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## **Superfoods: Natural ways to stay energized for optimal health**

**Pratibha<sup>a</sup> & Tansukh Barupal<sup>b\*</sup>**

<sup>a</sup>Department of Botany, M.L.V. Government College, Bhilwara, Rajasthan, India

<sup>b</sup>Department of Botany, The Gurukul College, Budal, Udaipur, Rajasthan, India

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**Abstract-** A unique class of food known as "superfoods" has come into existence as a result of developments in the food and nutrition industries. Superfoods are a unique class of food that has many beneficial effects, such as preventing various illnesses, boosting immunity, and supplying sufficient amounts of macro- and micronutrients. Functional foods are advantageous because they contain bioactive ingredients such as vitamins and phytochemicals (carotenoids, anthocyanins, pro-anthocyanidins, flavonoids, and phenolic acids) that have particular biological effects on the human body. A number of chronic degenerative diseases, including cancer, diabetes, obesity, osteoporosis, and cardiovascular disease, have emerged in recent years. This has led to research into strategies to protect human health by adopting proper eating patterns. Therefore, functional foods are recommended as a viable means of supporting the preventative approach, preventing the need for therapy, and advancing population health-as long as they fall within the parameters of hygiene and balanced nutrition. This review clarifies the nutritional makeup of some important superfoods as well as potential interventions in the prevention of various chronic illnesses. This review may make it easier and more frequent for people to include superfoods in their diets.

**Key words: Superfoods, Health, Disease, Nutrition, Vitamins.**

### **INTRODUCTION**

"Super diet" has gained popularity in recent years, and the word "superfood" is now frequently seen on food packaging and in the media.<sup>1</sup> It's interesting to note that among healthy foods, those with health claims and the designations "superfood," "superfruit," and "supergrain" sell for very high prices.<sup>2</sup> Superfoods are becoming more and more popular thanks to social media and popular influencer culture. On the other hand, scholarly study has focused specifically on the superfood trend in the consumer market, despite consumers' growing excitement for them. More precisely, it is still unclear what motivates people to take superfoods.<sup>3</sup>

Superfoods have been shown in numerous studies to be an excellent way to enhance general health by strengthening the immune system, producing more serotonin and other hormones, and facilitating the proper functioning of the body's organic processes. Some authors characterise these foods as foods that go beyond diets but come before medications, making comparisons between them and other particular goods that serve comparable purposes.<sup>4</sup> For example, functional foods<sup>5</sup> are similar to conventional foods in that they have a similar appearance, are regularly consumed as part of a diet, and offer health benefits that go beyond meeting basic nutritional needs. They also lower the risk of disease. Additionally, they are linked to nutraceuticals, which are defined as foods or portions of foods that have health benefits, such as the

\*Corresponding author :

Phone : 9983235235

E-mail : [tansukhbarupal@gmail.com](mailto:tansukhbarupal@gmail.com)

ability to prevent or treat certain diseases.<sup>6</sup> However, some authors argue that superfoods and functional foods are not the same thing because superfoods emphasise their nutrient density, while functional foods emphasise their traditional and exotic qualities. This is because functional foods are often enhanced by bioactive compounds that have immune-boosting and functional properties. As such, they require a different kind of analysis.<sup>7,8</sup> Functional foods may have advantageous qualities because they include bioactive substances, which have certain biological characteristics. Superfood promotes mental and physical well-being, which lowers the risk of degenerative diseases when consumed in accordance with appropriate dietary patterns. This article presents more research on superfoods, which were grouped according to their primary ingredients and their health advantages. In order to study or test superfoods, more reviews, investigations, clinical trials, and human case studies are required.

#### **GENERAL HEALTH BENEFITS RELATED TO SUPERFOODS**

Superfood advantages are typically linked to phytochemicals, or substances found in plants, or nutraceuticals. The majority of these important components are present in fruits, and their "super" quality is typically ascribed to their incredibly high concentrations of health-improving antioxidants, fibres, vitamins, and minerals.<sup>9</sup> From a broader standpoint, common characteristics of superfoods could be summed up as immune system support and exceptional nutrition, with exceptional concentrations of antioxidants, monounsaturated fats, dietary fibre, phytosterols, vital trace minerals, and vitamins, according to scientific research.<sup>10</sup> Among these, phenolic compounds-secondary metabolites that are commonly present in fruits, vegetables, and grains-are especially beneficial because they have a variety of bioactive qualities, including antiviral, anti-allergic, anti-inflammatory, and antimutagenic effects. Superfoods, or more precisely, superfruits, are often defined as exotic fruits that are not widely consumed. According to van den Driessche *et al.* (2018)<sup>11</sup>, many superfoods boast of having a wide range of health benefits, including high antioxidant activity, exceptionally rich sources of bioactive components like phenolics, flavonoids, anthocyanins, etc., or significant effects on diseases like diabetes mellitus, cardiovascular diseases, etc.<sup>12</sup> These benefits are typically attributed to changing certain markers like blood pressure, waist circumference, body mass index, and fasting

concentrations of plasma triacylglycerol, glucose, etc..<sup>7</sup> Superfoods may be considered natural because of this quality, but more research is undoubtedly required to fully comprehend their health advantages. As a result, human intervention studies are the true markers of consumption, they are essential for gaining a deeper understanding of the advantages associated with superfood eating.

#### **SOME SUPERFOODS**

##### **1. Goji (*Lycium barbarum*)**

As belonging to the Solanaceae family, *L. barbarum* is primarily found in China, Tibet, and other Asian regions. These fruits are called wolfberries or goji berries; they are vivid orange-red, ellipsoid berries that are 1-2 cm long. The orange-red colour of goji berries is attributed to their high carotenoids content (0.03%-0.5% dry weight), with zeaxanthin accounting for 31%-56% of the total carotenoids.<sup>13</sup> However, individual flavonoids of quercetin-3-O-rutinoside, kaempferol-3-O-rutinoside, chlorogenic acid, caffeic acids, and small amounts of caffeoylquinic acid and p-coumaric acid were found in goji berries<sup>14</sup>; additionally, ferulic acid, hyperoside, gallic acid, catechin, epicatechin, as well as phellandrene, sabinene,  $\gamma$ -terpinene, organic acids (citric acid, malic acid, oxalic acid, quinic acid, and tartaric acid), and vitamin C expressed as the sum of ascorbic acid and dehydroascorbic acid were found in goji berries.<sup>15</sup> The most important functional components of goji berries are a unique polysaccharide complex made up of six different types of monosaccharides (arabinose, rhamnose, xylose, mannose, galactose, and glucose), galacturonic acid, and eighteen amino acids.<sup>16,17</sup>

##### **2. Chia (*Salvia hispanica* L.) seeds**

Chia, also called *Salvia hispanica* L., is a native of Central and South America, specifically southern Mexico and northern Guatemala. According to Porras-Loaiza *et al.* (2014)<sup>18</sup>, chia seeds have a high oil content and are low in saturated fats and high in polyunsaturated fatty acids (omega-3 fatty acids, linolenic acid, 54%-67%) and omega-6 fatty acids, linoleic acid, 12%-21%).<sup>19</sup> Furthermore, the scientific community and consumers' interest in using them as functional foods is fueled by their soluble and insoluble fibre (18%-30%), protein contents (15%-25%), and other bioactive components like tocopherols and phenolic compounds.<sup>20</sup>

##### **3. Pomegranate (*Punica granatum*)**

The pomegranate, or *P. granatum*, is a fruit-bearing deciduous shrub or small tree with a long history of use in medicine, particularly for ulcers, diarrhoea, and aphithae.

Pomegranates contain a variety of bioactive polyphenols and have a high level of antioxidant activity. These properties are primarily ascribed to anthocyanins (delphinidin 3,5-diglucoside, cyanidin 3,5-diglucoside, delphinidin 3-glucoside, and cyanidin 3-glucoside), hydrolyzable tannins (galloyl glucose and gallagyl-type tannins), and ellagitannins (punicalagin and punicalin, ellagic acid, and ellagic acid glucoside).<sup>21</sup> Studies on pomegranates have primarily concentrated on their juice consumption, exploring various mechanisms related to their many antioxidant kinds and bioactive polyphenols. These studies have produced some noteworthy results concerning the health benefits of pomegranates. The results of the study also suggested that pomegranate juice could be a beneficial cardioprotective supplement for hypertensive subjects.<sup>22</sup>

#### 4. Ginger Root (*Zingiber officinale*)

Originating in South Asia, ginger is currently grown in nearly every tropical nation. It is derived from a herbaceous plant in the Zingiberaceae family, and it has thick branches and a fleshy rhizome. It is primarily composed of water (80%), with acceptable levels of potassium, zinc, and polyphenols. According to Srivastava (1989)<sup>23</sup>, Srinivasan (2007)<sup>24</sup>, Stowe (2011)<sup>25</sup>, and other sources, ginger has the following nutritional value per 100 g: 0.4 g fat, 18 g carbohydrate, 2 g fibre, 2 g protein, 43 mg magnesium, 2 mg copper, 415 mg potassium, 34 mg phosphorus, 16 mg calcium, sodium 13 mg, vitamin C 5 mg, and folate 11 µg.

#### 5. Blueberries (*Vaccinium myrtillus*)

*Vaccinium myrtillus*, often known as blueberries, are produced from a 60-90 cm tall bush with thick, translucent leaf and branching foliage. The high concentration of phytochemicals called anthocyanins, which have potent antioxidant properties, is what gives the colour its deep blue-purple hue. Blueberries are currently categorised as superfoods following a plethora of surveys and studies.<sup>26</sup> A growing number of surveys emphasise their significant role in promoting health, mostly due to the presence of polyphenols, particularly anthocyanins. Studies have demonstrated that consuming 120 milliliters of blueberry juice results in blood levels of anthocyanins that are higher than those of red and white grapes (2.42 mmol, 2.04 mmol, and 0.47 mmol, respectively). This suggests that blueberries have better anthocyanin bioavailability. Additionally, studies have suggested that the presence of flavones, phenolic compounds, and tannins in blueberries

may have a protective effect against colon cancer and other cancers.<sup>27</sup>

#### 6. Jackfruit (*Artocarpus heterophyllus* Lam.)

Jackfruit, scientifically known as (*Artocarpus heterophyllus* Lam.), is associated with the Moraceae family. The chief advantage of the consumption of jackfruit is due to the presence of a rich concentration of vitamin C. The protection against free radicals, due to the action of antioxidants in the body, keeping healthy gums and enhancement of the immune system are some of the benefits of vitamin C.<sup>28</sup> The presence of a rich amount of phytonutrients in jackfruit mainly involving saponins, lignans, and isoflavones exhibits a wide range of health benefits. This fruit supports exhibiting antiulcer, antiaging, antihypertensive, and anticancer functions, and aids in the prevention of the development of cancer cells in the body, battling against stomach ulcers, ameliorating blood pressure, and inhibits degradation of cells, which in turn helps in making skin look effectively young.<sup>29</sup> Jackfruit has the potential to display diverse positive health impacts, involving anti-inflammatory, antioxidant, anti-carcinogenic, antibacterial, prevention of biosynthesis of melanin, hypoglycemic, anti-neoplastic, positive impact on sexual performance, and healing of the wound.<sup>30</sup>

#### 7. Walnut

Compared to most other foods, walnuts have higher levels of antioxidants and omega-3 fats. Consuming walnuts may protect the brain from cancer and heart disease. Walnuts are low in carbohydrates and comprise 65% fat and 15% protein. Additionally, a significant amount of the beneficial omega-3 fatty acid alpha-linolenic acid (ALA) was found in them.<sup>31</sup>

#### 8. Kiwi fruit

The high content of vitamin C and potent antioxidants such as lutein, carotenoids, flavonoids, phenolics, and chlorophyll make kiwi fruit an extremely nutritious fruit. The fruit of the kiwi plant is high in fructose, galactose, and minerals. It also includes phytochemicals called flavonoids and isoflavones, which are significant in kiwi extract.<sup>32</sup> One key effect of phytoestrogen is its neuroprotective, cardioprotective, and anticarcinogenic properties.

#### 9. Almonds

The most well-liked tree nut in the world and a great source of vitamin E is the almond. They are abundant in vitamins, minerals, antioxidants, and good fats, making them extremely nutrient-dense. It reduces the incidence

of Alzheimer's, cancer, and heart disease. A study by Chen *et al.* (2016)<sup>33</sup> indicated that eating 42 grammes of almonds daily reduced LDL cholesterol by 5.3 mg/dL while keeping "good" HDL cholesterol same.

**FUNCTIONS OF BIOACTIVE COMPOUNDS IN HUMAN DIET**

According to Kris-Etherton *et al.* (2002)<sup>34</sup>, bioactive substances are food ingredients that affect the physiological

or cellular functions of the humans or animals. They can be preventive against a range of illnesses and metabolic disorders and are primarily present in fruits and vegetables. They also have anti-inflammatory, anti-carcinogenic, and antioxidant properties. They are therefore excellent candidates for the creation of novel functional foods that may have preservation and protective qualities. Table 1 shows the different bioactive compounds along with their effects on human health.

**Table 1: Utilization of bioactive components in human diet**

Bioactive components	Sources	Extraction methods
Epigallocatechin 3 (flavonoids/catechins)	Apples, berries, red wine,	Maceration, ultrasonic extraction, microwave extraction, stirring
Apigenin	grapefruit, oranges, onions	Organic solvent extraction using methanol, ethanol and propanol.
Quercetin (flavonoids/flavonols)	broccoli, berries	Subcritical water extraction, ultrasonic-assisted extraction
Naringin (flavonoids/flavanones)	Citrus fruits, tomatoes	Supercritical fluid extraction, conventional soxhlet extraction with different volatile solvents
Hesperetin (flavonoids/flavanones)	Citrus fruits, tomatoes,	Microwave-assisted extraction, extraction with organic solvents and mixtures (DMSO methanol)
Isoliquiritigenin (flavonoids/chalcones)	bean sprouts	Soxhlet extraction, supercritical fluid extraction
Gallicacid	Berries, pineapples, bananas, Wines	Soxhlet extraction, ultrasonic-assisted extraction, microwave-assisted extraction
Ellagic acid	Berries, pomegranate, walnuts	Ultrasound-assisted extraction
Resveratrol (stilbenes)	Red wine, grapes	Supercritical fluid extraction, pressurized liquid extraction (water, methanol and the organic solvents)
Lycopene, βcarotene, Xanthophylls and Lutein	Tomato, Spinach, Mangos and carrot	Supercritical fluid extraction (Ethanol solvent)

**CONCLUSIONS**

Superfoods are often plant-based foods that are high in nutrients and provide the most benefits for the fewest calories. Superfoods are meals that are thought to be exceptionally healthful and can occasionally even be used to treat physical ailments like headaches, exhaustion, diarrhoea, constipation, or irritable bowel syndrome. They can also help avoid certain chronic diseases. Superfoods are abundant in antioxidants, fibre, vitamins, and minerals. Superfoods have significant nutritional and bioactive potential, which means they may be essential in preventing chronic illnesses. Therefore, it is important to counsel people to eat enough nutrient-dense foods, which should include a greater variety of fruits and vegetables. It has been recommended that people who want to lower their risk of cancer should consume multiple servings of fruits and vegetables each day. Eating a wide variety of fruits and vegetables protects against cancer, malnutrition, and hidden hunger. In the near future, superfoods are probably going to gain popularity among consumers as more

research highlights their health benefits. More human intervention studies are needed in future research to substantiate the health advantages of superfoods. Superfoods will undoubtedly be better understood if the legal food authorities provide a general definition for them.

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