CASSAVA

Processing and Storage

Proceedings of an Interdisciplinary Workshop, Pattaya, Thailand, 17-19 April 1974

Editors: E.V. Araullo
Barry Nestel
Marilyn Campbell
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AND STORAGE

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Cultivation, Processing, and Utilization of Cassava in Sri Lanka

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Abstract Cassava has changed status in Sri Lanka during the present decade, from a traditional minor crop to one of great economic significance, both as a human food and a base for agro-industry. New interest in the crop has resulted in expansion of cultivation to 61,200 acres (24,777 ha) in 1973. Processing cassava for human food is receiving considerable attention at the moment. Significance of cassava as a human food will be a temporary feature. Starch, chips, and possibly pellet-making will eventually form a stable cassava industry.

Résumé La place occupée par le manioc au Sri Lanka a beaucoup changé au cours de la présente décennie; d'une culture traditionnelle mineure, il est devenu un produit d'une importance économique très grande, à la fois pour l'alimentation des hommes et en tant que produit de base de l'agro-industrie. Ce nouvel intérêt pour cette culture s'est traduit par un accroissement des surfaces cultivées en manioc, lesquelles sont passées à 61,200 acres (24,777 ha) en 1973. On porte actuellement une attention considérable à la transformation du manioc pour l'alimentation des hommes. L'importance de cette plante sur ce plan précis ne sera cependant que passagère et c'est sur la fécule, les cossettes et peut-être les granules que reposera finalement une industrie stable du manioc.

Cassava has been grown in Sri Lanka for a very long time in the traditional mixed cropping pattern known as shifting cultivation. In more recent times it has been grown in home gardens as a subsidiary food crop. In the 1970's this crop assumed great importance as an energy source due to the shortage of food grain. In the present Five Year Plan of development of Sri Lanka (1972–76) cassava has been singled out as one crop that has to be cultivated extensively for human food as well as for industrial purposes. The acreage under the crop has expanded greatly with the launching of the government's food production drive. Under the present land reforms being effected by the Government, it has been urged that every bit of uncultivated land should be cropped. Quick response has resulted from this move in terms of the planting of cassava, because cassava is relatively easy to cultivate
and there is a good possibility of getting a crop from marginally fertile land. At present, both small scale cultivation on homesteads and fairly extensive cultivations, both in monoculture and interplanting with permanent crops such as coconut, are found.

**Extent of Cultivation**

Official statistics of the extent of cultivation in the past are lacking. However, it has been estimated that as a result of the recent emphasis on the crop, the acreage as at the end of 1973 stood at 61,200 acres (24,777 ha).

**Varieties**

All the varieties cultivated in Sri Lanka are sweet varieties. The most popular varieties are introductions that have become acclimatized to different localities in the island. Varieties such as MU 10 and MU 71 can be harvested in about 6 mo and are low-yielding (2–7 metric tons (t)/acre). Others, such as MU 22 and MU 44, can be harvested in 10 mo and are high yielding (up to 20 t/acre).

**Prices**

In recent times the price of cassava and cassava products has shown a steep rise due mainly to the unprecedented food shortage. At retail points, cassava is sold at about 1 rupee per kilogram (US $0.10/kg). Dry cassava chips for animal feed fetches about Rs (rupees) 1,200.00 per ton (US $120/t). Fresh manioc roots for starch production sold in bulk to the manufacturers fetch about Rs 800.00 (US $80/t).

**Yields**

When the world average yield of cassava was reported by the FAO as 3.4 t/acre, the corresponding figure for Sri Lanka was estimated at 2.4 t/acre. However, with the present cultivations, which are done on a more systematic basis, it is likely that yields will be higher. The potential yields of the presently cultivated popular varieties as evidenced by yield trials done by the Department of Agriculture are given in Table 1.

**State of Utilization of Cassava**

A good proportion of the crop is at present consumed as human food. This is only due to the severe shortage of food grains. It is very likely that the situation will change once food grains become available. Then the excess will go into industrial purposes such as manufacture of starch for textile and food industries. A market exists at present for dried chips, the principal buyer being the Oils and Fats Corporation of Sri Lanka, which utilizes it for production of animal feed. Several new starch factories of small to medium capacity have developed during recent times as a result of the expansion in cultivation.

Traditionally, for human consumption the roots are peeled, washed, cut, and boiled in water. The water is drained off and the pieces are eaten with curry. Tubers are also cut into chunks and cooked in spices as a vegetable.

**Processed Products**

In recent times, an attempt has been made to use cassava as a substitute for flour both in bread making and for other traditional breakfast preparations such as “pittu,” “hoppers,” and “string hoppers.”

<table>
<thead>
<tr>
<th>Variety</th>
<th>Age (months)</th>
<th>% starch in edible portion</th>
<th>Yield (t/acre)</th>
</tr>
</thead>
<tbody>
<tr>
<td>MU 10</td>
<td>5–6</td>
<td>22.0</td>
<td>8–10</td>
</tr>
<tr>
<td>MU 22</td>
<td>9–10</td>
<td>33.0</td>
<td>18–20</td>
</tr>
<tr>
<td>MU 44</td>
<td>8–9</td>
<td>26.0</td>
<td>18–20</td>
</tr>
<tr>
<td>MU 71</td>
<td>5–6</td>
<td>26.0</td>
<td>8–10</td>
</tr>
</tbody>
</table>

*aEstimated by the method of Hollman and Aeten.*
The use of cassava starch as an ingredient in a composite flour for bread making forms a separate project. A bakery technologist from the Tropical Products Institute is working on this project in Sri Lanka. According to personal communications, he is about to recommend the use of about 10% cassava starch in composite flour with the traditional methods of baking prevalent in the country.

The Department of Agriculture has also worked out cottage scale methods of making flour from the root and ways of using it as an ingredient in composite flour with wheat, rice, and sorghum flour for making traditional breakfast preparations.

Toxicity

Cassava toxicity has become a topic of great concern within scientific circles. The problem is important in the context of Sri Lanka because manioc is boiled and eaten, with the likelihood of residual nonhydrolyzed glucoside being present. The dry processed flour also has the same problem, because the chips could dry out before the reactions are completed, leaving residues of both the enzyme and the substrate that will react on rehydrating during the preparation of foods, yielding hydrocyanic acid.

In our own work, we have found that the varieties grown in Sri Lanka have a cyanide content ranging from 60 to 130 mg/kg. FAO states in its monograph on cassava (1972) that 50 mg/kg of cyanide could be considered a safe level for human consumption. Cassava flour and chips could be prepared with low cyanide levels, but the great variability in cyanide content of roots, the limitations of analytical methods available, and the problems of accurate sampling for analysis leaves much to be done in the field.

Utilization of Leaves

Leaves of the variety MU 22 have 27% of the crude protein on a dry basis. However, the cyanide content of the leaf was much higher than the root, the younger leaves having a higher content than the older leaves.

Preliminary experiments are being carried out on feeding cassava leaf meal (MLM) to poultry as a direct substitute for coconut poonac. In one piece of work it is reported that at a level of 10% MLM in the mash, broiler chicks have thrived very well over a period of 9 wk. However, coconut poonac is higher in fat content than MLM and therefore there is an energy deficit arising from direct substitution of coconut poonac with MLM. The mean energy values for poonac and MLM are reported as 1764 kcals/kg and 1316 kcals/kg, respectively.

Prospects

Although the significance of cassava in the present context appears to be as a food crop, the trends in expansion of cultivation indicates that the crop will assume industrial status in the near future. Furthermore, the price factors are very favourable at the present moment; starch manufacturers are now buying fresh root at a wholesale price of about Rs 800.00 (US $80) per metric ton. The starch industry should also be very viable because there is a dearth of starch at the moment for textile manufacture and this will continue to be a stable market; on the other hand, for the purpose of animal feed, cassava chips have an assured market in the Oils and Fats Corporation, though the price is not as attractive as in the starch industry.

Since there are limitations on feed grain at the moment and a drop in the output of coconut (and hence coconut poonac), a combination of cassava chips for energy and cassava leaf meal for protein seems to be an attractive alternative.

The government policy on cassava as envisaged in the 5-yr plan of development (1972–76) is stated as follows:

"During the plan period, the cultivation of manioc for industrial purposes will be organised. Manioc tubers could be processed into—

(a) chips for animal feed
(b) sago and glucose as food items
(c) starch for industry
(d) flour to be blended with wheat flour for bread making."