

YACON

Fact Sheet

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Taxonomy¹

Yacon is a member of the sunflower family (Compositae or Asteraceae). Its scientific name is *Smallanthus sonchifolius*, previously recognized as *Polymnia sonchifolia* or *Polymnia edulis*. Common names used in different parts of the Andes include Ilaqon, Ilacum, Ilacuma, yacumpi, aricama, chicama, jiquima and jiquimilla.

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Yacon farmer. High jungle area in Sandia, Puno, October 2004.

Description and traditional uses

Yacon is a herbaceous perennial growing up to 1.5-2.5 m in height. The plant produces storage roots (also known as yacon) with a pleasant, slightly sweet taste, which are eaten raw like a fruit. Owing to their succulence the roots are traditionally used by rural people as a refreshment during field work, or occasionally for skin rejuvenation and to relieve intestinal, hepatic and renal disorders. Yacon is also used as an offering during Andean religious festivities.

Geographical distribution

The original habitat of yacon is the Andean highlands, from southern Colombia to northern Argentina, between 1800 and 2800 masl, in tropical montane climates. However, the plant thrives in a range of climates and soils from sea level to 3500 masl. Frost destroys the plant. In

1982, yacon was introduced into New Zealand and from there to Japan in 1985. Currently, it is grown in Brazil, Korea, Czech Republic, Russia, Taiwan and some places in the US.

Production zones

Eighteen of the 20 departments of Peru grow yacon with Amazonas, Cajamarca, Oxapampa, Huanuco and Puno having the largest areas of yacon production. An estimated total of 600 ha was grown in Peru in 2002 for commercial purposes. In Bolivia and Ecuador yacon is grown on a minor scale for subsistence, in Argentina it is grown only in the northern provinces of Jujuy and Salta. Outside of the Andes, Brazil (Sao Paulo) and Japan (about 100 ha) have the largest yacon areas.

Cultivars

With the aerial plant parts showing little variation, yacon cultivars are differentiated by the colors of the root skin and flesh. The flesh color ranges from cream, light orange to reddish and purple; occasionally the flesh has purple mottles. The number of cultivars is unknown but it is estimated that it could be between 20 and 30.

Propagation

Yacon is propagated vegetatively from its fleshy rhizome, a branched subterranean organ, which is partitioned into 6-14 propagules. Alternatively, nodal or stem cuttings can be rooted for vegetative propagation. Sexual reproduction of yacon is difficult because of the rare formation of fertile botanical seeds.

Cultivation

Traditionally, yacon is sown in the Andes between September and November, at the onset of the rainy season. However, where irrigation is available and frosts are absent, yacon can be sown at any time of the year, thus providing year-round supply of fresh roots.

Yacon grows best in soils high in organic matter and with neutral to slightly acidic pH. Plant spacing should be 0.6-1.0 m within rows and 0.8-1.0 m between rows. Water requirements are comparatively high (>800 mm) and water deficiencies can have significant adverse effects on yield.

Crop duration varies between 6 and 12 months depending chiefly on altitude.

Yield

Although yacon root yields up to 100 t/ha have been reported, yields under Andean conditions typically range 20-40 t/ha. There is variation in yield between cultivars, but the environment – locality, fertilization, cultivation period – can significantly modify yields.

Chemical composition

Yacon roots contain mostly water and carbohydrates (see Table). Forty to 70% of the root dry matter consists of oligofructose (OF), a particular sugar with several health benefits. Simple sugars (sucrose, fructose and glucose) account for 15-40% of dry matter. Other nutrients are low except for potassium.

Postharvest handling²

In ambient temperatures the harvested roots rapidly convert OF into simple sugars. One week after harvest the OF content of the roots can be reduced by 30-40%. Thus, if products with the highest possible OF content are required, the roots need to be either processed immediately after harvest or refrigerated to minimize OF degradation. On the other hand, the custom of putting the roots out in the sun for a few days to make them sweeter accelerates the conversion process of OF into simple sugars.

Experimental field of yacon at CIP, La Molina, Lima, October 2004.



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Nutritional table of yacon (100 gr peeled fresh root)

Compound	Range
Water	85 – 90 g
FOS	6 – 12 g
Simple sugars*	1.5 – 4 g
Proteins	0.1 – 0.5 g
Potassium	185 – 295 mg
Calcium	6 – 13 mg
Calories	14 – 22 kcal

* Includes sucrose, fructose and glucose.

To avoid degradation of OF in processing, it is preferable to not exceed 120°C.

Health benefits of yacon consumption³

Owing to the fact that OF contributes few calories to the human organism (1.5 kcal/g) and does not elevate blood glucose, yacon can be consumed by diabetics and weight-watchers. But OF is also a prebiotic (reconstituting intestinal microflora) and soluble fiber, which helps prevent constipation. Moreover, animal studies indicate that OF promotes calcium absorption, reduces cholesterol levels, strengthens the immune system and reduces carcinogen lesions in the colon.

Additionally, yacon roots and leaves contain polyphenols with anti-oxidant activity associated with the prevention of cancer and arteriosclerosis. Yacon leaf extracts –high in polyphenols- have been shown to reduce blood glucose levels in diabetic and non-diabetic rats^{4, 5}.

Market opportunities

Because of the high perishability of the roots, processed yacon products provide an alternative to the traditional marketing of fresh roots. Since 2003 several supermarkets in Peru have offered syrup, juice, marmalade and tea leaves made of yacon. Although small-scale production predominates, exports of yacon products to Japan, the European Union and the US have been affected. High demand for information on yacon indicates that there is considerable interest in this crop in various parts of the world.

Research needs

Today yacon is commercialized as a 'nutraceutical', a health food which helps in preventing certain diseases. However, clinical

Processed yacon products. Samples from Brazil, Japan and Peru.



studies are required to substantiate the beneficial health effects attributed to yacon consumption. Also, the genetic diversity of yacon and its potential for the development of differentiated commercial varieties needs to be researched (higher OF content, higher yield of roots and leaves, higher polyphenol content.)

References

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Yacon storage roots.

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