Available online at
www.agrospheresmagazine.vitalbiotech.org

ISSN (E): 2582 – 7022

Agrospheres:e-Newsletter, (2022) *3*(6), 13-17

Article ID: 401

Hidden Treasures of the Underutilized Sweet Potato (*Ipomoea batatas*)

Nabila Arshad* and Owais Yousuf

Department of Bioengineering, Integral University, Lucknow-226026, UP

*Corresponding Author
Nabila Arshad*

Article History
Received: 30. 05.2022
Revised: 6. 06.2022
Accepted: 10. 06.2022

INTRODUCTION

Modern agricultural system favours the rearing of high yeilding crop species with the escalation of a limited number of species only, which has lead to the downfall of the crop diversity. The developing of the conventional old harvest has declined and is continuosly declining broadly. Underutilized /neglected crops are basically the crops that have not been classified as major crops , have not been previously researched,occupy low levels of utilization and are contricted to small farming areas. In history these crops have played a crucial role in ensuring community and household food and nutrition security by providing good alternatives when the main crop failed or during periods between successive harvest. Neglected crops can overcome the constaints to wider production and use. Many neglected crops evidently are underused relative to their nutritional value , one such crop is sweet potato (*Ipomoea batatas*). Sweet potato which is locally known as camote is a tuber crop of utmost potential. It delivers more palatable energy ashore than some other significant food crop. It has a place with the second most significant gathering of food crops in emerging nations. It is a drought tolerant crop with the capability to increase food and nutritional security. Despite of its advantages and good nutrional value it is still underestimated and neglects to get consideration from farming analysts. This article is written with the intent of providing the details about the utilization of sweet potato (*Ipomoea batatas*) which is highly undrutilized.

Growing Conditions of Sweet Potato (*Ipomoea batatas*)

Sweet potato grows best and yields storage roots high in modestly warm environment and temperature of 21 to 26 degree celcius. A rainfall distribution of 75 to 150 cm is positive for its cultivation. It cannot withstand waterlogging but can tolerate drought to some extent. It requires a lot of sunshine, while shade can cause a derease in yield.

Abundance of rainfall and cloudy circumstances empower vine growth and lessen storage root yield. Clayey loamy soils are good for sweet potato production. Heavy clay soil limit the storage root development due to compactness and profoundly sandy soil energises long tube shaped pencil like roots. Soil pH of 5.5 to 6.5 is great for sweet potato despite the fact that it is grown in high acidic state. High pH can cause pox and scurf disease in sweet potato while low pH can cause aluminium toxicity.

Nutritional Value of Sweet Potato (*Ipomoea batatas*)

Sweet potato root gives nearly a fair eating routine to the human body. It contains almost every macro and micronutrients, considerable quantities of vitamin C, moderate amounts of vitamin B complex (vitamins B1, B2, B5 and B6) and folic acid, as well as good amounts of vitamin E. Sweet potato leaves are likewise nutritious and is good source of protein, vitaminA,C and B2. The leaves also contain significant amount of lutein which is good for human eye vision. Chemical and mineral composition of sweet potato is given in the following tables.

Chemical composition of sweet potato per 100 gram

Nutrients	Sweet potato
Moisture (%)	62.20
Protein (g)	0.89
Fat (g)	0.20
Crude fibre (g)	0.70
Carbohydrate (g)	35.71
Energy(K cal)	148
β -Carotene (µg)	4.99
Vitamin – C(mg)	17.29
Ash (g)	1.20

Mineral composition of sweet potato per 100 gram

Minerals	Sweet potato (mg/100g)
Potassium	300.02
Magnesium	19.09
Zinc	0.11
Iron	0.25
Manganese	0.22
Sodium	2.60

Importance of Sweet Potato (*Ipomoea batatas*)

Sweet potato is viewed as the most important root crop of the tropics due to its adaptability in various production aspects.It can be planted and reaped at any time of the year. It involves non-edible parts as planting material, and has a non-trellising development habit as well as low necessity for soil supplements, it also has short cropping season.Among the major starchstaple crops, it has probably the most noteworthy pace of creation per unit area perunittime, making it appealing to farmers with little land.Itcan be reaped piecemeal to providefresh everyday nourishment for a family.

Health benefitsof Sweet Potato (*Ipomoea batatas*)

Good source of vitamin A and C: The two supplements are vital for supporting immune

function, which is particularly significant during cold and influenza season. Vitamin A is likewise key for keeping up with solid skin, visionandorgan work.

Anti-inflammatory: Natural anti-inflammatory compounds in sweet potatoes have been reported to control inflammation at the cellular level.

Assist in regulating blood pressure: Skin of sweet potato provides potassium which lowers blood pressure and regulate heart rhythm and muscle contractions.

Don't cause glucose spikes: Some might see sweet potato as too starchy, yet its high fiber content makes it a slowly burning starch meaning they won't spike glucose and insulin levels.

Assist in supporting weight reduction: Around 12% of the starch in sweet potato is safe starch, a filling, fiber-like substance your body doesn't digest and retain.

Utilization of Sweet Potato (*Ipomoea batatas*)

Animal Feed: Separated roots and plants are utilized as animal feed either directly or processed. Silage, a nutritious feed can be really in little transportable amounts utilizing unsalable roots and tops. Boiled sweet potato can be fed to animals for better growth.

Starch Production: Sweet potato storage roots is used as a source of starch. Starch extracted from sweet potato is utilized in materials, paper and food producing businesses, planning of fluid glucose and adhesives. The starch content in developed varieties are around 12-20% on fresh weight basis. Sweet potato starch is utilized in food industry as an element of bread, rolls, cakes, frozen yogurt and noodles. It is often converted to glucose syrup which is further utilized in confection, frozen yogurt, jams and isomerized glucose syrup is utilized in lactic corrosive refreshments, soda pops, and bread. Sweet potato could be a reasonable option in contrast to oat grains as a substrate for alcoholic producion.

Coloured Sweet Potato: Sweet potato storage roots have three sorts of color pigments, anthocyanin, ß-carotenoids and unidentified flavonoids. In the health conscious world, consumers favour normal food tones to counterfeit ones. Orange and yellow shaded sweet potatoes are reported in various regions of the world. Sweet potato juice can be produced using profoundly shaded particularly orange hued sweet potatoes. As of late, a few sweet potato cultivars were created with higher carotene content as carrot. Hued sweet potato can likewise be aged to make alcoholic beverages like beer and vine. Hued pottage soup and croquette can be produced using shaded storage roots instead of potato and pumpkin.

Protein and Enzyme: Sweet potato is a low protein crop and contains 4 to 7% on dry weight basis. Sweet potato storage root protein quality is superior to maize and beans. Variation in amount and nature of rough protein and individual amino acids content is seen among varieties. Among enzymes contained in sweet potato ß-amylase is available in high sum. As ß-amylase is water soluble, it tends to be pressed from raw roots or frozen roots right away and afterward condensed by spray drier. Starch can be gathered from waste materials afterwards.

Tops: Generally sweet potato tops are utilized as domesticated animals food or reestablished into soil as green compost at the time when sweet potato is harvested. Studies indicate that sweet potato tops are plentiful in nutrition like protein, vitamins and minerals. The ethanol concentrates of leaves shows the strong suppressive effect to some food contamination microorganisms. Sweet potato tops such as leaves can be used for food, green drink like tea or medicine, whereas the fibrous part can be used for absorbent for poisonous gas, chemials, metals etc. Sweet potato storage roots can also be sliced and sun dried, the sun dried chips can be ground to make flour which can further be used for several food preparations. Sweet potatoes can also be

processed into frozen, canned or baked products.

Processing of Sweet Potato (*Ipomoea batatas*)

Canned Products: Sweet potatoes can be canned entire, split, or cut into pieces in either syrup or water. The unit operations prompting the creation of canned sweet potato roots includestripping, cutting, blanching, filling, syruping, exhausting, retoring.After blanching, the material is stuffed in jars and covered with syrup at 95°C to forestall staining. The Can should be exhausted long enough for the interior temperature to reach 77°C to guarantee a decent vacuum of the completed jars.

Dehydrated Form (Slices, Granules, Flakes and Flour): Sweetpotato roots are processed into dried out structures like dried chips, solid shapes, granules,flakes, and flour for capacity and use in food arrangements, including soups, pastry kitchen items,vermicelli, noodles, expelled nibble food varieties, and breakfast grains.Drying produces a light,smaller, somewhat economical ,easily stored,and transported material.Sweet potatoes are first peeled and sliced then some anti- browning agents are added and blanching is done. Finally after blanchig either sun drying, hot air drying, drum drying or spray drying is performed. Prior to drum drying and spray drying mashing and pureeing of the sweet potato is done.

Fried Products (Chips and French Fries): Sweetpotato French fries have somewhat low fat content, 10% fresh weight (fw), and high carotene content 10 mg/100 g fw. In chips procesing, unpeeled or stripped roots are cut into 0.8-2.0 mm dainty chips, and blanched for 2 minutes at 93°C, then drained to some extent utilizing warmed constrained air at 119°C.Ideal frying temperature is between 143 and 154°C.Following frying, the chips are drained and salted/sugared.For French fries, sweetpotato roots are cut into strips 1.9 cm thick×6.4 cm thick, blanched in bubbling water containing 1% Sodium Acid Pyrophosphate (SAPP) to repress polyphenolic staining, trailed by parial drying at 120°C for 5 minutes, frozen, and stored at −34°C until the slices are fried for utilization.

Fermented Products: Being rich in starch, sugars, and other supplements, sweet potatoes have been utilized in the creation of many fermented products.The cycle starts withthe inoculation of steamed sweetpotato slurry with a starter containing Aspergillus niger as an enzyme source for starch transformation to sugars, trailed by maturation to liquor by yeast Saccharomyces cerevisiae.The entire cycle ordinarily requires 12-14 days to yield a stock having 13-15% liquor, which is then refined and mixed to produce 20-40% liquor.

Frozen Products: Sweetpotatoes can be frozen in various structures like entire roots, parts, quarters, slices,cubes, French fries,paste, or as purée. Processing steps include stripping,sizing, cutting, blanching, bundling, and freezing.The major problem of discolouration of frozen sweet potato productscan be prevented by heat inactivation of the enzymes.

CONCLUSION

Sweet potato stays a significant root crop with an intrinsic capacity to create more eatable energy than most significant food crops. It is possible to produce this crop and have it accessible lasting through the year. Sweetpotato can play a major role in fulfilling the food and feed requirements in the coming years. Subsequently sweet potato with its high nutritional content, is a vital food source. There is an undeniable requirement for more scientific knowledge in order to exploit the yield capability of the crop. Emphasis should likewise be given to growing sweet potato on a commercial scale and for animal feed and industrial purposes. According to the point of view of food security, sweet potato is an incredible crop. There is a need to present more participatory exploration and expansion to teach smallholder ranchers about the worth of sweet potato as a major crop for subsistence and rural economic growth.

REFERENCES

Chivenge, Pauline, Tafadzwanashe Mabhaudhi, Albert T Modi, and Paramu Mafongoya. 2015. "The Potential Role of Neglected and Underutilised Crop Species as Future Crops under Water Scarce Conditions in Sub-Saharan Africa." *Int. J. Environ. Res. Public Health* 12: 5685–5711. www.mdpi.com/journal/ijerphCommentary.

Karyeija, R F, R W Gibson, and J P T Valkonen. 1998. *The Significance of Sweet Potato Feathery Mottle Virus in Subsistence Sweet Potato Production in Africa*.

Cynthia Sass, MPH, R. (2020). 7 Health Benefits of Sweet Potatoes. https://www.health.com/nutrition/sweet-potato-health-benefits

Greco, L. V., & Bruno, M. N. (n.d.). Food science and technology : new research.

Jillian Kubala, M. W. (2019). What's to know about sweet potatoes? Medical News Today.

Motsa, N. M., Modi, A. T., & Mabhaudhi, T. (n.d.). Sweet potato (Ipomoea batatas L.) as a drought tolerant and food security crop. 111. https://doi.org/10.17159/sajs.2015/20140252

Truong, V. D., Avula, R. Y., Pecota, K. V., & Yencho, G. C. (2018). Sweetpotato production, processing, and nutritional quality. Handbook of Vegetables and Vegetable Processing: Second Edition, 2–2, 811–838. https://doi.org/10.1002/9781119098935.ch35