

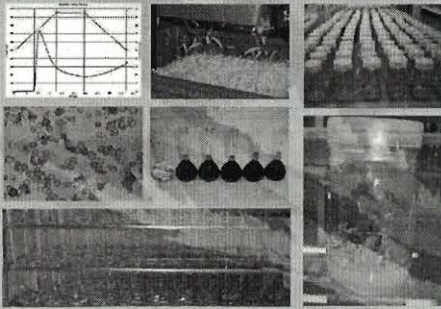
ROOT QUALITY CHARACTERIZATION OF THE CASSAVA CORE COLLECTION IN THAILAND

J. Hansethasuk¹, P. Wongtium¹, A. Youngmod¹, S. Sarakarn¹, S. Juthanka¹, C. Petcharabooranin¹, R.H. Howeler²

¹Rayong Field Crops Research Center, Rayong, 21150 Thailand
²FAO Laboratory for Asia and Pacific Region Research, Dept of Agric. Chemistry, Bangkok, 10000 Thailand

INTRODUCTION

Cassava (*Manihot esculenta* Crantz) is one of the most important economic crops in Thailand. Cassava plantation in Thailand is about 1.2 millions hectares and root production is about 2.6 millions tons. The products in term of cassava chips, pellets and starch are mostly exported to many countries in Europe and Asia, value at 20,000 millions baht a year. The half of starch is used for domestic consumption, food, paper, textiles, plywood, medicine and sweetener. Recently, cassava roots are also used for ethanol production. Because of various utilization quality of roots and starch which is the raw materials for each product should be concerned. Through the collaborative agreement between CIAT in Colombia and the Department of Agriculture of Thailand, CIAT has sent in tissue culture to Thailand the 630 accessions of the cassava core collection. In order to make the best use of the core collection we have set up a database for the most important characters.



MATERIALS AND METHODS

In 2006, 157 accessions were planted out at Rayong Field Crops Research Center and harvested after 12 months. The starch content (by Reimann scale balance), percentage of peels, moisture content, and total cyanogen in the fresh roots were determined. Cassava starch was extracted from 5 kilograms fresh roots and analyzed for amylose content and viscosity properties of 6% starch. For nutritional and edible characters, the color and the texture of the cooked root parenchyma were evaluated and the nutrition content; protein, P, K, Ca, Mg, Fe, Mn, Cu, and Zn were analyzed in dried pulp. The remaining accessions are now being planted in the field and will be evaluated in 2008 and 2009.

RESULTS AND DISCUSSION

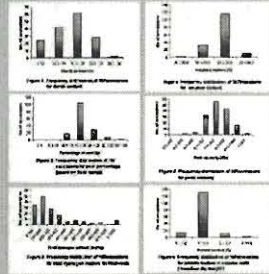
The starch content of 157 accessions varied from 0.8-27.3%. Total cyanide in the fresh roots varied from 28-1,685 mg/kg; the amylose content of the starch varied from 19.2-31.1%, the pasting temperature from 66.6-72.8 °C, the peak viscosity from 446-1,029 BU, the cool paste viscosity from 30-764 BU, and the breakdown from 301-704 BU. Concerning nutritional characters, the color of the cooked root parenchyma varied from pure white to bright yellow. The protein content varied from 0.72-3.2%, the P content from 0.073-0.271%, the K content from 0.608-2.819%, the Ca content from 0.008-0.301%, the Mg content from 0.045-0.352%, the Fe content from 0-21.46 ppm, the Mn content from 1.16-23.47 ppm, the Cu content from 0-6.82 ppm and the Zn content from 2.24-88.71 ppm.

Table 1. Nutritional composition of cassava root at 157 accessions (2-dried rooty sample).

Metabolite composition	Mean	Min	Max
Protein (%)	0.72	0.30	3.20
Phosphorus (P)	0.073	0.03	0.271
Potassium (K)	0.608	0.045	2.819
Calcium (Ca)	0.008	0.001	0.301
Magnesium (Mg)	0.045	0.007	0.352
Iron (Fe)	0	0	21.46
Manganese (Mn)	1.16	0.40	23.47
Copper (Cu)	0	0	6.82
Zinc (Zn)	2.24	0.71	88.71

Table 2. Nutritional analysis of cassava root components and physico-chemical properties of the starch in 157 accessions.

Root components + starch properties	Mean	Min	Max
Starch (%)	12.8	0.8	27.3
Protein (%)	0.72	0.30	3.20
Total cyanogen (mg/kg)	39	28	1,685
Amylose (%)	19.2	15.1	31.1
Pasting temperature (°C)	66.6	66.6	72.8
Peak viscosity (BU)	446	301	1,029
Breakdown (BU)	301	301	704
Cool paste viscosity (BU)	30	30	764
Texture (BU)	0	0	88.71



CONCLUSIONS

The quality of the roots is very important characters. The results indicated that there were variabilities in each character of the 157 accessions, especially in starch content, total cyanogen content and starch viscosity. Knowing the root quality of each accession can help breeders to identify and select the best parents in breeding for specific quality objectives. Furthermore, it also fasten time to get the new variety.

