



Project Support

Reduction of cyanide in Cassava, to reduce cyanide toxicity (Konzo) in children and women of child-bearing age

This project is following on from excellent research work undertaken by the Australian National University (ANU) with support from both ACIAR and AusAID over the past eight years. Initial research work was to establish a reliable and cheap test for cyanide levels in cassava, so that cassava toxicity could be detected early in drought years and measures taken to stop cases of konzo, a paralysis that affects particularly children and women of child bearing age. Development of this test was achieved, but the next step (this project) has been designed to test the use of very simple preparatory techniques for cassava before cooking, to reduce cyanide levels by two thirds of their levels in cassava flour.

Cassava is the third most important food source in the tropics after rice and maize. Cassava is popular because it is easy to grow, yields well in good conditions and even in poor soils subject to dry conditions it still produces edible roots and leaves. Some varieties produce cyanide-containing compounds (cyanogens), which gives a bitter taste and are called 'bitter cassava'. In order to prevent cyanide poisoning, medium and high cyanide cassava roots require some form of processing before they are eaten.

Consumption of cassava or cassava products that contain large amounts of cyanogens may cause cyanide poisoning with symptoms of vomiting, nausea, dizziness, stomach pains, weakness, headache, diarrhoea and occasionally death. Large cyanide intake over a relatively short period is considered to be the cause of konzo in Eastern, Central and Southern Africa.

Konzo is an upper motor-neuron disease of sudden onset that causes irreversible paralysis of the legs and occurs particularly in children and women of childbearing age. More than 2,000 cases of konzo have been reported in Northern Mozambique, two recent outbreaks have involved hundreds of cases in Tanzania and there are reported to be up to 100,000 cases in the Democratic Republic of Congo due to the prolonged civil war. There are also reports of konzo from Cameroon and Central African Republic. These medical conditions caused by cyanide overload can be prevented by a considerable reduction in the per capita cyanide intake.

It has been found recently by Dr Bradbury at ANU that there is a simple method to reduce the total cyanide content of cassava flour. The cassava flour is thoroughly mixed with water (1 part flour to about 1.25 parts of water) and all the water is absorbed by the flour. The mixture is left in an open vessel for about 5 hours

at about 30o C. The method was tested with ten different flour samples from Mozambique, Indonesia and Australia and it was found that providing there is a reasonable amount of the enzyme linamarase present in the flour (which is normally the case) the total cyanide content is reduced to about one third of its previous value. The wetted flour should then be used immediately for cooking.

This project will enable more testing of this process both in the laboratory and in the field in Mozambique during the cassava harvest season (August 2004 -November 2005), and also will involve a sociological study to check the following issues:

- Check whether the percentage cyanide loss in 5 hour obtained in studies in Canberra and Beira were also obtained in the field.
- Does the simple wetting method produce an acceptable product after cooking?
- Is there any possibility of mould growing on cassava flour within 5 hour of wetting with water. Studies in the laboratory here show no mould growth at 30o C until >20 hour after wetting. How long can the flour be left before mould develops?
- Can women use the method correctly? For example, can they measure the correct quantities of flour and water or would it be better to base this decision on the consistency and appearance of the wetted flour?
- Can women adhere to the five hour period? Laboratory studies have shown that the major amount of cyanide is lost during the first 5 hours after mixing; hence a shorter period is somewhat less effective and a longer period a bit more effective in removing cyanide. Exact timing is not critical.
- The methodology used needs to be acceptable to the women and easily accommodated in their daily schedule of work. It would need to be “user friendly” and not involve too much more work for them.

It is hoped that this project may be successful in causing a sufficient reduction of the cyanide intake of the cassava flour eating population of tropical Africa to limit the occurrence of konzo and perhaps virtually eliminate it altogether.

KYEEMA Foundation is also providing a small level of assistance for physiotherapy for women and children affected by konzo in Mozambique, to enable them to better use their paralysed limbs.

This project is following on from excellent research work undertaken by the Australian National University (ANU) with support from both ACIAR and AusAID over the past eight years. Through research ANU scientists have established a reliable and cheap method to reduce cyanide toxicity in cassava and cassava products, which is known to cause konzo, a paralysis that affects particularly children and women of child bearing age. Development of this test was achieved, but the next step (this project) has been designed to test the use of very simple preparatory techniques for cassava before cooking, to reduce cyanide levels by two thirds of their levels in cassava flour.