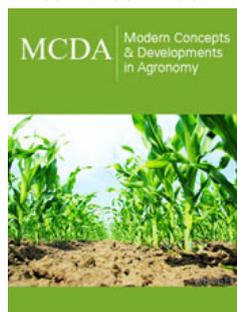


Sechium tacaco, an Underexploited and Endangered Food Crop: A Mini Review

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Abstract

Tacaco (*Sechium tacaco*) is a plant species of the Cucurbitaceae family, endemic to Costa Rica, and of nutritional interest. Its fruits, consumed both mature and immature, provide protein (1.9-2.1%), raw fiber (1.9-3.6%), starch (2.9-3.7%), as well as phosphorus, calcium, iron, vitamin A, ascorbic acid, riboflavin, and thiamine. Its leaves, stems and fruits contain saponins (called “tacacosides”) with inhibitory activity on the growth of cancer cells and probably also on microbial growth. This species is at risk of extinction due, among other factors, to deforestation and change in the consumption habits of the population, so actions must be taken to prevent its disappearance.

Keywords: Costa Rica; Saponins; *Sechium pittieri*; *Sechium talamancense*; Tacacosides

Introduction

Tacaco, [*Sechium tacaco* (Pittier) C. Jeffrey], is a plant species endemic to Costa Rica, which presents a herbaceous, climbing, annual and monoecious plant; it belongs to the Cucurbitaceae family and has nutritional interest. Its cultivation is only known to occur in Costa Rica and apparently in the mountainous area of western Panama, near the border with Costa Rica [1].

Cultivation of tacaco is mostly practiced in areas with altitudes between 500 and 1800 meters above sea level, and it is possible to grow it at any time of the year. Plantations are small and their production is mainly destined for self-consumption; only a few growers generate surpluses to be commercialized in the market.

Ripe tacaco fruits are consumed either as a cooked vegetable in soups, chopped vegetable, pickles, as a sweet dessert, or simply boiled as a snack, and are highly appreciated as part of the traditional Costa Rican stew called “olla de carne”. Of the immature fruit all parts are consumed, including the shell and the seed which have to be removed to consume ripe fruits. The immature fruit is often consumed cooked with rice, in soups, and as a mini vegetable in salads.

In mature fruits, the epicarp (shell) is hard and is removed after the cooking process, and the mesocarp is made up of parenchymal tissue loaded with starch granules. Some genotypes have fruits with spines (Figure 1).



Figure 1: Freshly harvested tacaco (*Sechium tacaco*) fruits (left); tacaco plantation in production (center); genotype 9 (with spines) and genotype 7 (without spines) (right).

The size of mature fruits on record ranges from 4.00 to 7.25cm long, 3.00 to 4.50cm wide, and 1.50 to 3.06cm thick; their weight ranges from 22.7 to 42.2g; and in genotypes that have spines, the number of spines per fruit varies between 15 and 26.

Tacaco fruits contain pulp moisture (81.1-85.3%), semi-solid type fats (0.2-0.3%), proteins (1.9-2.1%), raw fiber (1.9-3.6%), and starch (2.9-3.7%); starch is very white in color, made up of spherical granules 3-5 microns in diameter. The latter may be an appropriate feature for people suffering from type II diabetes, as the small diameter of starch granules has been recognized as appropriate for high digestibility and low glycemic index. In addition, each 100 grams of tacaco pulp have an average content of 53mg of phosphorus, 9mg of calcium, 0.9mg of iron, 20µg of vitamin A, 23µg of ascorbic acid, 0.13µg of riboflavin, and 0.03µg of thiamine. Tacaco surpasses other cucurbits such as chayote, cucumber, melon, watermelon and zucchini with regards to their protein and phosphorus content.

In addition, compounds with inhibitory activity for cancer cell growth have been found in leaves, stems and fruits not only in *S. tacaco* but also in its wild relatives *S. talamancense* and *S.*

pittieri, which are also present in Costa Rica. These compounds are saponins called "tacacosides", and they could also have microbial growth inhibitory activity.

In recent years the University of Costa Rica has developed several research projects on vegetative propagation of tacaco by means of *in vitro* culture (meristems and micro-stakes) and cuttings. An important variety of genotypes of this species, located in various areas of Costa Rica, have also been characterized.

Several scientists have warned about the serious risk of extinction faced by thousands of species in the planet, due to the effect of human beings on the ecosystem. Tacaco is among these threatened species due, among other things, to the effects of deforestation and changes consumption patterns from the population. Conservation efforts are needed to save this species from extinction.

References

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