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# Golden Sweet Potato as Natural Immunity Booster: A review

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***ABSTRACT***
*In recent times, when the world is busy fighting deadly coronavirus, it is necessary to take extra precautions to keep ourselves protected from getting infected. Therefore, we need a healthy and strong immune system. The best way to strengthen our immunity is by natural way. There are several food plant item to enhance our immunity. One such plant is a Golden Sweet potato, which plays a good role as a natural immunity booster. Golden sweet potato is now highlighted as a valuable member of the tropical tuber crops, having great possibility to be included as a daily diet of the consumer food chain to tackle the problem of vitamin-A deficiency. Golden sweet potato is a cheap and best source of energy, rich in starch, sugar, minerals and vitamin-A. It Benefits not only our immune system but also our heart, teeth, and vision. The aim of this paper is to aware the people about the nutritional properties of GSP and it can be easily grown in the kitchen garden.*

***KEY WORDS***
*Anticancer potential,Anti-inflammatory nutrients, Antioxidant properties, Vitamin-A*

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## I. INTRODUCTION

The precept "Let food be thy medication and medication be thy food," uncovered by Hippocrates almost 2500 years prior, acquired recharged interests that brought about money of terms like pharma, nutraceuticals, and practical food sources. These terms are acquiring notoriety among analysts, however, buyers are likewise intrigued toward normal eating routine based regimens. These normal items go about as insusceptible promoters in this way improving personal satisfaction (Ares *et al*., 2009; Sultan *et al*., 2009). Expanding resistance is a significant worry of diet-based treatments to fix different issues, and analysts are flourishing for safe sponsors (Bourgeon *et al*., 2007; Butt *et al*., 2009).

The resistant framework is an unbelievably complicated organization of particular cells that forestalls contaminations and illnesses by immersing, regulating, and directing threatening and unfamiliar cells. The human's insusceptible framework is made out of organs like spleen and thymus, though furthermore lymph hubs and bone marrow additionally contribute to the resistant framework by delivering and putting away explicit safe cells (Chaouat*et al*., 2007). Resistant cells are of two significant sorts, i.e., B cells and T cells. B cells are answerable for delivering antibodies (immunoglobulins) that are proteins intended to perceive and stamp particular antigens, while T cells are accused moieties of annihilating antigens labelled with a neutralizer (Chananaet *al*., 2007; Zhang *et al*., 2007). White blood cells assume a basic part in controlling the versatile safe capacities, and their reactions could be utilized to create defensive immunizations and may instigate resilience to antigens causing unseemly safe reactions, e.g., immune system illnesses (Cooper and Alder, 2006; Li *et al*., 2007). Likewise, phagocytes like granulocytes, macrophages and common executioner cells (NK cells) discharge pyrogens and interferons that go about as immunoregulatory moieties (Currier and Miller, 2002; Fauci*et al*., 2005). Substance go betweens like cytokines (monokines and lymphokines) are additionally successful in managing invulnerable reactions.

Ideal safe capacity is subject to a solid invulnerable framework. Thusly, sufficient sustenance is vital to guarantee a decent inventory of the fuel sources, macronutrients and micronutrients needed for the turn of events, upkeep and articulation of the resistant reaction (Maggini*etal.*, 2017). Micronutrients have crucial parts all through the insusceptible framework that are autonomous of life stage and it has been resolved that those generally expected to support immunocompetence incorporate nutrients A, C, D, E, B2, B6 and B12, folic corrosive, beta carotene, iron, selenium, and zinc (Alpert, P., 2017). There is a bidirectional communication among nourishment, disease and insusceptibility: the invulnerable reaction is undermined when sustenance is poor, inclining people to contaminations, and a poor wholesome state might be exacerbated by the resistant reaction itself to a disease (Calder,P., 2013). Unmistakably ideal immunocompetence relies on healthful status (Watson *et al*.,2010). It is perceived that micronutrient lacks and problematic admissions are regular overall (Biebinger*et al*., 2008), and certain micronutrients might be bound to be inadequate at various phases of the existing course. This can influence the danger and seriousness of contamination, and truth be told a person's

nourishing status can foresee the clinical course and result of specific diseases like the runs, pneumonia and measles (Alpert,P.,2017). Protection from contamination might be improved by adding the lacking supplement once more into the eating regimen and re-establishing resistance capacity (Alpert,P., 2017). In any case, it isn't generally conceivable to accomplish great dietary status utilizing the eating regimen alone. In agricultural nations, for instance, it very well might be hard to track down a satisfactory and shifted supply of food. Indeed, even in industrialized countries, where it could be assumed that solid, nutritious food is simpler to acquire, social, financial, instructive, ethnic and social foundations impact the eating regimen and may antagonistically influence a person's micronutrient status (Schalfer,E., 2016).

**Why you must go for Golden Sweet Potato?**

It is well known that sweet potato is considered one of the most nutritious vegetables in the world. But what is the reason behind it? Well, you should not be surprised to know that a sweet potato can full fill your body's maximum nutritional needs and it also strengthens your immune system effortlessly. It should be known that a sweet potato is enriched with natural antioxidant, vitamins, minerals and healthy fibers. This is the vegetables one's body needs to build resistant against virus attacks and much other lifestyle disease.

We have many options in our daily diet. However, many of these options are unhealthy ones, unless carefully chosen. This is because of the increasing popularity of junk food. This does not have a good effect on our health. Thus going for sweet potato is a very good idea and the best part is its versatile taste. It integrates the quality of cereals, fruits and also vegetables. This immunity-boosting vegetable also has very high nutritional value. From sweets to chips to salad to pickeles, sweet potato can amp up the taste of any dish. Sweet potato must be included in one's diet if he /she wants to strengthen their immune system. It is so because sweet potato is enriched with antioxidant natural.

Sweet potatoes are carried with so many vitamins and minerals, and also rich in antioxidant which protect our body from free radicals.

The fibre and antioxidant in the sweet potato are also good for our gut as it has both insoluble and soluble fibre for which stays in the digestive tract to protect for the intestinal lining to stay this organ healthy and powerful too.

The flesh is additionally rich in vitamin A and that they also are phenomenal for his or her anthocyanins which are super beneficial now during the coronavirus. We love that ….

Can you believe that one purple sweet potato promotes the expansion of healthy gut bacteria to stay our stomachs going strong? like one purple sweet potato ……just one.

A single sweet potato can contain 769% of the amount of vitamin A you needed to consume daily. Vitamin A is great for our vision, bones and skin and help strengthen our immune system.

**Golden Sweet Potato is the Best Immunity Booster our Body needs!**

- **High Nutritional value**

Orange-fleshed Sweet potato (OFSP) is moderately rich in β-carotene (antecedent of nutrient A) and consequently plentiful in nutrient A (Haskell *et al*., 2004). Also, GSP contains supplements like carbs, β-carotene, nutrient B6, riboflavin, pantothenic corrosive, folic corrosive and minerals like calcium, copper, iron, manganese, and potassium which are significant in human wellbeing and sickness (Woolfe, 1992; Hou*et al*., 2001). GSP additionally contain different cancer prevention agents, for example, anthocyanins, tocopherols and phenolic acids (Woolfe, 1992). Also, OFSP contains different micronutrients, for example, polyphenols. Polyphenols are generally known for their constructive outcome on human wellbeing. The incorporation of polyphenols in the eating regimen gives security against coronary illness and forestalls oxidation of LDL, by going about as 'foragers of free revolutionaries', particularly peroxide, breaking its development chain and killing it (Gervasi*et al*., 2016). A few creators have recently expressed that the polyphenols in SP displayed antioxidative or free extremist searching capacity, support people's protection instrument against oxidative pressure and, in this way, hinder the advancement of persistent illnesses, similar to malignancy, cardiovascular sicknesses, liver injury, and so on (Gervasi*et al*., 2016). Like polyphenols and nutrient E, carotenoids additionally show cancer prevention agent exercises (Ahmed *et al*., 2010).

GSP has an enormous potential to be utilized as a food security crop in agricultural nations with restricted assets due to its short development time, capacity to develop on under assorted climatic conditions, on less fruitful soil and are generally liberated from sickness. Arising medical advantages of the OFSP are generous, making it a much more significant food – particularly for populaces at risk for ailing health (Aywa*et al*. 2013; Kaspar*et al*., 2013).

**Nutritional value of Golden Sweet potato (Data source: USDA, CTCRI)**

| **Nutrient** | **Value** |
|---|---|
| Energy | 359KJ (86kcal) |
| carbohydrate | 20.1g |
| protein | 1.6g |
| Dietary Fibre | 3g |
| **Vitamins** | |
| Beta-carotene(vita.-A) | 20mg (283%) |
| Riboflavin (B2) | 0.061mg (5%) |
| Thiamine (B1) | 0.078mg (7%) |
| Pantothenic acid (B5) | 0.8mg (16%) |
| Niacin (B3) | 0.557mg (4%) |
| Folate (B9) | 11ug (3%) |
| Vitamin B6 | 0.209 (16%) |
| Vitamin E | 0.26mg (2%) |
| Vitamin C | 2.4mg (3%) |
| **Minerals** | |
| Iron | 0.61mg (5%) |
| Manganese | 0.258mg (12%) |
| Magnesium | 25mg (7%) |
| Potassium | 337mg (7%) |
| Zinc | 0.3mg (3%) |
| Sodium | 55mg (4%) |
| Phosphorus | 47mg (7%) |
| **Fats** | 0.1g |

- **Golden sweet potato: a great alternative to vitamin A**

Nutrient-A is a fundamental supplement and its insufficiency is a genuine medical problem for a large part of the creating scene (Burri, 2011). Insufficiency of nutrient-A will be a significant reason for sudden passing in non-industrial countries, especially among kids (Maiani*et al*., 2009). Food stronghold is an elective strategy for guaranteeing a sufficient stockpile of nutrient- A in the eating routine. Nonetheless, food fortress can likewise be hard to maintain, for the most part, due to the troubles innate in strengthening food (Burri, 2011). The food should be devoured by nearly everybody, including the least fortunate people. It should be overcome with a limited scope of admissions: so it forestalls nutrient -A lack in the vast majority, yet doesn't cause harmfulness in individuals who can eat more than normal sums (Burri, 2011). Even though, OFSP have the capability of tackling nutrient-A lack.

Insufficient admission of nutrient-A at this age can prompt nutrient -Inadequacy that, thus, may cause night visual impairment, sabotage development and invulnerable capacity. This likewise brings about expanded danger of dismalness and mortality, to a great extent from measles, the runs and respiratory diseases (Sommer, 2011, WHO, 2011 and WHO, 2012). Kids are at a higher danger of intestinal pervasions and contaminations, which may likewise hinder the assimilation of nutrient-A (WHO, 2014). Bosom milk is the solitary critical wellspring of nutrient-A for babies (Sommer, 2011) and newborn children took care of next to zero bosom milk in early life are progressively helpless to contaminations (Akhtar *et al*., 2013). Along these lines, nutrient-A unhealthiness is a significant general wellbeing worry of the non-industrial nations and is liable for a large

number of passings yearly among the little youngsters. The nutritionists in a few non-industrial nations constrained the proof of absence of satisfactory fundamental nutrients and minerals in the eating regimen of numerous youngsters and grown-ups (Sommer, 2011). In contrast to those in created nations, who get bountiful preformed nutrient-A (retinol) from creature food varieties (liver, eggs, milk and milk items), though destitute individuals living in underdeveloped nations depend on modest dim green-yellow nearby vegetables and organic products for nutrient-A. Nutrient-A insufficiency is brought about by an ongoing eating routine that gives too little bioaccessible nutrient-A to address physiologic issues, fast development and continuous contaminations. Inadequate usage of nutrient-A is likewise basic variables for the nutrient-A lack (Akhtar *et al*., 2013 and WHO, 2011).

- **Antioxidant properties**

In numerous nations, GSP are accessible on a virtual all year premise and their capacity to give a cancer prevention agent supplement like beta-carotene makes them a champion cell reinforcement food (Han *et al*., 2007). Ongoing exploration shown that during the absorption cycle, while going through stomach related plot, phytonutrients present in these harvests might have the option to bring down the free oxygen extremists substantial metals poisonousness (Han *et al*., 2007 and Xie*et al*., 2010). That hazard decrease may be significant not just for people in danger of stomach related plot issues yet for all people needing to lessen the potential danger brought about by the presence of hefty metal buildups in their eating routine. The Storage proteins i.e., sporamins present in GSP additionally have some significant cell reinforcement properties (Ozaki *et al*., 2010). These capacity proteins created by GSP plants, at whatever point they are exposed to actual harm. Their capacity to assist the plants with recuperating this harm is altogether identified with their job as cell reinforcements (Chang *et al*., 2010). Particularly when GSP is being processed within our gastrointestinal plot, we may get a portion of these equivalent cancer prevention agent benefits (Filla*et al*., 2009).

- **Anti-inflammatory nutrients**

The shading related colors (carotenoids, anthocyanin and so forth) present in GSP are similarly important for their mitigating medical advantages. In creature contemplates, initiation of atomic factor-kappa B (NF-kB), enactment of inducible nitric oxide synthase (iNOS) and cyclooxygenase-2 (COX-2) and development of malondialdehyde (MDA) have all be appeared to get decreased by utilization of either GSP or its tone containing separates( Hwang *et al*., 2010). The shading related GSP phytonutrients additionally affect fibrinogen (Ludvik *et al*., 2008). Adjusted measures of fibrinogen, thrombin and fibrin are a critical piece of the body's wellbeing and its capacity to cut off injuries and stop loss of blood. In any case, abundance measures of these clotting related particles may in some cases represent a wellbeing hazard. In creature considers, overabundance fibrin in the focal sensory system has been related with expanded demyelination measure in neurons and can likewise trigger undesirable irritation in nerve tissues (Zhang *et al*., 2009). In fundamental creature considers, admission of SP hued removes has been appeared in the decrease of irritation and concurrent decrease of fibrinogen levels (Wang *et al*., 2010 and Mei *et al*., 2010).

- **Anti-cancer potential**

Concentrates from various pieces of SP have likewise been accounted for to display anticancer and antitumor properties. GSP remove restrains multiplication and initiates apoptosis in prostate malignancy cells in vivo and in vitro (Karna *et al*., 2011), this anticancer movement was ascribed to the high polyphenol substance of the concentrate. Also in a new report, purple-fleshed sweet potato separate was found to have inhibitory impact on the development of MCF-7 (bosom malignant growth) and SNU-1 (gastric disease) malignancy cell lines (Sugata*etal*., 2015). The restorative capability of purple-fleshed yam has generally been ascribed to its high anthocyanin content. Anthocyanins or anthocyanin-rich concentrates have shown an inhibitory impact on malignancy cell development in different disease cells (Wang *et al*., 2008). A gathering of analysts likewise detailed that cleaned protein from the capacity foundation of GSP advances portion and time-dependent restraint of human colorectal malignancy SW480 cell multiplication, movement and attack (Li PG,*et al*., 2013).

- **Effect on immune system**

GSP removes have likewise been accounted for to have modulatory impacts on the safe framework and wellbeing. Ethyl acetic acid derivation parts of bioactives removed from two distinct cultivars of SP showed immunomodulatory exercises in a cultivar subordinate way in mice splenocytes (Chen *et al*., 2013). Haniehet *al* detailed that dietary supplementation of purple SP improved insusceptible reaction after inoculation in chickens. Likewise, the utilization of purple SP leaves had the option to balance T-lymphocyte capacities, lytic action of characteristic executioner cell and immunizer creation in an investigation including 16 solid human grown-ups (Chen *et al*.,2005). Reports of immunomodulatory concentrates on SP are generally on purple cleaned potato cultivars.

It has been proposed that extricates from purple SP improve safe brokenness conceivably by tweaking cell reinforcement safeguard frameworks (Kim *et al*., 2015). A dietary enhancement with purple SP separate expanded the movement of the cancer prevention agent compounds, superoxide dismutase and glutathione peroxidase in LP-BM5 murine leukaemia infection incited murine AIDS (Kim *et al.*, 2015). The cooked leaves of GSP leaves likewise showed immunomodulatory impact when devoured by b-ball players during a preparation period. The plasma convergence of polyphenols in the players expanded altogether during this period combined with a critical expansion in the cytotoxic action of nature executioner cells, and emission of interferon (IFN)- γ (Chang *et al*., 2007).

## II. CONCLUSION

A typical factor all through life is the requirement for a satisfactory stock of micronutrients, which assume a key part in supporting immune function. Well, it is not surprising that a GSP can full fill our body's maximum nutritional needs and it also strengthens our immune system effortlessly. Thus, there's a good risk of this subsistence crop for being adopted as a regular diet of the patron organic phenomenon to supplement as another nutritive food supply for the resource-poor farmers within the era of in-depth increment and nutrition crisis.

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