and to prevent serious problems arising, through better care and husbandry of the animals. *Where there is no Vet* follows the same user-friendly approach as *Where there is no Doctor*, a popular book already in press.

The book covers topics that affect the health of livestock, from diarrhoea to rinderpest, and traditional remedies to the uses of modern medicines and vaccines. It includes

advice on the care, feeding and handling of animals. By describing the signs of disease, it helps readers to work out what is

wrong with an animal and then tells them how to treat it. It also tells readers when they should contact a trained vet.





Adding value to cereals, roots and tubers. Developments and opportunities in small-scale enterprise development in Africa. Study Report

D. Bruinsma, CTA, Postbus 380, 6700 AJ Wageningen, The Netherlands. ISBN 92 9081 2028 pp91; available from CTA.

This book is the summary of a study into the potential opportunities for development of small-scale food processing enterprise in Africa. It looks at developments that have taken place in the storage and processing technologies for cereals, roots and tubers in Africa and also examines relevant developments that have taken place in the food marketing chain.

The main crops covered by the study are maize, millet, sorghum, rice, cassava, potato, sweet potato and yam. Throughout, the study stresses the importance of carrying out any technical development within the prevailing social and economic context. Thus, the first chapter of the book is an overview of developments in storage and processing within the context of the food marketing chain. Further chapters go on to report on technology developments for cereal storage and processing, and root and tuber storage and processing at the small-scale.

The fourth chapter reports on the factors crucial to the successful development of small-scale food

processing enterprises. It includes issues such as technology selection and dissemination, local manufacture of equipment, enterprise development, management and organisation, training and entrepreneurship development.

The book ends by highlighting several issues in storage and processing, and enterprise development that deserve further attention and research.

This book would be extremely useful for project workers and policy makers planning the development of small-scale food processing enterprises in Africa.



BOOKS

International Beekeeping Symposium

Harare, Zimbabwe

4th & 5th November 1999

The Zimbabwe Beekeepers Council (ZBC) and Intermediate Technology Development Group (ITDG) jointly sponsored a two day symposium on the promotion of beekeeping in Zimbabwe which was held in Harare during November.

The Symposium focused on:

- Developing a common understanding and approach to solve the threat posed by bee diseases to the local bee industry and food production.
- Identifying priorities and strategies for Research and Support Services.
- Understanding the current Bee Act and its impact on the bee industry.
- Bringing together all stakeholders in the bee industry in Zimbabwe.
- Investigating ways and means through which non-governmental organisations (NGOs) and other players can support efforts and initiatives of keepers country wide.
- Discussing strategies for promoting and

training rural beekeepers.

- Recommending strategies for sustaining the bee industry and its contribution to food production in Zimbabwe.

Representatives of the bee industry from Botswana, Zambia, Mozambique and South Africa also presented papers at the symposium which gave delegates an opportunity to learn from the experiences of other international stakeholders. About one hundred delegates attended the symposium and listened to papers presented by twenty speakers from all over Southern Africa. Time was allowed for 'Questions and Answers' at the end of each session which enabled lively discussion amongst all the delegates and lead to inspiring conclusions.

The symposium was an extremely successful event and the papers, including presentations on rural beekeeping, pollination, honey by products, training and extension services, marketing, bee diseases and access to finance, can be obtained from Clara Chingosho, ITDG Zimbabwe, P.O.Box 1744, Harare, Zimbabwe. E-mail: itech@samara.co.zw



Nigeria

Africa

A new device to prevent the contamination, loss and wastage of fruits and vegetables

In many developing countries, the display of fresh fruit and vegetables for sale can often be a major constraint. This article, written by S. NwaneLe Aso of The Rivers State University of Science and Technology in Nigeria, highlights several of the problems associated with the display of fresh produce. It analyses the effectiveness of a new device that has been designed to prevent the contamination, loss and wastage that are associated with more traditional methods of display.

Introduction

Fresh fruit and vegetables are an essential part of the diet, providing vitamins, minerals and dietary fibre. They are, however, highly perishable and easily prone to damage if badly handled during transport and sale. The traditional methods of displaying produce are very basic and often crude. For example, in Port Harcourt, Nigeria, fresh produce is frequently presented for sale along the road side and in the local markets, spread on old tables, or on old pieces of cloth or polythene or simply spread on the bare ground. The produce is also demarcated into selling portions with unhygienic objects, making for an unattractive and potentially unsafe environment.

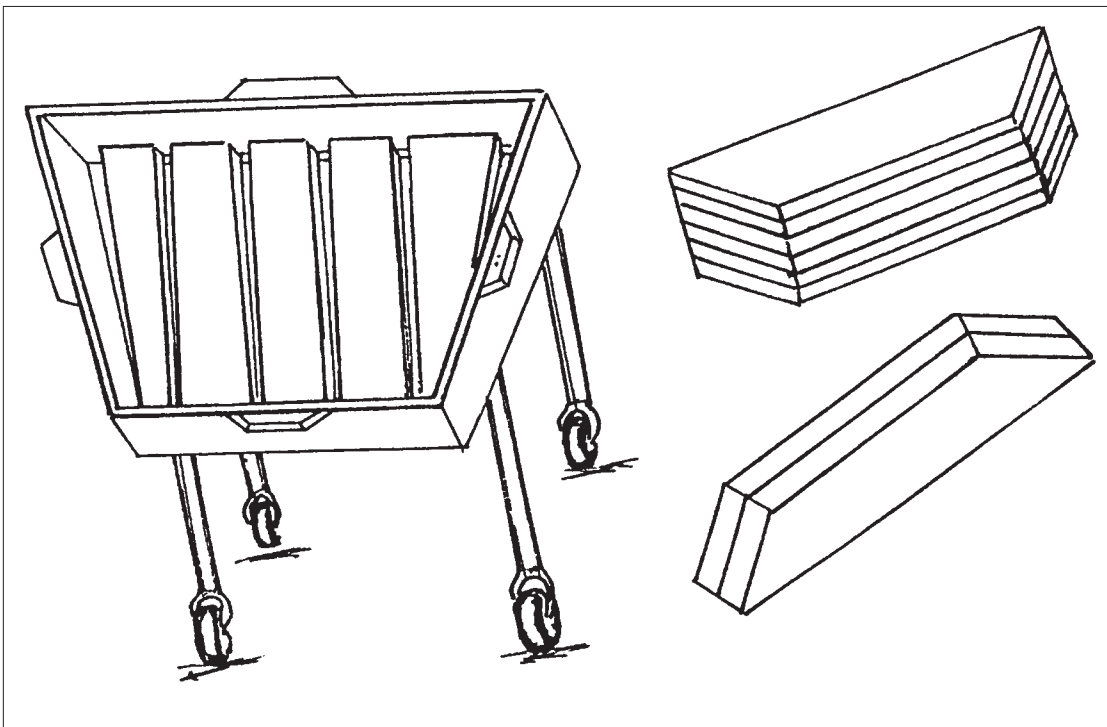
There are several potential and actual problems associated with these traditional methods of display:

- The unhygienic objects used for demarcation introduce contaminants, e.g. fungi, that reduce produce quality and pose a health hazard.
- The produce displayed on the floor is contaminated by passing vehicles and pedestrians. Buyers also have to stoop over to select their purchase, proving to be uncomfortable and difficult for those with back pains.
- Conventional tables lack drainage openings and any form of gradient, therefore, juices and moisture collect on the tables and, as well as being unsightly, can harbour pathogenic and spoilage bacteria.
- Because there is no means of drainage from conventional tables, it is difficult to wash the produce and dispose of the washing water.
- The design of conventional tables – flat top with no sides – means that produce can easily roll off the top, resulting in spoilage and wastage.
- Tables are difficult to move around, especially when loaded.

Seeing the need for more hygienic and pleasant methods of displaying fresh produce and taking into consideration the limitations described above, engineers at the Rivers State University of Science and Technology designed and tested a fruit display unit, known as the NwaneLe Fruit Bed.

Characteristic features of the NwaneLe Fruit Bed

- Compact and modular design: the bed system (figure 1) consists of six modular components: right module; left module; forward part; rear part; pallet floor and accessories. These components are made in different sizes that can be assembled in various combinations according to the individual need.
- NwaneLe Trapezoid Shape: this is a novel shape creation. In its fruit bed application, the shape projects a disparate but attractive view from each perspective. Also, the loading and unloading facilities are functionally omni-directional, that is, from all directions.
- Pallet floor: the slatted floor facilitates drainage and ventilation and reduces the mixing of commodities.
- Rails: railing around the edges allows bulk display and storage of the produce and reduces loss by preventing produce from falling off the edges of the bed.
- Rollers/wheels: these facilitate rapid mobilisation of the bed with minimal effort.
- Accessories: handles are attached to help with moving the bed. Demarcators are used to segregate the commodities into different quality categories and/or selling portions.
- Hygienic outfit: the bed has smooth surfaces to prevent crevices and corners where dirt and micro-organisms can collect. Modular design enables disassembly and easy cleaning of the bed components.



- Ease of fabrication: the bed can be constructed by most trained carpenters or cabinet makers, using locally available materials.
- Ergonomics: the bed is user friendly, with no environmental or health hazards.
- Aesthetics: the NwaneLe Fruit Bed is elegant and can be manufactured to any desired size.

Cost analysis

The cost of producing a basic NwaneLe Fruit Bed was analysed in comparison with that of a conventional table of equal height and surface area. The basic model had the following dimensions:

volume of 0.11m³
area of 0.81 m²
height of 0.91m

The total production costs for the NwaneLe Fruit Bed and the conventional table are N4037.25 (US\$47.50) and N3060 (US\$36.00) respectively.

Discussion

The production cost of the NwaneLe Fruit Bed exceeded that of the conventional table by N977.25 (US\$11.50). The main difference was due to the hooks, rollers/wheels, railings, extra preparation and labour used for the bed design. However, this cost is insignificant when the advantages of the bed in terms of reduced wastage and loss, improved display

features and extra mobility are considered. Analysis of the deck/floor area profiles showed a twenty percent reduction in material for the bed as compared to the table. This reduction occurred with deck spaces of only 0.03m. The reduction would be greater for larger deck spaces required for customised or large production applications. Such material savings would minimise any production cost differences.

Conclusion

The traditional methods of displaying fresh produce in Port Harcourt, Nigeria are unsatisfactory. Current practices promote contamination, wastage and loss of the produce. The development and testing of the NwaneLe Fruit Bed seems to provide a cost effective alternative to some of the more common problems encountered by fresh fruit and vegetable vendors.

Acknowledgement

The helpful comments of Mr N.O.Obuzor are acknowledged.

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Mexico

Central America

Production of melcocha and queso de tuna from cactus pear fruit in the centre of Mexico

This article has been written by H.Ortiz-Laurel and S.J.Mendez-Gallegos, from the Postgraduate College at the Campus San Luis Potosi in Mexico and describes the use and production of cactus pear.

Introduction

The cactus pear, or prickly pear, (*Opuntia spp.*) is a native American plant that has become widely spread throughout the world, especially in the drier countries of Africa, the Mediterranean and the Middle East. The crop has many production advantages in that it can grow on shallow soils with poor texture and low pH levels. It has a high water use efficiency, with no special climatic requirements and it grows and fruits prolifically. In semi-arid and arid zones of Mexico, the crop is a valuable source of fodder and the fruits are used as a fresh green vegetable. The many attributes of cactus pear have led to it becoming a profitable crop in certain regions of Mexico.

The fruit, known as 'tuna', is very nutritious and has a high content of vitamin C (about 20mg per 100g). It is unusual in that it has a low acidity (pH 6.4) which is important to remember when deciding on methods of processing. Products with a high pH are more

susceptible to food spoilage bacteria than those that are more acidic. Furthermore, food with a pH of 4.5 or more can support pathogens which, if consumed, can result in illness or even death. Products made from prickly pear fruit need to be heated to 121°C in a pressure cooker to ensure that they are safe (this method is not recommended for small scale producers) or, alternatively, the fruit can be made more acidic by the addition of lemon juice or citric acid. The growth of harmful bacteria is also controlled by very high sugar content in foods.

Processing prickly pear

The fruits are highly perishable and therefore it is important to process them to avoid losses and to preserve them for consumption later in the season. Several products can be made from cactus pear, including juice, jam, jelly, fruit cheese, confectionery products and wine. Two popular products that are made in Mexico are fruit cheese – *queso de tuna* – and a toffee like substance called *melcocha*. Both processes use tunas that are thoroughly ripened. The fruit can be picked by hand and then peeled, or it can be peeled directly on the plants. The extracted tuna juice will need to be boiled for up to 7 hours, which places extra demands on the need for fuel wood or alternative sources of heat.

The products from tunas are processed in rural structures known as '*mieleras*' or '*ranchos*'. These are small cottage industries, either permanent or mobile, which can be situated inside the houses of the peasants or near to the cactus pear orchards. Generally, the *mielera* is a cottage built of stones or soil bricks, with a thatched roof made from the leaves of palm and branches of several plants that protect the batch from rainfall. It has the following features:

A de-seeding device (*mouli-legune*) made from a tin perforated vessel that will not allow the seeds to pass through. In the centre of the vessel is a pivot support with an axial shaft upon which are hung paddle-like wings.

A furnace that consists of a fire pit dug in the soil, and a '*ruego*' in the upper part to reinforce the kettle. This is made from slabs of wood cut from palm tightly fitted together with earth and soil bricks, with two openings – one of them is used to introduce the fire-wood and the other acts as a smoke flue.



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Keywords:

Cactus pear, prickly pear, tuna, fruit processing, melcocha, queso de tuna.

Queso de Tuna ready for selling



Mexico

Central America

Inside the *mieleras*, there are also several smaller tools and equipment, including a kettle (generally made of copper although sometimes pottery is used) placed 40-60 cm above the soil inside the *ruego*; several paddles made of 'mezquite' (*Prosopis spp.*), 'pirul' (*Chinus molle*) or 'quioté' (*agave inflorescence*) measuring more than 1 metre in length; a large container to collect the juice from the seeder; a trough made out of willow for cooling; a table for kneading and drying; moulds of several shapes and dimensions; a pan and a scoop; a bucket; and a large flat stone.

Production of melcocha

The melcocha is a very sweet preserved semi-solid food of dark red colour (if it is made from red tunas) or dark mustard (if it is made from white tunas). The first step in processing is the collection of the juice by squeezing the pear pulp in the seeder until all the juice drains into the collecting vessel. The kettle is filled two-thirds full of juice and is allowed to boil on a brisk fire for about three-quarters of an hour, when more juice is added and the boiling continues. To avoid sticking or burning, the juice must be stirred continuously with a wooden paddle. The fire should be kept at the same rate throughout the whole cooking process to maintain a constant low rate of evaporation until the proper consistency is reached.

The melcocha is ready when a scoopful can be tipped upside down and the material does not run out or when the bottom of the kettle can be seen as the mixture is stirred with the paddle. At this stage the kettle is removed from the heat and the syrupy liquid is poured into the trough and worked with wooden paddles very rapidly in order that it may cool as quickly as possible. When the temperature is reduced so that it is not uncomfortable to the touch, the vessel is covered and left at room temperature for drying until the next day when the material is bottled. Approximately 10 to 14 kilograms of tunas are needed to obtain one kilogram of melcocha. The yield depends on the amount of juice extracted from the fruit and by tending carefully to the cooking.

Producing queso de tuna

To produce queso de tuna, the process detailed above is continued, until the cooled material will not leave the spoon when it is shaken. It is a compact mass, similar to candy, with a high sugar content and mustard in colour. When the melcocha is cool, it is 'struck' on a flat, smooth and moistened stone, the whole lump being raised above the head and then thrown forcibly down. This is done in small batches (around one kilogram) or large batches (up to 5 kilograms) until the material develops the appropriate consistency or until it does not stick to the stone. Each portion should be 'struck' around 200 to 300 times. This process beats air into the syrup and retards sugar crystal formation which would give a granular feel in the mouth. The more stirring or kneading the material gets during the manufacturing process, the harder it becomes and the lighter its colour will be.

Afterwards, the dough is placed in wooden moulds of different shapes where it remains for 12 to 15 hours. Finally, it is wrapped according to the selling shape required. The yield to process queso de tuna is similar to that for making melcocha. The amount of processed cheese per family can vary from 5 to 15 kilograms per day. In order to offer a better product presentation and more quality, some traders soften the cheese by heating it and then add walnuts, coconut, raisins or almonds.

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'Ruego' where the juice is cooked

© H.Ortiz-Laurel



Amirtham – a low cost, ready to eat nutritious food

Rajammal P. Devadas and Jana Bai Giri, Avinashilingam University and the Avinashilingam Education Trust in Coimbatore, India provided this recipe on amirtham.

'Health for all by 2000 AD' – this is the cherished goal of the World Health Organisation. One of the strategies for achieving this goal is to make nutritious food available to all sectors of the population. In an attempt to meet this target, the Avinashilingam Education Trust, under the sponsorship of the Government of the Indian Ministry of Human Resource Development, has launched the production of a nutritious food.

The food was formulated with the following objectives:

- The food should be nutritious
- It should be pre-cooked and ready to eat
- It should be easy to digest
- It should be palatable
- The cost should be within the purchasing capacity of the poor

During the formulation of the food, several cereal and pulse mixes were produced and analysed by a panel of experts. The final choice was a mixture of wheat (*Triticum vulgare*), roasted Bengal gram (*Cicer arietinum*), groundnut (*Arachis hypogaea*), defatted soya flour (*Glycine max*) and powdered jaggery (a product of sugarcane, *Saccharum officinarum*). This food was called 'amirtham', which means nectar.

Composition of amirtham per 100 grams

Ingredient	Weight (g)
Wheat	37.5
Bengal gram (roasted)	18.8
Defatted soya flour	6.2
Groundnut (roasted)	12.5
Jaggery (powdered)	25.0

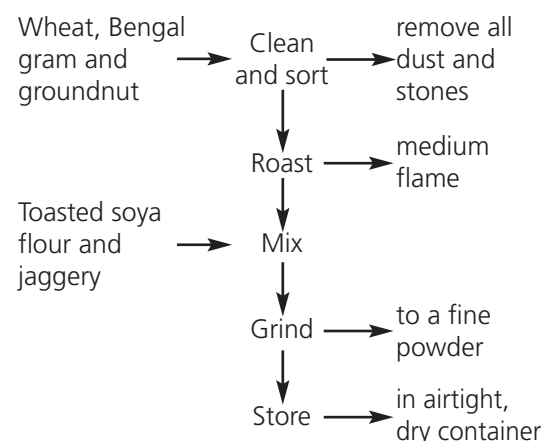
Preparation of amirtham

Wheat, Bengal gram and groundnut are thoroughly cleaned and then roasted over a medium flame. Toasting in this way is commonly used as it reduces the level of anti-nutritional factors. The roasted ingredients are mixed with the toasted soya flour and pow-

dered jaggery (raw sugar) and pulverised to a fine powder. The ground mixture can then be used to prepare different dishes such as porridges, sweets and breads.

Amirtham is a low cost food that is rich in protein and calories. It costs about Rs30 per kg (US\$1 per kg). 100g of the flour can provide a child with one third of its daily requirement for energy and protein. Because amirtham is a pre-cooked flour it can be eaten without further processing. For children aged 7 to 12 months, it can be made into a thick or thin porridge, with water or milk. Adding milk improves the nutritional value of the porridge. For older children, amirtham can be made into traditional food products such as *laddbu* (sweets), *pittu* (steamed flour) and *kozhukattai* (steamed cake).

Flow diagram



Sugar free amirtham

A sugar free amirtham has also been produced that is suitable for diabetics and those who wish to avoid sugar. The composition of this amirtham is given below.

Component	Weight (g)
Wheat	50
Bengal gram (roasted)	25
Defatted soya flour	8.3
Groundnut (roasted)	16.7

The method of preparation is the same as for sweet amirtham. Amirtham can be used in several traditional Indian recipes to produce a range of sweet and savoury products including kanji, pittu, dosai, uppama, vegetable cutlets, bajji, boonda, biscuits and soup.

Food Chain: What impact does it have?



Attention all readers! As we enter the new millennium, *Food Chain* is celebrating its 10th anniversary but unfortunately, due to funding difficulties, it may not be around in 2001, let alone the next decade.

We have been trying to find solutions that will help us overcome this disastrous possibility and we need your help! We don't want money, we want something that only our readers can provide. We want information!

We need to know if you would be willing to help us find evidence to prove that *Food Chain* is a valuable journal that makes a difference, however small, to people's livelihoods. By telling us how you use *Food Chain* and showing us where an article, extract, piece of equipment or anything discussed in one of the issues, has made a difference to your life, we may be able to convince donors to carry on funding it. Maybe *Food Chain* has not had a direct impact on you but it may have affected or influenced the people you work with, in which case, we still want to know about it. In fact, we want to know about any action that has been the result of something that you or the people you work with have read in *Food Chain*.

The impact assessment will inform us if the information in *Food Chain* is reaching the intended target groups and how they are using it to improve their livelihoods. It will highlight any gaps in the journal and identify areas where improvements could be made. Most importantly, it provides you with an opportunity to tell us what you want to read and learn about in *Food Chain*.

So come on, cast your mind back. There have been 26 issues with information on everything from fish smokers to utilising fruit waste and from packaging equipment and marketing to coconut processing. We rely on you for the contribution of articles and now we need to know what you do with the information. Think about it, have you used *Food Chain* as a source of technical, commercial, marketing, social or economic information; or for training courses and workshops; or in discussion with international/regional policy makers; or for networking and fund raising purposes? Or maybe none of the above but for something as simple as providing a balanced meal for your family? Whatever it maybe, we need to know. All

you have to do is write, e-mail or fax a couple of sentences to me, Emma Judge, at Intermediate Technology (please find the address on the back page) including your contact details.

The more information we can gather, the stronger our case for *Food Chain* becomes. Ten minutes of your time could mean a lifetime for *Food Chain*.



Impact