INTERNATIONAL DEVELOPMENT RESEARCH CENTRE
Box 8500, Ottawa, Canada, K1G 3H9 • Telephone (613) 996-2321
• Cable: RECENTRE • Telex: 053-3753

CANADA

FEATURE

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SOLVING THE CASSAVA MYSTERY

by JEAN-MARC FLEURY

Cassava, a staple food of 300 million people in the Third World, is known to contain the toxin cyanide. Eating large quantities of raw cassava, at least the bitter varieties, has been known to cause severe poisoning leading to diarrhea, bleeding, convulsions, coma, and occasionally death.

Eating large amounts of cassava can also increase the incidence of goitre and mental retardation in areas where people have iodine-poor diets.

For this reason Dr Francois Delange warns that care must be taken when promoting cassava in developing countries and that its toxic effects must be understood by agronomists. Delange, a pediatrician at Saint Pierre Hospital in Brussels, is part of a Belgian research team who, in cooperation with the Zaire Scientifique Research Institute, has studied both of these medical problems in northern Zaire.

A kilogram of cassava may contain between 30 and 150 mg of cyanide, depending on the variety. According to Dr B.O. Osuntokun of the University of Ibadan in Nigeria, 60 mg of cyanide is enough to cause death. Some people in Nigeria may ingest as much as 50 mg a day, he says.

Yet there is always a certain amount of cyanide left and once in the body it attacks the nervous system. In Indonesia and Nigeria, chronic cyanide poisoning is the cause of a well-known disease called tropical neuropathy. It is a disorder of the nervous system caused by the action of cyanide on the spinal cord and its surrounding nerves. It affects mostly those too poor to afford food supplements rich in protein.

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Cyanide also attacks the thyroid gland. A metabolic process transforms cyanide into thiocyanate, a substance that prevents iodine, or salt of iodine, from being absorbed by the gland. The thyroid's prime function is to synthesize hormones, of which iodine is an essential element. These hormones in turn stimulate the processes through which the cells in the body carry out their functions.

Any shortage of these hormones or of iodine upsets all the metabolic processes. When daily iodine intake drops below 100 mg, the thyroid gland grows unnaturally, producing goitre, a large lump on a person's neck.

The link between goitre and cassava was first suspected by Dr O.L. Ekpechi of the Faculty of Medicine at the University of Nigeria in 1964. He studied the disease in various villages, but was unable to produce proof of his theory. Later the work was taken up again by the Belgian and Zairean researchers in a project supported by Canada's International Development Research Centre.

The team studied the 38,000 inhabitants of Idjwi Island in Zaire and came to the same conclusions as Dr Ekpechi. The people all had a low-iodine diet, but in the north, 55 percent suffered from goitre, whereas that number fell to only five percent in the south. Subsequently it was discovered that the people in the north consumed more cassava than those in the south.

Studies in the Ubangi region of Zaire again showed that the inhabitants' high levels of thiocyanate (due to consuming cyanide in cassava) aggravated the effects of an iodine deficiency. Goitre affected 65 percent of the the two million inhabitants. The region also had a high level (between 1 and 8 percent) of cretinism, a condition marked by physical stunting and impaired mental development due to thyroid disorders. Thyroid disorders observed in infants were attributed to excessive consumption of cassava by expectant mothers.

"This disease in large part explains the intellectual and economic stagnation of the Ubangi region," observes Dr Delange.

The research team concluded that cassava can be consumed safely as long as the proper level of iodine is maintained. If a person receives enough iodine for the amount of thiocyanate in their body, these medical problems can be prevented. The critical ratio is four micrograms of iodine for each milligram of thiocyanate.

"Determine the amount of iodine ingested by a given population," says Dr Delange, "and you will know the amount of thiocyanate to which it can be exposed. As long as you are above this ratio no nutritionist can reproach you."

In 1973, the team treated the people of Idjwi Island with injections of iodine in an oil solution and goitre was eleminated. Dr Delange says the deficiencies in iodine cannot be met by the conventional method of distributing iodized salt because such programs have been ineffective due to "the inadequate preparation of salt and poor distribution networks."

Injections of iodine in an oil solution can give protection for three to seven years depending on the individual's age and sex, since the iodine is absorbed slowly. By 1980 half a million people in Zaire had been treated by the research team making it the most extensive of its kind.

"This is an extremely effective, totally harmless and inexpensive ($US 0.20 per person per year of protection) method," states Dr Delange. "These treatments greatly reduce the prevalence of goitre, cause cretinism to disappear completely, and help the thyroid gland to function normally again."

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