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**cassava toxicity
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research and
public health issues**
proceedings of
a workshop
held in
Ottawa, Canada,
31 May – 2 June 1982



Editors: F. Delange and R. Ahluwalia

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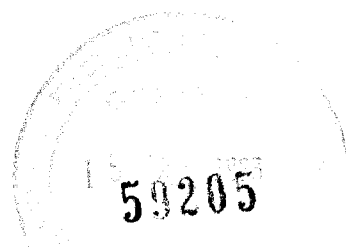
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CASSAVA TOXICITY AND THYROID:

RESEARCH AND PUBLIC HEALTH ISSUES



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CASSAVA TOXICITY AND THYROID:

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**Proceedings of a workshop held in
Ottawa, Canada, 31 May – 2 June 1982**

Editors: F. Delange¹ and R. Ahluwalia²

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Résumé

Cette publication est un résumé des actes d'un atelier qui a porté sur les relations entre la consommation de manioc et les troubles thyroïdiens chez l'homme. L'atelier a rassemblé des spécialistes de la médecine, de l'agriculture et de l'hygiène publique pour (1) examiner les résultats des études subventionnées par le CRDI sur le rôle du manioc dans l'étiologie du goitre endémique et du crétinisme ; (2) passer en revue les travaux de recherche sur les aspects du manioc intéressant l'agriculture ; (3) échanger des informations sur la méthodologie et les résultats d'études dans des domaines connexes ; et (4) définir les priorités de recherche et faire des recommandations touchant les programmes d'hygiène publique. La poursuite des travaux de recherche dans ces domaines contribuera grandement à prévenir et à contrôler le goitre endémique qui, par les anomalies de développement dont il est la cause constitue toujours un grand danger pour les populations des pays en développement.

Resumen

Esta publicación informa sobre las exposiciones presentadas en un seminario dedicado a la relación entre el consumo de yuca y el problema de la tiroides en los humanos. El seminario reunió científicos de los sectores médico, agrícola y de salud pública con el objeto de (1) reseñar los resultados de los estudios financiados por el CIID sobre el papel de la yuca en la etiología del bocio endémico y el cretinismo, (2) reseñar las actividades investigativas sobre aspectos agrícolas de la yuca, (3) intercambiar información sobre metodologías y hallazgos de otros estudios relacionados, y (4) identificar prioridades específicas para la investigación y hacer recomendaciones para los programas de salud pública. Los esfuerzos continuos en estas áreas de la investigación se dezicarán en buena parte a prevenir y controlar el bocio endémico y sus anormalidades acompañantes en el desarrollo, las cuales siguen constituyendo un problema serio de salud pública entre las poblaciones del mundo en desarrollo.

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Utilization of Cassava in the European Community¹

D. Renshaw²

Virtually all cassava, or manioc as it is commonly known, imported within the European Community is used in animal feed.

Animal products (meat, milk, eggs, etc.) represent about 60% of the Community's final agricultural output; consequently, the question of animal feed is of prime importance. The Community's approach to these feedstuffs is based on four main elements: (1) maximum effective use of natural forage crops such as grass, with permanent and semipermanent grasslands providing about half of the total feed used by the animal population; (2) maximum use of cereals in animal feed, thereby supporting the cereal growers; (3) free access to world supplies of protein in which the Community is deficient (it is the Community's import of soybean that is principally responsible for its large agricultural trade deficit with the USA); and (4) encouragement of the Community's own production of protein.

The increase in livestock production within the Community in recent years has led to the spectacular development of a new factor — that of cereal substitutes — to the extent that increased demand from the animal sector has been met largely by cheap substitutes, imported over nil or low levies, rather than by cereals. For example, during the period between 1975 and 1980, Community production of compound animal feed increased by 36%, but the use of grain in feedstuffs rose by only 9%.

The most important of these cereal substitutes has been maize gluten feed, the import of which rose from 700 000 tons in 1974 to an

estimated 3 million tons in 1981; cereal and rice brans, which rose from 1.2 million tons to just over 2 million tons over the same period; and manioc, the import of which has increased three times, from 2 million tons in 1974 to an estimated 6.5 million tons in 1981 (Table 1). All of this has taken place amid increased cereal production within the Community, which has necessitated expenditure on the disposal of grain on the world market.

Faced with this situation, the Community must try to balance the interests of its livestock producers and cereal growers as well as its budget. It is with all three interests in mind that the Commission of the European Communities has proposed that over the next few years, up to 1988, the Community narrow the gap between its own cereal prices and those applied by its main competitors. In the long term, this should make cereal substitutes less attractive; in the short and medium terms the Commission of the European Communities has proposed that arrangements be made to stabilize imports of these products at their present levels. In the past, there has been a tendency for both the nature and source of these substitute products to change. Originally from basic raw materials grown in developing countries, an increasingly large percentage of these substitute products are now residues and processed products coming from developed economies.

In Table 2, imports of manioc into the Community since 1974 and the principal sources of these imports are presented. The year 1974 has been chosen as a base year because this is the first year for which complete statistics are available for all nine member states of the European Community, i.e., after the accession of Denmark, Ireland, and the United Kingdom and before that of Greece.

Even the total import in 1974 of 2.1 million tons, although low by today's standards, represents a three- or fourfold increase over the

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Table 1. Imports of substitute products (1000 tons).

Product	1974	1975	1976	1977	1978	1979	1980	1981 (estimate)
Manioc	2073	2222	2984	3801	5976	5375	4866	6500
Sweet potatoes	177	115	55	9	6	81	324	75
Molasses ^a	1498	1731	2198	2648	2789	3317	2706	2100
Grape marc	13	10	19	17	7	9	38	70
Fruit waste								
Citrus peels	327	480	646	968	1000	1205	1571	1400
Other fruit waste	21	56	136	164	117	177	156	90
Maize gluten feed	700	930	1147	1486	1685	2021	2596	3000
Brans								
Maize, rice (max. 35% starch)	233	267	417	280	145	205	233	265
Maize, rice (>35% starch)				15	6	3	2	6
Wheat (max. 28% starch)	976	1237	1839	1903	1798	1806	1707	1750
Other brans				4	6	0.1	5	1
Brewers grains	64	57	94	116	161	204	290	340
Maize germ cake (<3% fat)	NA	465	564	709	790	869	822	750
Maize germ cake (3-8% fat)	NA	60	65	108	181	167	203	220

NOTE: NA = Not available.

^a50% destined for human consumption.

Table 2. Imports of manioc by source (tons).

	Thailand	Indonesia	Brazil	China	Malawi	India	Tanzania
1974	1739487 (84)	259747 (13)	40581	4111	12644	—	—
1975	1873337 (84)	313893 (14)	7006	4211	6089	—	—
1976	2785727 (93)	179433 (6)	1638	7253	1757	—	—
1977	3639474 (96)	143920 (4)	1864	999	1026	7949	—
1978	5668254 (95)	218898 (4)	2032	1327	2059	37182	39508
1979	4528761 (84)	694214 (13)	27804	51449 (1)	3400	26799	34967
1980	4115816 (85)	372228 (8)	12316	335989 (7)	2087	11915	8074
1981 (estimate)	5500000 (84)	470000 (7)	2000	560000 (9)	NA	NA	NA

NOTES: Values in parentheses are percentages of total. NA = not available.

quantities imported during the mid-1960s, when Community imports were around 0.5 million tons, increasing in 1968 to about 1.0 million tons.

It was only after heavy investment by European companies in handling and shipping installations in Thailand, encouraged by the government, that Community imports, particularly those from Thailand, started their dramatic increase. Total imports rose from just over 2 million tons in 1974 to almost 3 million tons in 1976 and 6 million tons in 1978. Owing to supply difficulties, imports fell in 1979 to 5.4 million tons and decreased further in 1980 to 4.9 million tons, which, nevertheless, represented an

increase of 135% over 1974 imports. Provisional figures for 1981 suggest an increase of 1.7 million tons, bringing the total quantity imported to over 6.5 million tons.

During the period under review, Thailand, although not the world's largest producer, with an output slightly less than that of Indonesia and only half that of Brazil, has been by far the principal source of manioc, supplying between 84% and 96% of imports. The increase of 189% in total supplies between 1974 and 1978 was easily surpassed by Thailand, whose exports rose by 225% over this period, thus boosting their share to 95% of total imports. Thailand's

1978 record of 5.67 million tons has not since been exceeded; in fact, imports from Thailand declined by 1.5 million tons within the next 2 years. Due to a large crop, however, imports from Thailand in 1981, at an estimated 5.5 million tons, will almost return to 1978 levels. This represents an increase of 216% over 1974 values, which is slightly higher than the increase for all imports.

Indonesia, the second most important source of manioc, has been a much more erratic supplier than Thailand. Its share of the market has ranged from as low as 4% in 1977 and 1978, with 144 000 and 219 000 tons, respectively, to 14% in 1975. A record tonnage of 694 000 in 1979 went a long way toward compensating for the decrease in supplies from Thailand. Shipments decreased to 372 000 tons in 1980 to reduce the Indonesian market share to 8%.

The only other supplier of manioc to the Community of any importance during recent years has been China, whose exports when added to those of Thailand and Indonesia account for more than 98% of total supplies. Imports from China have grown very rapidly over the last 2-3 years. During the period 1974-1976, China averaged 5000 tons per year. Quantities fell to a mere 1000 tons in 1977 and 1978 but increased to 51 000 tons in 1979, 336 000 tons in 1980, and an estimated 560 000 tons in 1981. Thus, in 1981 China will replace Indonesia (470 000 tons) as the second most important supplier of manioc and gain an 8.5% share of the market.

Smaller and more variable suppliers of manioc include Brazil, whose average quantity between 1978 and 1980 was 14 000 tons; Malawi, averaging 2500 tons between 1978 and 1980 but with 12 000 tons in 1974; India, averaging 25 000 tons between 1978 and 1980; and Tanzania, with almost 40 000 tons in 1978, nothing between 1974 and 1977, and a 1978-1980 average of 27 500 tons.

Total imports between 1974 and 1981 have been characterized by an overall increase of more than three times, with a similar rate of increase applying to Thailand; a variable performance by Indonesia, which currently has a smaller share of the market than was the case in 1974 and 1975; and a dramatic increase by China. Thailand's performance is due mainly to the fact that, unlike nearly all other producers, manioc cultivation in Thailand is geared and organized toward export and animal feed, whereas elsewhere the crop is intended primarily for domestic human consumption and forms a

vital element in local diets. Consequently, a number of the world's largest producers, such as Brazil, Zaire, and Nigeria, are far from being the largest exporters.

Table 3 presents the destination countries for manioc imports within the Community. Three countries, Germany, the Netherlands, and Belgium/Luxembourg, usually take at least 90% of Community imports, with Germany and the Netherlands accounting for more than 70%.

The Netherlands, the Community's dominant importer, has seen its imports grow from an average of 1.15 million tons in 1974 and 1975 to 2.7 million tons in 1978. A downward trend in 1979 and 1980, caused by supply difficulties, resulted in a decrease in imports to about 2.4 million tons. Preliminary figures for 1981 indicate that imports will resume their upward movement and should reach about 3.4 million tons.

Germany usually accounts for between 20 and 25% of total imports. Quantities rose from 430 000 tons in 1974 to 1.44 million tons in 1978. Following a temporary drop to around 1.26 million tons in 1980, they are estimated to rise again to about 1.33 million tons in 1981.

Belgium/Luxembourg, the third largest user, regularly imports between 15 and 20% of the Community's total, with an average quantity for 1978-1980 of about 835 000 tons. Belgium imports a much larger proportion of its supplies from Indonesia and China than do the Netherlands and Germany. For example, in 1979 and 1980, an average 25% of Belgian imports were supplied by Indonesia, which was more than twice the Community average of 11%. As is the case with other major importers, quantities are estimated to rise in 1981 (to about 925 000 tons).

France tends to import a larger proportion of its supplies from Indonesia, partly because French ports find it easier to handle the smaller ships used in this trade. Over the last 3-4 years, France has taken just under 10% of total Community imports.

The United Kingdom, whose imports until recently were extremely small, has now started to use manioc in its compound feeds. Total imports for 1981 are estimated to reach about 140 000 tons, compared with an average of 14 000 tons during the previous 3 years.

Despite recent increases in the use of manioc in countries such as the United Kingdom and Italy, the Netherlands, Germany, and, to a lesser extent, Belgium/Luxembourg remain by far the biggest users in the Community.

As stated earlier, the Community's manioc imports are used almost entirely in animal feed

Table 3. Imports of manioc by importing country (tons).

	Germany	France	Italy	Netherlands	Belgium/ Luxembourg	United Kingdom	Ireland	Denmark
1974	429764 (21)	164588 (8)	596	1085923 (52)	357554 (17)	30848	5	3340
1975	483909 (22)	146399 (7)	—	1232037 (55)	352985 (16)	6876	—	—
1976	663912 (22)	173243 (6)	12857	1508392 (51)	611774 (21)	7082	927	6241
1977	908988 (24)	190997 (5)	26	2024988 (53)	617143 (16)	5198	1604	51737
1978	1437704 (24)	644504 (11)	219152	2687878 (45)	883042 (15)	12233	8270	83587
1979	1402118 (26)	527784 (10)	189817	2335090 (43)	867043 (16)	21431	9363	22210
1980	1260843 (26)	331814 (7)	98869	2388839 (49)	757486 (16)	8229	8223	11519
1981 (estimated)	1325000	590000	240000	3350000	925000	140000	NA	NA

NOTES: Values in parentheses are percentages of total. NA = not available.

and particularly in pig rations, which utilize about 75% of imports; poultry and cattle feed share the rest almost equally.

In those areas of the Community that have easy access to the large unloading ports on the North Sea, but are far from surplus grain areas, manioc comprises up to 30-40% of pig and poultry compounds. For dairy cattle, the maximum manioc content is lower, at about 20%, but only about 10% is normally used. The rate of incorporation of manioc varies widely across the Community. In all compounds in 1979, the Community average was 7%, ranging from 17% in the Netherlands and 15% in Belgium to 4% in

France and 2% in Italy.

As to the future, particularly with respect to whether or not the dramatic rate of increase in the use of manioc in animal feed observed over the last decade will continue, sight must not be lost of two very important factors. First, the proposed reduction in the gap between Community cereal prices and those on the world market should make cereals more competitive for use in feed and, second, given current economic conditions, it is far from certain that the dynamic development in animal production achieved in the European Community during the 1970s will continue during the 1980s.