

Nutrition in Immunity



Issued in Public Interest by:



Mumbai Chapter

Created by Ms Sukhada Bhatte, Dr Anagha Palekar
& Ms Megha Terse

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Nutrition in Immunity

Disclaimer- Viral Respiratory Tract Infections spread through droplets from infected persons. It is important to note that there is no single super food or foods in general which can help cure/prevent/treat the infection. An overall healthy diet will ensure better immunity and lesser chances of getting affected by this epidemic. One must follow all hygiene and food safety precautions published by WHO

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A healthy balanced diet is the key for maintaining good healthy and immunity.

Diet should have a balance of:

✓ **Macronutrients**

- Carbohydrates
- Proteins
- Fats

✓ **Micronutrients**

- Vitamin A
- Vitamin E
- Vitamin C
- Selenium
- Zinc
- Magnesium etc..

✓ **Water**



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Healthy Carbohydrates

Carbohydrates form a bulk of the Indian Diet.

On an average one should consume at least 1-3 servings (roti, bhakri, thepla, rice, upma, poha etc)- of Carbohydrate in each meal

- a total of 4-5 servings in a day.



Complex carbohydrates come from whole wheat flour, corn, red/brown rice, jowar, bajra, nachani, fruits and vegetables are a power house of micronutrients and fibre that help improve gut health and immunity.

Cut down intake of refined carbohydrates.

Limit intake of sugars, sweetened beverages, carbonated drinks, maida and bakery items etc

Ref 1. Riaz Rajoka M, Shi J, Mehwish H, Zhu J, Li Q, Shao D et al. Interaction between diet composition and gut microbiota and its impact on gastrointestinal tract health. Food Science and Human Wellness. 2017;6(3):121-130.

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High Protein Sources (Veg)

It is important to consume at least 1 serving of protein rich food in each meal/ at least 2-3 servings of protein rich foods per day.



Thick Dal/ Pulses like Chana, Moong, Matki, Rajmah, Chole

Protein per 100 g = 21 g

**Protein per serving (30 g) = 6.3 g
approx. 1 katori**

Dal/Pulse preparation

Soya Bean/ Soya Chunks

Protein per 100 g = 21 g

**Protein per serving = 6.3 g
(30 g)**

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High Protein Sources

It is important to consume at least 3-4 servings (1 serving = 100 ml or g) of milk and milk products (curd, buttermilk, cheese etc) each day.



**1 cup (150 ml)
Cows Milk**

**Protein per
1 cup = 4.89 g**



**1 cup (150 ml)
Buffalo Milk**

**Protein per
1 cup = 5.52 g**



1 cup Paneer (100 g)

**Protein per
1 cup = 18.86 g**

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High Protein Sources (Non-veg)

Protein from Non-vegetarian sources have high biological value.

It is important to consume at least 1 serving of protein rich food in each meal.



Chicken breast (palm size piece)/ Two palm size drumsticks without bone

Protein per 100 g = 20 g serving of chicken (without skin and bones)



Egg

Protein per 100 g = 13.4 g

Protein per serving (approx. 50 g or 1 egg) = 6.5 g



Fish

Protein per 100 g = 20 g

Protein per serving (approx. 200 g) = 40 g Big Piece

Protein per serving (approx. 140 g) = 28 g Medium Piece

Protein per serving (approx. 70 g) = 14 g Small Piece

Meats high in fat such as organ meats, mutton etc should be consumed less frequently.

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Healthy Fats

Our bodies only need a certain amount of fat each day, any extra that is consumed is stored in fat tissue and contributes to weight gain. One must maintain

ideal SFA:MUFA:PUFA ratio of 1:1.3:1 (NCEP, AHA)

Moderate consumption MUFA rich fats may help reduce total cholesterol and LDL cholesterol and may be beneficial in management of blood pressure and heart disease.

Include MUFA rich oils like Groundnut oil, Rice Bran Oil, Canola oil which are considered to be healthy for cooking.

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Healthy Fats

Rotation of Oils (alternating between different oils) or using blend of oil available in the market may help achieve an ideal SFA:MUFA:PUFA Ratio. Consult a Registered Dietitian to obtain an ideal ratio in your diet.

It is important to reduce intake of saturated fats (desi ghee, butter, cheese, organ meats) and avoid trans fat (margarine and vanaspati ghee) which is usually found in large quantities in bakery items, fried foods esp the ones that are fried in used oils.

**Recommended Amount of Oil/Fat Intake-
500 ml per person per month**

This amounts to 3 tsp (15 ml) of oil per day per person and 1 tsp (5ml) of ghee per day per person or

4 tsp of oil per day per person.

This includes oil in the visible form i.e. oil added to cook the food. It does not include hidden fats in groundnut, coconut and oil seeds used in cooking.



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Healthy Fats- Omega-3- Fatty Acid (ALA)

Omega-3 fatty acids are essential fats since the body can't make them from scratch but must get them from food. Foods high in Omega-3 include fish, vegetable oils, nuts (especially walnuts), flax seeds, flaxseed oil, and leafy vegetables.

Alpha-linolenic acid (ALA) is found in vegetable oils and nuts (especially walnuts), flax seeds and flaxseed oil, leafy vegetables, and some animal fat.

The human body generally uses ALA for energy, and conversion into EPA and DHA is very limited.



Flaxseed Oil

**1 tbsp (13.6 g) gives
7.23 g of ALA**



Chia Seeds

**1 oz (28 g) gives 5 g of
ALA**



Walnuts

**½ cup (63 g) gives 1.67
g of ALA**



Soy Oil

**1 tbsp (13.6 g) gives
0.94 g of ALA**

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Ref: USDA-<https://ods.od.nih.gov/pubs/usdandb/ALA-Content.pdf>

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Healthy Fats- Omega-3- Fatty Acid (EPA & DHA)

Eicosapentaenoic acid (EPA) and docosahexaenoic acid (DHA) come mainly from fish, so they are sometimes called marine omega-3s.



Mackerel/

Bangda

100 g gives 1.4 g of
DHA and 0.9 g of
EPA



Salmon

100 g gives 1.1 g of
DHA and 0.9 g of
EPA



Tuna

100 g gives 0.89 g of
DHA and 0.28 g of
EPA



Sardine

100 g 0.92 g of
DHA and 0.48 g
of EPA

Ref: USDA/NIH

<https://ods.od.nih.gov/pubs/usdandb/DHA-Content.pdf>

<https://ods.od.nih.gov/pubs/usdandb/EPA-Content.pdf>

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Vitamin A

Vitamin A is involved in the development of the immune system and plays regulatory roles in cellular immune responses and humoral immune processes.

RDA for Vitamin A

Adults 600 mcg of Retinol or
4800 mcg of Beta Carotene



Carrot

100 g gives 5012 mcg of
Beta Carotene



Pumpkin

100 g gives 2558 mcg of
Beta Carotene



Dark Green Leafy Veg

100 g gives 2800 mcg
Beta Carotene



Chicken Liver

25 g gives 872 mcg of
Beta Carotene



Egg

1 egg gives 228 mcg of
Beta Carotene



Mackerel/ Bangda

100 g gives 16 mcg of
Beta Carotene



Chicken Breast

100 g gives 8.52 mcg of Beta
Carotene

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Ref:

1. Huang Z, Liu Y, Qi G, Brand D, Zheng SG. Role of Vitamin A in the Immune System. J Clin Med. 2018;7(9):258. Published 2018 Sep 6. doi:10.3390/jcm7090258
2. IFCT
3. NIN

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Vitamin C

Vitamin C contributes to immune defense by supporting various cellular functions of both the innate and adaptive immune system.. Vitamin C deficiency results in impaired immunity and higher susceptibility to infections.

RDA for Vitamin C

Adults 40 mg/ day



Amla

100 g gives 252 mg Vit C



Guava

100 g gives 214 mg Vit C



Capsium

100 g gives 122 mg Vit C



Orange

100 g gives 42.72 mg Vit C



Raw Mango

100 g gives 90 mg Vit C



Red Amaranth Leaves

100 g gives 86 mg Vit C



Lemon Juice

100 ml gives 48 mg Vit C

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Ref:

1. Carr AC, Maggini S Vitamin C and Immune Function. Nutrients. 2017 Nov 3;9(11). pii: E1211. doi: 10.3390/nu9111211.
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Vitamin E

Vitamin E is a potent antioxidant and has an ability to modulate host immune functions esp. in elderly populations.

RDA for Vitamin E

7.5-10 mg alpha-tocopherol/day

Ref: FSSAI



Sunflower Seeds

5 g gives 1.07 mg Vit E



Pistachios Nuts

15 g gives 4.7 mg Vit E



Safflower Seeds

5 g gives 1.6 mg Vit E



Garden cress seeds/ Halim

5 g gives 15 mg of Vit E



Almonds

15 g gives 3.73 mg of Vit E



Flaxseeds

5 g gives 0.39 mg Vit E

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Ref:

1. Moriguchi S1, Muraga M. Vitamin E and immunity. Vitam Horm. 2000;59:305-36.
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Zinc (Zn)

Zinc is crucial for normal development and function of immune cells. Deficiency of zinc is associated with immune dysfunctions.

RDA for Zinc

Adult Male- 12 mg/ day

Adult Female 10 mg/ day



Cereals

30 g gives 0.5 mg of Zn



Dals and Pulses

30 g gives 1 mg of Zn



Soyabean

30 g gives 1.2 mg of Zn



Black Til

5 g gives 0.5 mg of Zn



Garden cress seeds/ Halim

5 g gives 0.24 mg of Zn



Nuts and Oilseeds

15 g gives 0.6 mg of Zn



Chicken

**100 g gives 1.36 mg
of Zn**



Egg

1 egg gives 1.8 mg of Zn

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Ref:

1. Prasad AS. Zinc in human health: effect of zinc on immune cells. Mol Med. 2008;14(5-6):353-357. doi:10.2119/2008-00033.Prasad
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Magnesium (Mg)

Magnesium acts as a cofactor for the immunoglobulin synthesis which are the immune cells of the body and plays a role in innate as well as acquired immunity.

RDA for Magnesium

Adult Male- 350 mg/ day

Adult Female 310 mg/ day



Ragi/Nachani

30 g gives 44 mg of Mg



Jowar

30 g gives 40 mg of Mg



Pulses and Legumes

30 g gives 48 mg of Mg



Green Leafy Veg

100 g gives 97 mg of Mg



Almonds/ Cashew

15 g gives 46 mg of Mg



Garden cress seeds/ Halim

5 g gives 15 mg of Mg



Sunflower Seeds

5 g gives 20 mg of Mg



Black Til

5 g gives 20 mg of Mg

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Ref:

1. Tam, M., Gómez, S., González-Gross, M. *et al.* Possible roles of magnesium on the immune system. *Eur J Clin Nutr* **57**, 1193–1197 (2003). <https://doi.org/10.1038/sj.ejcn.1601689>
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Selenium (Se)

Selenium plays a role in regulating oxidative stress in the body. Deficiency of selenium may alter host responses to viral infections.

RDA for Selenium

40 mcg/day

Ref: FSSAI



Egg

50 g gives 30 mcg Se



Toor Dal

30 g gives 16.8 mcg of Se



Chana Dal

30 g gives 15 mcg Se



Mackerel/ Bangda

100 g gives 64 mcg of Se



Whole Wheat Flour

30 g gives 15.39 mcg of Se



Chana

30 g gives 12.37 mcg of Se



Moong Dal

30 g gives 15 mcg of Se



Chicken

100 g gives 20 mcg of Se

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Ref:

1. Hoffmann PR, Berry MJ. The influence of selenium on immune responses. Mol Nutr Food Res. 2008;52(11):1273–1280. doi:10.1002/mnfr.200700330
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Antivirals from your kitchen

No single food is a super food!
Using these ingredients in your daily cooking or as tea/concoction may help improve immunity over a period of time.



Ginger

Rich in Gingerol



Garlic

Rich in Allicin



Turmeric

Rich in Curcumin



Tulsi

Rich in Eugenol



Neem

Rich in Azadirachtin



Lemon grass

Rich in Triterpenoids

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Ref: P K, Z K. Antiviral Activity of Some Indian Medicinal Herbs [Internet]. Ijopp.org. 2020 [cited 22 March 2020]. Available from: <http://www.ijopp.org/article/156>

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General Guidelines

NO SINGLE FOOD IS A SUPER FOOD.

Do not fall prey to whatsapp forwards that claim that consumption or application of certain foods will help prevent or cure certain respiratory tract infection.

Although garlic, ginger, turmeric are known to have antiviral properties, there is no evidence on their role in preventing/ treating infections from respiratory tract viruses.

You may use these antioxidant rich ingredients in your daily cooking. For eg in the form of marinade or tempering or you can add them to milk/ tea preparations.

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Water/ Fluids

It is important to maintain hydration during any viral infection.

**Drink plain, boiled and cooled or warm water.
Aim to consume 2.5-3 litres of fluids per day.**

Consult a Dietitian if you are suffering from any clinical conditions that may have fluid restrictions.



Avoid drinking sweetened, sugary and carbonated beverages.



Coconut water, nimbu pani, kokum sherbet are good options to hydrate yourself.

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Food Safety Guidelines

Avoid roadside foods, water and beverages.



Prefer home cooked meals.

Eat well cooked foods only. Avoid consumption of raw foods.

Salads can be lightly steamed.



Wash your hands thoroughly with soap before eating and drinking as well as cooking/handling food.



Wash fruits and vegetables thoroughly.



Buy non-veg items like chicken, meat and eggs from clean authorised outlets only.



Ensure that food is cooked well (esp. fish, meat and meat products).

Wash food packets (like milk etc) with soap and water thoroughly.

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