

Technical Note

Variability of β -Carotene Content in Cassava Germplasm*

ABSTRACT

β -Carotene content of 21 clones of cassava from exotic and indigenous collections found to be possessing yellow colour in the flesh, was determined. The values varied from 0.04 to 0.79 mg per 100 g edible portion, the highest being recorded for CE-314, an exotic collection. Eight clones had values over 0.25 mg while the rest had values less than 0.25 mg. Thus, considerable variation in β -carotene content has been found in cassava germplasm.

INTRODUCTION

Cassava (*Manihot esculenta* Crantz) is an important food crop grown in humid tropics and is valued for its high starch content. However, its nutritive value is considered poor in view of lack of nutrients other than carbohydrates, which form 90% of the dry matter in the edible portion of the tuber. In most of the clones, the edible portion is white and devoid of β -carotene, the precursor of vitamin A. However, screening of the large cassava germplasm revealed the presence of some clones with different intensities of yellow colour. There is very little information on β -carotene content in cassava and this note describes the variation in β -carotene content in cassava germplasm.

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MATERIALS AND METHODS

Tubers from 654 clones in the germplasm collection of cassava grown in CTCRI farm were examined visually for the presence of yellow colour in the flesh. The β -carotene content in the flesh portion of the 21 clones identified as having yellow coloration was determined by the standard procedure (AOAC, 1975). Two replications, using 25 g fresh material were carried out for β -carotene determination, and the values expressed as mg per 100 g edible portion.

RESULTS AND DISCUSSION

The screening of the germplasm showed that 21 clones possessed noticeable yellow colour in the flesh. The ratio of yellow-fleshed clones was higher among the exotics (5.4% compared to 2.1% for indigenous). The intensity of colour was found to vary from a very light ring in the centre to a yellow colour throughout the tuber flesh. The β -carotene content, as determined chemically, was found to be related to flesh colour. The clones with a light yellow ring contained only 0.04–0.05 mg/100 g, while others recorded above 0.28 mg, the highest viz. 0.79 mg, being recorded for CE-314, an exotic clone (Table 1). Although the number of clones having carotene is low, the results show the existence of large variability in carotene content of cassava. The effect of cooking on carotene has also been examined by determining the β -carotene content after cooking in selected varieties possessing a β -carotene content of over 0.3 mg/100 g. There was no noticeable reduction in the β -carotene content after cooking, indicating that cooking does not affect the β -carotene.

Reports on the occurrence of β -carotene in cassava are rare. Maravalhas (1964) reported yellow varieties containing 0.5 mg β -carotene in certain parts of the Amazon. Guimaraes and Barros (1971) and Nobre (1972) have also mentioned Brazilian varieties possessing yellow flesh. Arkcoll (1981) reported a high value of 3.2 mg carotenoids in a variety from the Amazon. The preference of carotene-rich cassava in Ghana has been highlighted by Oduro (1981, 1983).

This paper is the first detailed study on variation of carotene content in cassava germplasm. Cassava is consumed mostly by low income groups and, hence, intake of high-carotene varieties can be nutritionally beneficial. There is no reduction in β -carotene content, even after cooking, which is the usual mode of consumption. β -carotene has been found to be quite stable to cooking, as reported earlier for carrots and other vegetables (Eheart & Gott, 1964; Park, 1987). In the case of animal feed also, β -carotene can improve the

TABLE 1
Carotene Content in Yellow Fleshed Clones

	Colour of flesh	β -Carotene content (mg/100 g fresh weight)
<i>Exotic lines</i>		
CE-314	Yellow	0.79
CE-373	Yellow	0.40
CE-303	Light yellow	0.25
CE-358	Light yellow	0.22
CE-352	Light yellow	0.16
CE-356	Light yellow	0.16
CE-350	Light yellow	0.11
CE-4	Very light yellow	0.06
CE-117	Very light yellow	0.06
CE-175	Faint yellow ring	0.051
CE-169	Faint yellow ring	0.042
<i>Indigenous lines</i>		
CI-93	Yellow	0.31
CI-554	Yellow	0.31
CI-499	Yellow	0.29
CI-562	Light yellow	0.27
CI-51	Light yellow	0.27
CI-560	Light yellow	0.27
CI-618	Light yellow	0.16
CI-451	Light yellow	0.10
CI-461	Faint yellow ring	0.04
CI-507	Faint yellow ring	0.04

egg yolk colour (Agudu, 1972) and hence the β -carotene-rich varieties can be preferred for use in feeds. Thus, cassava varieties rich in β -carotene can be useful both in food and feed.

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