Proceedings of the Tenth Symposium of the International Society for Tropical Root Crops, held in Salvador, Bahia, Brazil, October 23-29, 1994

NUTRITIONAL CHARACTERISTICS OF ARRACACHA GENOTYPES (*ARRACACIA XANTHORRHIZA* BANCROFT)

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Abstract

Adequate knowledge of the nutritional value of a species is relevant for determining its participation in food preparation and in industrial processes. Several arracacha genotypes, obtained from segregating seeds, were evaluated for their nutritional characteristics and composition. Genotypes differed in their contents of total sugars, starch, vitamins, and protein. Particularly striking was the difference in vitamin A content (by as much as 27 times) between the lowest and highest genotypes. Arracacha genotypes can be selected to correct vitamin A deficiencies and formulate more nutritious foods.

Introduction and Objectives

Arracacha is used in the human diet as a source of energy and as a good source of vitamins from the B complex, particularly niacin, and of vitamin A. It also contains considerable levels of vitamin C, minerals, and fibre.

Genetic materials differing in agronomic traits and chemical composition have been obtained through breeding activities at the Centro Nacional de Pesquisa de Hortaliças (CNPH) of the Empresa Brasileira de Pequisa Agropecuária (EMBRAPA). The colour of root parenchyma has attracted attention, as it can vary from white to deep orange in progenies from a yellow-root parent (90134). Knowing the chemical composition of different genotypes is necessary for understanding their potential as component in different foods. The elements usually analysed for nutritional quality are vitamins, minerals, proteins, amino acids, fibre, total sugars, total carbohydrates, and starch. To determine protein quality, the amino acid composition is compared with a reference protein made up of different amino acids in optimal proportions.

Methods

Analyses were performed by the CNPH and the Centro Nacional de Pesquisa de Tecnologia Agroindustrial de Alimentos (CTAA, also of EMBRAPA). Material for analysis was harvested 10 mo after planting. Root colour was classified visually in the following categories: white, creamy, yellow, and orange. The standard methodology for analysis proposed by the Association of Official Analytical Chemists (AOAC) was used to determine total sugars, ash, fibre, ether extract, and proteins. Vitamin C was determined by the Tillenaus method, and carotenoids were determined by colorimetry, after extraction with acetone and hiflosurpecel. Total sugars and carbohydrates were also determined. Starch content was evaluated through the reduction of ortho-toluidine, while amino acids were determined by high-performance liquid chromatography (HPLC) after hydrolysis with HCl_6N.

Results

Total solids for the arracacha genotypes analysed in this study varied from 18.63%-30.85%. This range can be considered normal when compared with published results. Concentration of proteins, carbohydrates, total sugars, starch, ash, fibre, vitamin C, and ether extract can also be considered as among normal ranges.

A wide range was observed for carotenoid concentration, from 152.85-4127.12 µg/100 g. Lower values corresponded to white-root materials, while higher values were recorded in orange-root genotypes.