

## Evaluation of the Nutrient Contents of Cupuaçu (*Theobroma grandiflorum*) as a Function of Different Levels of Fertilizers

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Agroforestry systems have frequently been called one of the alternatives for sustainable use of Amazonia soils with possibilities to decrease deforestation, as well as presenting alternatives for diversification of crops, and increasing the income of the farmers. Amongst regional fruit, cupuaçu *Theobroma grandiflorum* (Willd. ex Spreng. Schum.) is a species that presents multiple uses, and is frequently found in agroforestry systems on farms. However, research on the nutritional aspects of the species are scarce. This research had the objective of evaluating of cupuaçu in an agroforestry system with different fertilizer levels. The study was conducted on the research station of Embrapa Western Amazonia near Manaus in Central Amazonia of Brazil (3° 8' S, 59° 52' W, 40-50 m.a.s.l). The soil of the experimental site is a Oxisol with a clay content of about 80%. It is acid with a very low cation exchange capacity, high aluminum saturation and low available phosphorus contents. The climate is of Köppen Am type with an annual precipitation of 2622 mm, air temperature of 26 °C and atmospheric humidity around 85%. The study was carried out between 1997 and 1998, in an agroforestry system with cupuaçu (*Theobroma grandiflorum*, Sterculiaceae) peach palm (*Bactris gasipaes*, Arecaceae) for the production of palmito (heart of palm), and rubber (*Hevea brasiliensis*, Euphorbiaceae). The trees were grown in rows with 5 m spacing between the rows. During the first three years of the experiment (1993-95), one row of papaya (*Carica papaya*, Caricaceae) was grown in every interspace between the three rows at 2 m spacing within the rows. The soil of the agroforestry systems is covered by kudzu tropical (*Pueraria phaseoloides*). This system was studied at four fertilization levels: a) full fertilization according Embrapa's recommendation-100%; b) a third this fertilization level-30%; c) a third of the full fertilization minus N fertilizer-30%-N and

d) full fertilization with additional P fertilizer-100%+P. The fertilizer was applied in two doses during the study year, in the first week of December 1997 and in the first week of June 1998 (beginning of the dry season) The field experiment was conducted in a randomized complete block design with three replicates. Plot size was 48 by 32 meters. Cupuaçu's leaves of the different age (new leaves 3rd, intermediary 6th and old 9th), were collected during one year, every 2 months, for analysis of N, P, K, Ca and Mg. The fertilization levels did not influence the foliar contents of N. Comparing the age of the leaves, the largest concentrations of N were found in the intermediate leaves, and the lowest concentrations were found in the old leaves. The contents of P and K decreased with the age of the leaf. This can be explained with the mobility of these elements in the plant where the nutrients stored in the oldest leaves are translocated into the youngest leaves. For the new and intermediate leaves, the lowest concentration of P was observed in the treatment 30%-N. The P contents were not influenced by the different fertilization levels. For all the leaf ages, the smallest concentrations of K were found in the treatments 30% and 30%-N. The fertilization levels did not influence the foliar contents of Ca and Mg. The contents of these two elements increase with the age of the leaf, especially in the case of Ca. The highest concentrations of nutrients were found in the samples collected immediately after fertilization and the lowest after the harvest of the fruits. This suggests that leaf samples for the evaluation of the nutritional status of the plants should not be collected soon after fertilization, but rather following fruit harvest. With relation to the age of the leaves, the intermediate leaf would be the best option for the evaluation of the nutritional status of cupuaçu.