

YACON, the Apple of the Earth

Continuing Scientific Discoveries Value an Ancient Foodplant

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Yacon, a Southamerican daisy in cultivation as a food and medicinal plant for at least a millennium, continues to interest gardeners, farmers, consumers, elders, diabetics, weight watchers, raw foodists, dieticians, biochemists and foodies in general.

As a garden plant, yacon grows 4-8' tall with soft attractive leaves, pliable stems like a sunflower, and makes edible tubers in 3-5 months after planting in mid-spring. Yields are double to triple that of potatoes. The largest tubers are 1-3 pounds and look like sweet potatoes. For high yields, thorough and frequent watering in late August thru mid September is essential. When harvested the somewhat fragile tubers are clear to translucent white. After curing in the sun, on a shelf or in a greenhouse, the skins turn red-purple and the tubers become much sweeter. Propagation is with the central crown which can be split into several pieces. The tubers themselves have no eyes and are solely for food. They are stir-fried, baked, eaten raw, cooked into pies, made into a syrup or the juice can be dried into a sweet powder.

While yacon has been a traditional Andean foodplant grown from Venezuela to Chile for centuries originating in Peru, only recently has it become of interest to the rest of the world. Japanese scientists in the late 1980's found that yacon tubers stimulated the growth of probiotic microbes, particularly bifidobacteria (like the ones found in human breast milk), in our large intestines. Conjugates of sucrose with fructose produce inulofructans, short chain polymers, in the yacon tubers. The chain length of these polysaccharides is predominantly 3-7 and they are easily broken down by lactobacilli and bifidobacteria. The sweetening of yacon tubers with storage indicates that the tuber produces an enzyme which hydrolyzes fructose and sucrose from the inulins. The human intestinal system cannot break down these fructose polymers and we rely on the microbes in our large intestine to do this. The ones that can and do break down the inulins into simpler sugars use these sugars as a carbon source to promote their growth and make short chain fatty acids which inhibit the growth of putrifying bacteria like clostridia whose numbers decrease when we use yacon as a food.

Recent studies of the composition of the tubers reveals that anti-oxidant phenolic acids, chlorogenic acid, ferulic acid, caffeic acid and their derivatives are present in the tubers of yacon. These compounds are active free radical scavengers (J. Chromatographic A.

2003 1016:89-98). Free tryptophan in the tubers has also been reported (J. Agric. Food Chem. 1999 47:4711-13).

While the tubers have been known for ages and they were grown in Italy in the mid 1930's (Lost Crops of the Incas, National Academy of Sciences Press, 1989 Washington DC), the use of the leaves for tea has only now become of great interest.

Water extracts of the leaves of yacon are able to reduce the sugar content of our blood by increasing the amount of circulating insulin (J. Ethnopharmacol. 2001 74:125-32). Thus use of yacon tea may help those suffering from oxidative stress as in diabetes. In Japan and Brazil, the tea is used medicinally (Cell Biol. Toxicol. 2004 20:109-20).

Free radical scavenging anti-oxidants are found in the leaves as well as in the tubers. Chronic illnesses like atherosclerosis may be remedied by including yacon tea in the diet (European J. Nutr. 2003 42:61-66).

Further studies of aromatic compounds in the leaves of yacon find six anti-microbial sesquiterpene lactones, one of which, fluxtuatin, is most active against gram-positive bacteria like *Bacillus subtilis* (Biosci. Biotech. Biochem. 2003 67:2154-9).

While yacon tubers and leaves are important to our health and physiology, the plant itself increases soil fertility and is an inspiration to gardeners (see A.M. Kapuler 2004 "Fructo-oligosaccharides, Inulins, Yacon and the Fertility of the Temperate Zone" In *Good Tilt* 15(5):6). Other plants that have inulins are the cereals, in the leaves of corn and the seeds and plants of oats, barley, wheat and rye. Also inulins are found in agaves, alliums like onion and garlic and in other daisies like dahlia and Jerusalem artichoke. Some members of the grasses, alliums and daisies comprise many temperate zone ecosystems, it is likely that they contribute to the growth of beneficial soil microbes by providing inulins as carbon sources in a manner comparable to what happens when they are part of our food and promote worthwhile bacteria in our large intestine.

Yacon grows in the mountains from 3-7000 feet elevation in Southamerica along the cordillera of the Andes, from the north in Colombia and Venezuela to Bolivia and Chile in the south. It is now a valuable crop in the Czech Republic in Europe and in New Zealand where dried yacon chips are sold as an export commodity to the food and health conscious in Japan. In the USA

I first saw it growing in Steven Spangler's garden in Vista, California in the late 1980's. Rick McCain of Quail Mountain Herbs in Watsonville, California and Jerry Black of Oregon Exotics promoted its cultivation during the mid 1990' and Peace Seeds, Corvallis, Oregon grew enough crowns during the past few years to further the distribution of yacon through Seeds of Change in Santa Fe, New Mexico, Nichols Garden Nursery in Albany, Oregon and Sow Organic Seeds in Williams, Oregon (organicseed.com).