

## Understanding Nutritional Approaches Towards Preventing COVID-19 Infections and Disease Progression

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**Conflict-of-interest statement:** The author(s) declare(s) that there is no conflict of interest regarding the publication of this paper.

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**Received:** March 19, 2021

**Revised:** April 20, 2021

**Accepted:** April 22, 2021

**Published online:** April 27, 2021

### ABSTRACT

Nutritional and integrative approaches to health have become more widely researched and a strong area of interest for many patients. Ensuring adequate hydration, sufficient caloric intake and consumption of protein-rich foods is also essential to hasten recovery from Covid-19. Certain foods including arginine and processed foods are best avoided if infected with Covid-19. While vaccine campaigns race to slow infection rates and establish herd immunity, the future risk of Covid-19 is still unknown. A better understanding of which foods to eat and avoid in order to minimize Covid-19 infection risk

and possibly disease progression may be important for long-term respiratory health.

**Key words:** COVID-19; Diet; Vitamins; Minerals; Immunity

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Stephens KC, Alagappan V, Shah R. Understanding Nutritional Approaches Towards Preventing COVID-19 Infections and Disease Progression. *Journal of Respiratory Research* 2021; 7(1): 155-157 Available from: URL: <http://www.ghrnet.org/index.php/jrr/article/view/3102>

### INTRODUCTION

Every day, food is the medicine we provide our bodies, equipping it with the nutrients to prevent and fight infections, including Covid-19. Eating well is also an important part of healthy living and good self-care during the stress of COVID<sup>[1]</sup>. Here, we offer nutritional recommendations regarding which foods to eat and to avoid during the pandemic, based on studies showing correlations with certain nutrients and disease progression.

### EATING WELL TO PREVENT COVID-19

Eating a plant-based, whole-foods diet, rich in fresh fruits, vegetables, whole grains and legumes, is an important way to ensure the body obtains its daily vitamins, minerals and core nutrients, and is fit to fight infection. A plant-based diet also helps to prevent the development of obesity, type II diabetes, and coronary artery disease, which contribute to higher rates of Covid-19 infection and worse outcomes once infected<sup>[1]</sup>. Antioxidants and anti-inflammatory agents, including fiber from whole grains and polyphenols found in quality olive oils, berries, and spices, also play important roles in fighting infection<sup>[2,3]</sup>. The American Heart Association recommends four servings of fruit and five servings of vegetables per day, in addition to six servings of whole grains<sup>[4]</sup>.

Getting the recommended values of vitamins and minerals, including vitamins A, B, C, D, E, and zinc, as well as probiotics, is also vital to preventing infection from Covid-19. These nutrients may be obtained from supplements, but are most readily found in food sources.

Vitamin A has been linked to improved immune function, and thus may be helpful to prevent and fight Covid-19. Research suggests that individuals with low vitamin A levels may be at increased risk for respiratory disease<sup>[2]</sup>. Vitamin A is involved in the first line of defense from Covid-19 by maintaining healthy mucus layers in the respiratory tract<sup>[2]</sup>. It is also important for the healthy functioning of immune cells, another of its infection-preventing properties<sup>[2]</sup>. Good sources of vitamin A include raw carrots, cantaloupe, and mango<sup>[5]</sup>.

B vitamins are also important for preventing infection from Covid-19. Vitamin B3, or niacin, helps reduce inflammation and lung damage that may worsen viral symptoms<sup>[6]</sup>. Eating fish, whole grains, nuts, beans and other legumes are excellent sources of niacin<sup>[6]</sup>. Vitamin B9, also known as folate and folic acid, has also been shown to help prevent respiratory infections in children<sup>[6]</sup>. Leafy greens and fortified foods like pasta and bread are good sources of the vitamin.<sup>[6]</sup> Recommended dietary allowances of niacin and folate are 15mg and 400mcg, respectively<sup>[7,8]</sup>.

Vitamin C is one of the most widely promoted vitamins to prevent and treat viral infection due to its role in the health of leukocytes, or white blood cells that help the body fight infection. Classic sources like orange juice and other citrus fruits like grapefruit, as well as tomatoes, cranberries, and strawberries are excellent sources of the recommended 2,000 mg of vitamin C per day<sup>[2]</sup>.

Vitamin D deficiency has been linked to a higher risk of infection by Covid-19, and ensuring adequate vitamin D intake is another important way to prevent Covid-19 infection<sup>[9]</sup>. Several foods, including mushrooms, milk, and milk alternatives, which are fortified with vitamin D, are rich sources of the recommended 2,000 IU daily<sup>[9]</sup>. Mid-day sunlight exposure for 10-30 minutes most days of the week is another way to ensure adequate vitamin D levels<sup>[9]</sup>.

Vitamin E is known for its especially high antioxidant properties. Vitamin E is the collective term given to fat-soluble compounds that behave in the same manner as alpha-tocopherol<sup>[10]</sup>. Food sources of this compound include nuts, seeds, vegetable oils, green leafy vegetables and fortified cereals<sup>[10]</sup>. The recommended dietary allowance for vitamin E is 15 IU for adults<sup>[10]</sup>.

Zinc is a trace mineral that is required for the normal development and functioning of immune cells. Some studies have also shown that zinc can slow the replication of viruses, including the SARS-CoV-2 virus<sup>[11]</sup>. About 40 mg of zinc per day is recommended, and may be found in nuts, seeds, and dark chocolate<sup>[6]</sup>.

Finally, probiotic bacteria aid in maintaining a robust microbiome that is ready to combat upper respiratory tract infections like COVID-19. Fermented foods including yogurt, keifer, kimchi and kombucha are good sources of probiotic bacteria<sup>[6]</sup>.

## EATING TO HEAL MORE QUICKLY FROM COVID-19

Adequate hydration, caloric intake and consumption of protein-rich foods are essential to hasten recovery and prevent malnutrition when fighting Covid-19 infection.

Fever frequently results in increased fluid losses as well as dehydration. Additionally, fighting infection requires increased work by the body and also leads to fluid loss<sup>[12]</sup>. Drinking approximately 8 to 10 cups of clear beverages per day, or a few ounces every fifteen minutes, may help prevent dehydration. The optimal beverages for recovery have some calories and protein. Drinks meant specifically for hydration, such as oral rehydration solutions or sports drinks, are good options<sup>[13]</sup>.

Loss of taste and smell are frequent symptoms of Covid-19, and

may result in low appetite while infected. However, when the body is under increased stress, as when infected, it requires more calories. If it does not receive adequate energy from food sources, the body will start breaking down muscle for energy, leading to muscle loss and weakness<sup>[13]</sup>. For these reasons, it is recommended to consume 2,000-2,500 calories a day when recovering from Covid-19<sup>[13]</sup>. In order to meet this goal, eating small meals 6 times per day, or approximately every 2 to 3 hours, as well as consuming nutrient-dense foods and high calorie beverages may be helpful<sup>[14]</sup>.

Protein-rich foods are important to consume as proteins are essential to produce antibodies that fight infection. Consuming fish, eggs, beans, soy, and nuts is recommended<sup>[2]</sup>. With infection, there is a risk of muscle loss, which may impact your ability to fight Covid-19 and is therefore important to replenish in order to heal more quickly<sup>[14]</sup>. Consuming 75-100 grams of protein per day helps in this effort<sup>[13]</sup>.

A popular home remedy to the common cold, chicken soup, may also help speed recovery from Covid-19<sup>[15]</sup>. One in vitro study found that particles of chicken soup inhibited movement of white blood cells, and may indicate the soup's anti-inflammatory properties<sup>[16]</sup>. Additionally, hot chicken soup was more effective than hot water alone in stimulating the mucociliary transport system, a mechanism for moving things along the upper and lower respiratory tract to rid the body of particles and infection<sup>[17]</sup>. Additionally, soups are primarily liquid, helping the body stay hydrated when infected. Chicken also provides important protein and B vitamins. Ingredients like garlic, onion, and ginger may also contribute to the healing effects of chicken soup<sup>[18]</sup>. Garlic has been shown to prevent and hasten recovery from the common cold, possibly due to antiviral properties<sup>[18]</sup>. A compound in onions may have antioxidant effects, and fresh ginger is effective against some cold-like respiratory illnesses<sup>[18]</sup>. Adding these ingredients to chicken soup may be all the more beneficial when recovering at home from Covid-19.

## FOODS TO AVOID DURING COVID-19 INFECTION

Arginine is a compound present in nuts, seeds, meat and dairy that should be avoided during Covid-19 infection. As an amino acid, it plays an important part of the viral life cycle and other cellular replication<sup>[19]</sup>. Drugs that cause arginine depletion are commonly used to treat other viral infections, such as Herpes Simplex Virus and Adenovirus (the common cold) as well as various types of cancers<sup>[19]</sup>. Limiting arginine exposure while infected with Covid-19 may help mitigate the body's inflammatory response and decrease the severity of lung infection<sup>[19]</sup>. Foods to avoid include almonds, peanuts, pecans, and cashews, as well as pumpkin and sesame seeds<sup>[20]</sup>. While meats, including turkey, chicken and beef, as well as dairy products and whole grains contain arginine, they are also important sources of protein, calcium, folate and B vitamins and may still be consumed, although in moderation. Obtaining protein from plant-based sources, including tofu, tempeh, edamame, lentils, chickpeas, beans and rice are good alternatives while infected with Covid-19<sup>[21]</sup>.

Additionally, processed foods, which are high in trans-fats, sugars and salt, are important to avoid in order to prevent Covid-19 infection as well as to hasten recovery if infected<sup>[22]</sup>. These foods are highly inflammatory and damage the body's ability to fight infection effectively. If your access to fresh foods is limited due to quarantine, frozen fruits and vegetables, as well as whole grains and pastas with longer shelf life may be reasonable alternatives<sup>[22]</sup>. The WHO provides a helpful list of recipes online to eat nutritiously during self-quarantine.

## CONCLUSION

While vaccine campaigns race to slow infection rates and establish herd immunity, the future risk of Covid-19 is still unknown. It is estimated that approximately 10% of those who have been infected with Coronavirus continue to experience symptoms weeks to months later, though the reason for this is currently not known<sup>[23]</sup>. Consistent anti-inflammatory nutrition and avoiding elements like arginine which support key viral functions may aid these “long-haulers” in reducing their symptomatology. The recommendations provided here may be beneficial not only for preventing Covid-19 infection and recovering more quickly, but also for promoting overall health and wellbeing.

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