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ROLE OF VEGETABLES IN BOOSTING IMMUNITY DURING COVID-19 PANDEMIC SITUATION

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Introduction

We are evident of the situation that COVID-19 pandemic is still in a motion which is a serious matter of concern. Its impact has not only affected India but all over the globe. It has affected the economy of the nations, educational scenario, agricultural systems, etc. but most importantly it has resulted in emotional disturbances to those who have suffered or are still suffering due to such pandemic. It is a bitter truth that, no such vaccine or medicine has been regulated till now to neutralize COVID-19. However, due to several issues now government are trying to normalize the activities by withdrawing various restrictions which were formulated during the initial stage of COVID-19 interference in our nation.

Through various research and statements during this pandemic situation we were familiar with the fact that proper immune system can tackle such problem and could recover after a fairly short period of time. Therefore, keeping in mind that the immunity is a key concern which needs to be taken care of, people have started adopting several alternatives such as following proper healthy balanced diet, maintaining fitness as by doing exercises, meditation, yoga, health hygiene, etc. in order to maintain and improve the immunity.

In such situation it was realised that consumption of good amount of healthy vegetable in a diet is one of the easy substitute to maintain and improve the immunity during this pandemic situation especially to the old aged people who are at more risk due to their weak immune system. Vegetable is simply a plant or part of plant which can be consumed either raw or cooked or even consumed in a processed form. According to Indian Council of Medical Research (ICMR) consumption of 300g of vegetable per day is essential for balance diet (Muthukumar and Selvakumar, 2013) which indicates the importance of vegetable in human diet. Vegetable contains a wide range of essential nutrients and bioactive compounds which is known to exhibit various antioxidants, anti-viral and anti-cancer properties which is beneficial for human health. A vegetable make up a major portion of the diet of humans and plays a crucial role in human nutrition, especially as good sources of nutraceuticals, vitamins, minerals, dietary fibre and phytochemicals which will be helpful in improving our immunity system. Nutraceuticals are the substances which are found as a natural component of food or other ingestible forms that have been determined to be beneficial to the human body in preventing or treating a number of diseases. Early before it was believed that 14 vitamins and 16 essential minerals were the key for human nutrition and health but recently, with the advancement in research, it was found that vegetables contain thousands of beneficial phytochemicals in addition to the 14 vitamins and 16 minerals (Ramya and Patel, 2019). It has been observed that it is preferable to eat fresh vegetables and salads at every meal, as well as fresh fruits to increase the efficiency of the immune system, especially for the patient of the digestive system and to clean the

body (Dhandevi amd Jeewon, 2015). As vegetables are rich in different nutrients, minerals and vitamins it is also known as protective food.

Role of some major vegetables in boosting immunity system

Several research and experiments has revealed that consumption of healthy vegetables have positive responses in improving the immunity system in human beings. The most important vegetable that improves the immune system cabbage, broccoli, broccoli, cauliflower, beetroot, carrots, pepper, radish, watercress, parsley, celery, red onion, garlic, pumpkin, eggplant, tomatoes, green beans, potatoes, spinach, artichoke, turnip, etc. (Ali *et al.*, 2019) Some of them are as follows:

Tomato : Tomato is one of the major vegetable well known for its nutritive value. It is a good source of vitamins (A, B and C) and antioxidants which is known to improve immunity and found to be helpful in prevention against several cancerous cell and other harmful diseases. Consumption of tomatoes in daily diet are effective in lowering blood pressure and reducing cholesterol levels in the human body. Tomato is a good source of chromium which is beneficial for the diabetic patients to maintain their body sugar level under control (Bhowmik *et al*., 2012).

Carrot : Carrot has a remarkable nutritional and health benefits. They are enriched with carotenoids, phenolic compounds, polyacetylenes, and vitamins which help to reduce the risk of several diseases. It has been reported that such carrot compounds exert antioxidative, anticarcinogenic, and immune enhancer effects (Shakleel *et al.*, 2017). A carrot is a rich source of beta-carotene, a potent antioxidant that fights free radical damage of cells, which in turn may take a toll on immunity (Sengupta, 2020).

Onion : Onions are low in calories and high in beneficial nutrients like vitamins, minerals, and antioxidants that can help cure a cold, cough, high fever, sore throat, and boosts immunity (Agustin-Bunch, 2020) which plays a vital role in maintaining and boosting immunity.

Garlic : Garlic and its product offer beneficial ability to enhance the immune system. It helps the body to fight against various infections, heart diseases, allergies, bronchitis, arthritis, cold and several fungal and bacterial problems which constantly threaten our health. It is also known to possess antitumor properties. In some cases garlic is also known as a natural immune system enhancer (Tripathi and Lawande, 2006).

Broccoli : Broccoli is a good source of potassium which helps to maintain a healthy nervous system and also enriched with minerals like magnesium and calcium that regulates the blood pressure. It also contains trace mineral i.e. zinc and selenium which helps to strengthen immune defence actions (Rasquinha, 2013).

Beet root : Beetroot is one of the most potent vegetable with respect to antioxidant activity. Significant amount of vitamin C, Vitamin B1, B2, niacin, B6, B12 are found in beetroot, while the leaves are an excellent source of vitamin A. Beetroot helps in curing many diseases such as anaemia, blood pressure, cancer, dandruff, gastric ulcers, kidney ailments, liver toxicity or bile ailments like jaundice, hepatitis, food poisoning, diarrhoea or vomiting (Zitnanova *et al*., 2006, Neha *et al*., 2018.)

Green Leafy vegetables : Leafy vegetables includes spinach, palak, amaranthus, lettuce, fenugreek, etc, which generally possesses various medicinal and health benefits. They are considered as an essential part of the diet for meeting the daily nutrient requirements. Green leafy vegetables are rich source of nutrients, high in dietary fibre, low in lipids, and rich in folate, ascorbic acid, vitamin

K, Mg, and K. They also carry plenty of phytochemicals such as β-carotene flavonoids (Randhawa *et. al.*, 2015). They are helpful in boosting immunity.

Conclusion

Immunity of a body is a key weapon to combat any diseases or infections threatening our body. A good immunity system in our body will restrict the invasion of several problems causing health issues. In present days, most of the people are dependent on synthetic chemicals to maintain their better health. However, some are unaware of the fact that there are several other natural sources such as consumption of healthy vegetables which not only fulfils the dietary requirements but also plays a vital role in boosting immunity, preventing and also treating several infections and diseases in human body. Even during this COVID-19 pandemic situation, consumption of healthy vegetables will be helpful in boosting immunity and prevention from several other harmful infections and pathogens which may result in serious health issue which is better to be avoided especially during this pandemic situation. Such step might also reduce the burden and dependency over the synthetic chemicals for maintaining our health which will be a positive outcome.

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