“Monk fruit”  
(luo han guo)  
Siraitia grosvenorii

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General ideas

- Originally from south China
- Kingdom— Plantae
- Order – Cucurbitales
- Family – Cucurbitaceae
Appearance

- Either oval or spherical, 4.5-8.5cm long, 3.5-6cm diameter
- Surface – brown, green-brown, has dark patches and yellow pubescent, and some contain 6 to 11 vertical lines
- Leaves alternate, petiole length 2-7cm
- Light body, crisp, thin skin, and easy to break
- Fruit flesh (endocarp) spongy, light brown.
- Seed is flat round, around 1.5cm long. 1.2cm width
Environment for growth

- Cool temperature environment
- Huge temperature difference between day and night
- Humidity
- Need large amount of water due to the branches and leaves
- Like sunlight, but can not suffer strong sunlight, 7-8 hours illumination is enough for its growth
- Soil does not really matter, but prefer humus soil
Chemical component

- Mogroside V (main component)
- Fructose
- Amino acid
- Flavone
- Vitamin C
- Linoleic acid, palmitic acid, stearic acid, palmitoleic acid, myristic acid, lauric acid in seed
Advantages of Mogrosides V

- High sweet degree. Approximate 250-400 times of sucrose
- Low calories
- Fine light color and fine water soluble
- Good stability. In addition, it can be maintained at a pH value 2.0~10.0 for two years without quality affected
- Safe and dependable. No side effects found during thousands of years of use by people in China
- All natural source
Application of Mogrosides

- Mogrosides can partially or wholly replace sucrose in the food industry.
- Mogrosides (Luo Han Guo Extract) can be blended with some other herbal extracts (Green Tea, Kuduz, etc) to make teas and herbal drinks with possible health benefits.
- Mogrosides use in the dairy industry to develop a new product line.
- Sugar-Substitute for coffee and tea.
Where?

• Southern part of China

• Guilin city, Guangxi
Who?

- Joint Venture company; partnership with Tate & Lyle
- Vertically integrated value chain from beg. to end
- Location: Waikato Innovation Center (NZ)
- Works with Chinese government
Growing of Monk Fruit

- Seedlings are taken from mother plants
- DI water cleans seedlings
- Sodium hypochlorite or silver chloride disinfect
- In next 40-50 days, sprouts placed on agar medium to promote growth of callus tissue
- New agar medium for fostering of differentiated plants for another 200-240 days
- Moved to another agar medium to promote roots development for 25-35 days
- Put in pot with potting mix for 30-40 days
Conditions for growth

- Subtropical climate zone of hilly, mountainous areas
- Direct plants towards the sun at a 200-600m altitude
- Warm, moist, and foggy climate (short-day sunshine)
- Difference in day to night temperature
Pest control

- Pyrethrum pesticide is used
- Extracted from the Chrysanthemum family of permethrin, fenvalerate, tetramethrin, allethrin, cypermethrin etc.
- Enriched with phosphate and potassium throughout the growing cycle
- Pesticide residual on monk fruit??
Time

March & April: seedlings transferred to the fields

April & May: organic pesticide used for pest control

August-November: bloom and harvest
Harvest

Fruit is picked before ripening

Fruit is stored dried to maintain supply of fruit year-round and allow transport of the fruit to distant markets
After Harvest

- Harvested plants go under inspection before they are processed.

- The excess, if any, are stored in a controlled atmosphere of cool storage from 0-5 deg. Celsius
PROCESSING
HOW THIS WHOLE FRUIT EXTRACT IS OBTAINED?
1. SELECT
2. CLEANING
3. CRACKING OPEN
4. WHOLE FRUIT EXTRACTION
5. ENZYME DIGESTION
6. STABILIZING
7. SEPARATION
8. FILTRATION
SELECT

- Only pick the fresh and ripe fruits, but not the green ones
- Discard decay fruits
CLEANING

- Clean in a moving water bath
- Two water bath compartments: Initial and further washing
- Help to remove all the dirt
- Water should not contain disinfectant or chlorine
CRACKING OPEN

- The outer peel of the fruit is cracked open
- Extraction is based on peel and pulp, and not the seed
- It is important not to break the seeds
WHOLE FRUIT EXTRACTION

- Boiled in water for 1-2 hours
- This increases its sweetness and make the color of the extracts lighter
- Water extract components from the fruit
- No chemicals
ENZYME DIGESTION

- Contain pectin which are not stable during storage
- Pectinase is conditioned (1 hrs, 45C)
- pH is adjusted by citric acid solution.
- Final product < 5
- Pectinase is added to extracted liquids
- Fast mixed for 5mins
STABILIZATION

- Contains active pectinase & possibly enzymes and bacteria
- Contaminants negatively affect the stability & its shelf life
- Remove contaminants by boiling for about 0.5-1 hour
SEPARATION

- The extracted solid is separated through a draining process
- Drains off liquid from the container
Filtration

- Processed by high speed centrifugation
- All extracted liquid is combined
- Filtered by different mesh
- Made into dry powders
- Bacterial growth is prevented during the process
Output-Delight, Cost, and Convenience

Rachel Kim
Delight

- “Superior taste-profile” compared to Stevia
  - Less bitter after-taste
- Used to sweeten products like yogurt, juice, desserts, cereals
- A major monk-fruit sweetener, Nectresse
Consumer Marketing

- Key Method: Increasing awareness and familiarity with the fruit itself.
- Focusing on Monk-fruit sweetener as fruit-derived.
Cost

- Cost of box of 40 single-serve packets of “Monk Fruit In the Raw” is $3.49.
- More expensive than Stevia
Convenience

- Convenient Product “Monk Fruit to Go” by Nevella Company
Kashi Cereal and Granola
Bear Naked Granola
So Delicious Coconut ice cream and Vitalicious Products
Conclusion

- Monk fruit is a safe, natural way of sweetening products without adding sugar or calories.
- It is projected to become a new product that will enter the American market and be a major player in the low-calorie sweetener industry.

Video