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Immunity Booster Plants from Manipur, North East India

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ABSTRACT

Overall health and immunity is determined by the food intake of a person. Herbs give immune system a boost to help better fight viruses like Covid-19. As the, the virus gets stronger with asymptomatic attack, to fight its menace one has to be stronger. This paper presents Manipur's very important, most powerful immune-boosting foods. Currently reliance on natural products is gaining popularity to combat various diseases and threats including oxidative stress, cardiovascular and cancer complexities and immune dysfunction. The use of traditional remedies is gaining popularity due to an array of scientific evidence in their favour.

Keywords: *Immunity, Covid-19, Traditional remedies.*

INTRODUCTION

Coronavirus disease (COVID-19, caused by the novel coronavirus SARS-CoV-2) is a transmissible disease identified within December 2019 and declared a global pandemic by WHO on 11 March 2020 (WHO, 2020). The ongoing epidemic has been declared by the World Health Organization (WHO) as a global public health emergency. Since no medicine or vaccine has been developed for COVID-19 disease yet, the authorities and medicine experts are looking after the knowledge and information for the short- and long-term management of the disease.

Immunity is the capability of our body to fight unwanted biological invasion that may cause damage to our body. It maintains the body homeostasis. As a balanced and protective state of the body, immunity provides adequate defences to resist infection /disease and to counteract its effects by the action of specific antibody. It is true that no diet and dietary supplements can prevent or cure COVID-19 infection, however, healthy diets are important for supporting immune systems. Hence, in the present circumstances, supporting the immune system is among consumers' top health priority globally (Nutraceuticals World, 2019). Luo *et al.,* 2020, provide historical evidence regarding the prevention of H1N1 and SARS influenza in the high-risk population indicating that Chinese herbal formulas could provide an alternative approach for the prevention of COVID-19.

Diet constitutes an important immune booster for healthy life. The nutritional status of individuals has for long been considered as an indicator of resilience against destabilization (Cobb, 2001). As poor diet quality has been associated not only with physical but also with mental health (Hislop, 2006), inadequate nutrition can lead to long-lasting effects that are linked to health (Yousafzai *et al*., 2013). Optimal nutrition and dietary intake is a resource that transcends the individual and the community to reach global influence (Ma and Lee, 2012). It has been demonstrated that specific nutrients or nutrient combinations may affect the immune system through the activation of cells, modification in the production of signalling molecules, and gene expression (Valdés-Ramos, 2010).

Diet-health linkages in Manipur is obvious as the diet includes a list of such herbs and vegetables that are widely accepted in Manipuri cuisine and whose components exhibit immune-modulating properties to prevent, fight and recover from infections. Widespread acceptance of functional and nutraceutical foods in the Manipuri diet paves the way to the therapeutic avenues to enhance immunity against diseases. As the best medicine for illness is prevention, hence the first line of defence against fighting pathogens constitutes boosting the immunity naturally. Thus, the way to stay healthy includes the consumption of plant based healthy foods. Modern trends confirm the efficacy of folk medicines, traditional people have used for thousands of years.

The paper highlights the importance of 15 such plants which are natural immune boosters as they contain active principles/ingredients that may provide protection against undesired responses helping in improvement of defence system. It provides insights about the properties of bioactive ingredients of foods and herbs for the support of the human immune system against infections. They are considered extremely essential for building immune system in Manipur, most of them also contain abundant amounts of Vitamins C, B and E, which help get rid of infections and supposed to in turn fights off the virus.

MATERIALS AND METHODS

The study was conducted in Manipur (Latitude 23°48'N to 25° 36'N and Longitude 93°03'E to 94°47'E), a state in the NE India and a global Biodiversity hotspot. Information was collected during field trips on the basis of interview with the local heads on the plants utilized by people to prevent infections. The plant species were identified referring to standard literature and flora. The information was obtained on description, distribution and uses of plants. The chemical constituents of these plants was recorded and compared with those of some important 'Indian Medicinal Plant Literature'. A list of 15 such plants are furnished in the Table 1.

Table 1
Immune System Booster Plants

Sl. No.	Scientific Name	Family	Vernacular Name and Local Name	Distribution	Description	Medicinal Uses	Chemical Constituents
1.	*Allium hookerii* Linn	Liliaceae	Winter leek Maroi napakpi	N.E. India	Bulbous herb. Leaves basal, linear, membranous	Plant extract is used in bodyache. It is used as flavouring agent in local delicacies.	Benzoic acid, prostaglandins,fructans, phytosterol Octadecanoic acid.
2.	*Allium odorum* Linn	Liliaceae	Aromatic herb Maroi nakupi	N.E. India	Bulbous herb. Leaves linear, flat acuminate.	The plant is prescribed for the reatment of urinary troubles. Used in different local dishes	Amino acid, saponins.
3.	*Allium sativum* Linn	Liliaceae	Garlic Chanam	India, China, USA, Italy and Egypt	Leaves flat, Slender; heads bulbils and flowers	Bulb is given to treat in the ailment of bronchitis. Used in various local dishes.	Allicin, allyl sulfide.
4.	*Centella asiatica* Linn	Apiaceae	Indian pennywort Peruk	India, S.E. Asia, Africa	Annual prostrate herb, simple, exstipulate, arising in group from nodes.	Plant juice with honey is given to cure stomach ulcers, urinary troubles. It is used as ametpa (chutney)	Asiaticoside, Madecassic acids

5.	*Cissus adnata* Roxb	Vitaceae	- Kongouyen	China, India and Australia	Climbing shrub, stem 5-15 m long.	Leaves is given in urinary complaints. Leaves are used as vegetables.	Flavonoids, alkaloids, β sitosterol and bergenin.
6.	*Cucurma longa* Linn	Zingiberaceae	Tumeric Yaingang	S.E. Asia	Perennial herbaceous, rhizomatous plant. Leaves are alternate and aranged in two rows	Decoction of rhizome is given in stomach complaints. It is added to almost in every dishes.	Essential oil, Alkaloids, Curcumin.
7.	*Gnaphalium luteoalbum* Linn	Asteraceae	Jersey cud weed Phunil	India, China and Japan	Annual/Biennial herb. Leaves are oblanceolate to lanceolate.	The plant is prescribed in cardiac problems. It is used in local dishes.	Flavonoids, alkaloids, phytosterols, sesquiterpenes, anthraquinones.
8.	*Lemanea australis* Atkins	Rhodophyceae	Algae Nungsham	N.E. India	Sparsely branched, pseudoparenchy matous thallus with a single central axial filament that lacks cortical filaments.	Algae is used in removing placenta after child-birth. It is used in shingju (salad).	Carotenoid, iron and measurable quantities of minerals.
9.	*Mentha spicata* Linn	Lamiaceae	Spearmint Nungshihidak	Throughout India, China and Europe	A glabrous perennial with creeping rhizomes; leaves smooth	Leaves are prescribed for the treatment of stomach disorders, bronchitis. Used in local dishes	Lemonene, menthol Methone,Carvone
10.	*Neptunia oleracea* Lour	Fabaceae	Water mimosa Eshing ekaithabi	Africa, S.E. Asia, Australia and S. America	Stems spread in water 3-5' long. Primary leaf segments, oblong leaflets arranged in opposite pairs.	Decoction of root is used to cure syphilis stem are eaten	Phenolics,Flavonoids,source of crude fibre and minerals like Potassium
11.	*Plantago erosa* Wall	Plantaginaceae	Fleaworts Yempat	India, Russia and Bulgaria	Herbs with perennating rootstock. Leaves radical, long petioled.	Leaf juice is applied in wounds. Leaves are used as vegetables.	Flavonoids, fatty acids , terpenoids, and vitamins .
12.	*Solanum x anthocarpum* Schrad. and Wendl.	Solanaceae	Yellow-berried Nightshade Leipungkhanga	India, Japan and China	A pricky diffuse herb	Seed juice is given in stomach ulcers, urinary troubles. Fried seeds are eaten	Flavonoids, amino acid, *β*-sitosterol , amino acid.
13.	*Spinacia oleracea* Linn	Chenopodiaceae	Spinach Palangshak	South East Asia	Annual Plant, dioecious herb, 20-60 cm tall, glabrous. Leaves ovate to triangular-hastate.	Leaves are used in the treatment of inflammation of bowels. Used as vegetable.	Flavonoids, tannins, Alkaloids, proteins.
14.	*Zingiber officinale* Roscoe	Zingiberaceae	Ginger Shing	S.E. Asia	Slender, erect, herbaceous perennial plant with 30-150 cm tall. Branched rhizome	Rhizome is given in cough, asthma. Used in local dishes.	Gingerol, resins,Citral ,B-D Curcumene.
15.	*Houttuynia cordata* Thumb	Sauraceae	Chameleon plant Tuningkhok	N.E. India and Vietnam	Herbaceous perennial plant. Leaves alternate, broadly heart-shaped.	The plant is given in the treatment of dysentery, skin problems. Used is curry, salad.	Flavonoids, phenolic acid, Aristolactams, Oxoaporphines, 5,4-Dioxoaporphines.

RESULTS AND DISCUSSION

The paper reports an array of plants included in Manipuri diet that have immune-boosting ingredients and contain suitable vitamins, minerals, and antioxidants. Their possible inclusion in diets could explore new therapeutic avenues to enhance immunity against diseases. They are used for every day maintenance in Manipuri cuisine and supposed to prevent exposure to pathogens. Certain foods like Red algae Lemanea in Manipur provides good options to build resilience in the body against infections.

Studies have shown that herbs and green vegetables provide nutrients that can boost immune function like beta-carotene, Vitamin C, and Vitamin E, other plant-based foods are also rich in antioxidants, help reduce oxidative stress (Barnard *et al*.,2019). Modes of their actions include boosting and functioning of immune system, activation and suppression of immune specialized cells, interfering in several pathways that eventually led to improvement in immune responses and defence system. These plants enhance immunity more directly by boosting immune system chemicals that help ward off viruses. Thus, these plants provide immune benefits to us, and in Manipur most of our vegetables are organic. Research shows vitamin D supplementation may reduce the risk for viral infections, including respiratory tract infections. Food sources of vitamin D include fortified cereals and plant-based milks and supplements (Grant *et al*., 2020).

CONCLUSION

Avoiding deficiencies of the nutrients, helps in maintaining an effective immune system that plays an essential role in immune cell triggering, interaction, differentiation, or functional expression. Proper food intake is a natural response to stress and heightened emotional states through both psychological and physiological mechanisms (Macht, 2008). Melbourne researchers in Nature Medicine published a detailed report of how the patient's immune system responded to the virus and recover from the infection. They have mapped immune responses from one of Australia's first novel coronavirus (COVID-19) patients, showing a robust immune response across different cell types associated with clinical recovery (Thevarajan *et al*., 2020).

According to Wypych *et al*., (2017), dietary ingredients are significant determinants of gut microbial composition and consequently can shape the characteristics of immune responses in the body. Vegetarians have been shown to have more effective white blood cells when compared to nonvegetarians, due to a high intake of vitamins and low intake of fat (Malter *et al*.,1989). Research also shows that oil may impair white blood cell function and that high-fat diets may alter the gut microbiota that aid in immunity (Carddoc *et al*., 2019).In daily meals, Manipuris consume less oil by using fermented foods, their traditional delicacies like Utti, Eromba, Champhut (Boiled vegetables like squash, bottlegourd, Brahmi, Carrot, Mustard leaves etc and consuming that water) provide antioxidants and sufficient vitamins and minerals. It is said that the gut and the immune system are symbiotically connected. Hence, consuming healthy foods keeps healthy microbiome in the gut with a healthy immune system that can ward off infections faster. Optimal nutrition and dietary intake is a resource that transcends the individual and the community to reach global influence (Ma and Lee , 2012). Here, it may be recalled that very popular herb from Manipur, *Houttuynia. cordata* has also been utilized for the treatment of herpes simplex virus type 1 (HSV-1), influenza virus, human immunodeficiency virus type 1(Duerr, *et al*., 2007; Hayashi *et al*., 1995 and Malter *et al.*, 1989) and chronic sinusitis and nasal polyps (Li *et al.*, 2005).

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