WORLD JOURNAL OF PHARMACEUTICAL RESEARCH
SJIF Impact Factor 8.084
Volume 11, Issue 5, 554-567. Review Article ISSN 2277– 7105

MORINGA OLEIFERA AND VITIS VINIFERA: A MEDICAL BOON FOR IMMUNITY BOOSTER

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Article Received on
13 March 2022,

Revised on 02 April 2022,
Accepted on 23 April 2022

DOI: 10.20959/wjpr20225-23840

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ABSTRACT

Herbs were also widely employed in ancient Indian traditional medicine, where nutrition was the primary therapy for disease. According to the World Health Organization (WHO), herbal medicine is used by 80% of the population in various Asian and African countries for some part of basic health care. FDA found active pharmaceutical ingredients in over 700 dietary supplements sold as "herbal," "natural," or "traditional" in a 2018 study. The desire to take control of one's health was the most common reason for making changes (as opposed to suffering from a health condition). The goal of this review is to give current and categorised information on the extraction, nutritional value, photochemistry, and biological activities of Moringa Leaves and Grape Seeds in order to evaluate future research oppurtunities and investigate their therapeutic potential.

KEYWORDS: Immune System, Herbs, Medicinal Plant, Immunity Booster, Nutritional Supplement, Grape Seed, Moringa Leaves.

INTRODUCTION

The immune system is our most pivotally, and its main function is to keep us healthy and robust. If we eat foods which are completely pure and full of vitamins, enzymes and minerals, our immune system will be able to continue its battle against viruses, harmful bacteria, parasites and toxins. The idea of boosting your immunity is enticing, but the ability to do so has proved elusive for several reasons. The immune system is precisely that a system, not a single entity. To function well, it requires balance and harmony. There is still much that researchers don't know about the intricacies and interconnectedness of the immune response. Nature has provided mankind with a plethora of medicinal herbs that provide effective and

timely treatment for a variety of ailments. People can use medicinal herbs to strengthen their immunity during health crises like the new coronavirus. People must be aware of new concepts such as quarantine and self-isolation when attempting to employ therapeutic herbs that enhance immunity.[1] Despite evidence that elderly malnutrition is linked to impaired immune function and negative outcomes, few studies have shown that nutritional therapy can improve clinical outcomes in this population. These investigations are difficult to conduct, are rarely conducted in hospitalised or nursing home patients, and require a high number of people to detect important clinical etiologies.[2]

HERBAL IMMUNITY BOOSTER

The immune system is in charge of battling outside invaders in the body, such as pathogenic bacteria and viruses, as well as destroying malignant cells within the body. Poor nutrition leads to an increase in infection, slowed recovery from injury and illness, and increased vulnerability to immune system dysfunction symptoms and complications. Immune function declines with age, according to studies, and new research reveals that this decline is linked to nutrition, and that it can be slowed or even stopped by eating a nutritious diet. A few herbs that can be utilised to improve immunity are listed below.[3]

EFFECT OF MEDICINAL PLANT ON INNATE AND ACQUIRED IMMUNITY COMPONENTS

Various herbal remedies have been discovered to regulate innate and acquired immune system components. Indeed, plants produced from secondary metabolites in natural goods can be the lead molecules for the future creation of immunomodulators for therapeutic application, based on a thorough understanding of varied immunomodulatory activities of herbal plants. On the basis of investigations performed on numerous animal models, various immunomodulators have been recommended in various allergic illnesses such as asthma, allergic rhinitis, and eosinophilic eosinophilia.[4]

MORINGA LEAVES

Moringa, along with Anoma and Hyperanthera, is a member of the Moringaceae family of plants. The “drumstick” or “horseradish” family is well-known. Moringa is a genus of 13 plants found in southwest Asia, southwest Africa, northeast Africa, and Madagascar.

Among the 13 species, current study focuses on Moringa oleifera, Moringa stenopetala, and Moringa concinna. They are endemic to Madagascar and Northeast Africa, and they are being

studied less because there is less investigation for naturally occurring bioactive compounds. substances that can be found in these places M. In India, on the other hand, oleifera is a prominent study subject. As a result, the plant can be found in Asia, Latin America, Florida, the Caribbean, and the Pacific Islands.[5].

Extraction of Moringa oleifera

Moringa oleifera leaves was obtained by using maceration method

⇩

Maceration method was performed with a ratio of 1:5 with Water, Acetone and Ethanol

⇩

25 grams of Moringa powder with 125 ml of ethanol was kept for 72 hours at room temperature

⇩

After that, it was filtered with filter paper

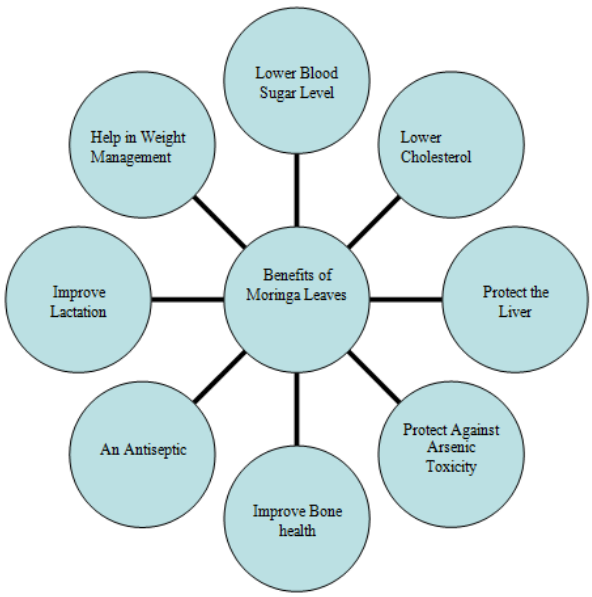
⇩

Extract was evaporated by using rotary evaporator

⇩

80% of extract was obtained.[6]

Moringa Leaves Extract was obtained by using maceration method



Nutritive Value

Moringa is known as the "Miracle Tree" since every component of the plant is beneficial (Ashfaq et al., 2012; Yisehak et al., 2011). It's chock-full of vitamins and minerals. Minerals such as calcium, potassium, zinc, magnesium, iron, and copper are abundant in the leaves of M. oleifera (Kasolo et al., 2010). Vitamins such as vitamin A beta-carotene, vitamin B such as folic acid, and pyridoxine. Anti-cancer substances such as glucosinolates, isothiocyanates, glycoside compounds, and glycerol-1-9-octadecanoate are also found, as are phytochemicals such as tannins, sterols, terpenoids, flavonoids, saponins, anthraquinones, alkaloids, and reducing sugar. Moringa oleifera contains both essential and non-essential amino acids. (Fahey, 2005); Moringa dry leaves are believed to have 7 times the vitamin C content of oranges, 10 times the vitamin A content of carrots, 17 times the calcium content of milk, 9 times the protein content of yoghurt, 15 times the potassium content of bananas, and 25 times the iron content of spinach. The bulk of the important elements required for optimal health in the year 2020 have been discovered in Moringa oleifera leaf powder.[7]

Phytochemistry

Moringa trees include alkaloids, saponins, tannins, steroids, phenolic acids, glucosinolates, flavonoids, and terpenes, to name a few phytoconstituents. The genus's extensive variety of therapeutic benefits is due to its abundance of phytochemicals. Around 110 compounds were found in the genus. Some of these compounds showed promise when tested for a variety of biological purposes. GC-MS demonstrated that the genus contains many more compounds than these 110. Despite the genus' high phytochemical content, only a few species, specifically M. M. concanensis, M. concanensis, M. concanensis M. peregrina and peregrina peregrina peregrina peregrina M. stenopetala, M. stenopetala, M. stenopetala, M. stenopetala, M oleifera, with the majority of research focusing on the leaves of the plants.[8]

Phytochemical Screening

S. No	Phytoconstituents	Chemical Tests	M. oleifera
1	Alkaloids	Wagner's test	Present
		Dragendorff's test	
		Mayer's test	
		Hager's test	
2	Carbohydrate	Benedict's test	Present
		Fehling's test	
		Molish's test	
3	Flavonoids	Shinoda test	Present
		Alkaline reagent test	

		Lead acetate test	Present
4	Saponins	Froth test	
		Foam test	
5	Glycosides	Modified Borntrager's test	Present
6	Phenols	Ferric chloride test	Present
7	Phytosterols	Salkowski test	Present
8	Tannins	Gelatin test	Present
9	Proteins and amino acids	Xanthoproteic test	Present
		Ninhydrin test	

Antioxidant Activities

Moringa species have a high phenolic content, which contributes to their high antioxidant activity. Phenolic chemicals work as antioxidants by stabilising radicals produced in cells by donating or receiving electrons. DPPH (1,1-di-phenyl-2-picrylhydrazyl) inhibition was stronger in a water extract of M. stenopetala leaves (IC50: 40g/mL) than in a comparable extract of M. oleifera leaves (IC50: 215g/mL). Rutin (1) also possessed high antioxidant activity (IC50: 5µg/mL) in a DPPH assay. M. stenopetala has a higher amount of rutin (1) compared to M. oleifera, enhancing its antioxidant properties. A methanol fraction of M. was inhibited by DPPH. Leaves of the peregrina (IC50: 2014). M. made the decision based on the HPLC results. The hexane fraction of peregrina leaves did not contain 17.07g/mL) of ascorbic acid (IC50: 13.68g/mL) (Al Owaisi et al., phenolic compounds, but it did have radical scavenging activity. Abd El Baky and El-Baroty (2013) reported that M. peregrina seed oil also had significant antioxidant activity compared to the common antioxidants BHA, α-tocopherol, and BHT. M. ovalifolia, specifically its bark, contained quercetin (3), kaempferol (8), and myricetin (14) that showed antioxidant activity by increasing ferric reducing activity and inhibiting DPPH activity. A study reported that pre-treatment of M. peregrina leaves could prevent the plasma hydrogen peroxide concentration from rising at doses of 200 and 400 mg/kg. It also reduced the elevated hydrogen peroxide concentration in plasma and increased the ferric reducing antioxidant at doses of 400 mg/kg. Santhi and Sengottuvel (2016) reported that a methanol extract of M. concanensis leaves inhibited DPPH activity, hydroxyl radicals, reducing power, and superoxide anion radicals. The hydroxyl radical inhibition of the extract (IC50: 45.3µg/mL) was stronger than that of ascorbic acid (IC50: 58.2µg/mL).[9]

Effects on the reproductive system

The weight of the testis, seminal vesicle, epididymis, and a higher score for epididymal maturity and lumen development were all significantly increased by leaf extract, as was the

diameter of the seminiferous tubules (all doses). Ethanolic extract of leaf protected prepubertal spermatogonial cells in Swiss male albino mice in cyclophosphamide-induced damage model. Upregulation of c-Kit and Oct4 transcripts independent of the p53-mediated pathway could be the underlying mechanism. The abortive effect of leaf extract on rats after treatment for 10 days after insemination has been reported. Extract showed a synergistic effect with estradiol and an inhibitory effect with progesterone. Vitamin A has a key function in a variety of anatomical processes, including reproduction, embryonic growth and development, immune development, and cell differentiation, and is found in abundance in the fresh leaves of MO.

Hepatoprotective activity

Extract of leaves has shown hepatoprotective effects against carbon tetrachloride and acetaminophen-induced liver toxicity in Sprague Dawley rats and also hepatoprotective effect against antitubercular drugs and alloxan-induced liver damage in diabetic rats. This plant-based diet for 21 days showed significant potential in attenuating hepatic injury. Alkaloids, quercetin, kaempferol, flavonoids, ascorbic acid, and benzylglucosinolate were discovered to be responsible for hepatoprotective action.

Gastroprotective and anti-ulcer activities

Extract of leaves remarkably reduced ulcer index in ibuprofen-induced gastric ulcer model and in pyloric ligation test and a significant reduction in cysteamine-induced duodenal ulcers and stress ulcers was also observed. Bisphenols and flavonoids could be contributing to this property.

Cardiovascular activity

In male Wistar rats, an extract of MO leaf decreased cholesterol levels and protected them from hyperlipidemia caused by iron shortage. In spontaneously hypertensive rats, leaf extract has been shown to have antihypertensive effects., as well as reduced chronotropic and inotropic effects in isolated frog hearts. The active ingredients of niazinin A, niazinin B, and niazimicin are hypotensive. In male Wistar albino rats, extract of leaves showed cardioprotective effects against isoproterenol-induced myocardial infarction; the mechanism underlying this cardioprotective activity was found to be antioxidant activity, prevention of lipid peroxidation, and protection of histopathological and ultrastructural abnormalities. Moringa oleifera Lam was the subject of research. It revealed a reduction in inflammation and fat buildup in many tissue systems.

Anti-obesity activity

Significant reduction in body mass index was observed after oral treatment with leaf powder compared with that in obese control. Treatment of hypercholesterolemia rats with methanolic extract of MO leaf for Total cholesterol, triglycerides, and body weight all decreased dramatically after 49 days. moreover, liver biomarkers, organ weight, and blood glucose levels were also decreased. Downregulation of leptin and resistin mRNA expression and overexpression of leptin and resistin mRNA expression are among the mechanisms. of adiponectin gene expression in obese rats.

Antiasthmatic activity

The postulated mechanism for this effect was a direct bronchodilator impact mixed with anti-inflammatory and antibacterial activities, as well as suppression of the immediate hypersensitive reaction, as tested in numerous models. In guinea pigs with ovalbumin-induced airway inflammation, an ethanol extract of seeds exhibited a significant rise in respiratory parameters and a decrease in interleukins in bronchoalveolar lavage.

Hematological activity

A randomized, double-blind, placebo-controlled study was carried out on women who were anemic with hemoglobin levels between 8 and 12g/dL and were treated with aqueous extract of moringa leaf, the results showed an increase in mean hemoglobin and mean corpuscular hemoglobin concentration._Another study revealed that when moringa was given to healthy human volunteers for 14 days, a significant improvement in platelet count was observed.

Antidiabetic activity

Another study found that feeding moringa to healthy human participants for 14 days resulted with a substantial increase in platelet count. leaf demonstrated strong antihyperglycemic and hypoglycemic action in normal and alloxan-induced diabetic mice. rats. In insulin-resistant (IR) and type 1 diabetic rat models, an extensive investigation was conducted to examine the effects of aqueous leaf extract on lipid profile, body weight, glucose, plasma insulin, homeostatic model evaluation, and oral glucose tolerance test. Streptozotocin (STZ) (55 mg/kg) was given to type 1 diabetic rats and IR rats were fed a high-fructose diet. In IR rats, hyperinsulinemia, hyperglycemia, and body weight increased, but STZ-induced diabetic rats had hyperinsulinemia and hyperglycemia. All abnormal parameters returned to normal after 60 days of leaf extract administration Furthermore, extract of leaf prevented the production of advanced glycation end products by lowering monosaccharide-induced protein glycation.

Anti-diabetic effect has been attributed to glucomoringin, phenols, flavonoids, quercetin-3-glucoside, fibre, and phenol.[10]

GRAPES SEED

The grape (Vitis vinifera) is a member of the Vitaceae family. Grapes are commonly consumed around the world. The United States, China, Italy, and Europe are the world's leading grape producers. Grapes, their leaves, and their sap have long been utilised in traditional European medicine. With regard to grapes, there are numerous classifications. Wine grapes, table grapes, seedless, edible seed, and raisin grapes are some of the varieties available. Grape seeds can be gathered as a byproduct from any wine-making operation. Grape Seed Extract (GSE) is typically extracted from the seeds of red wine grapes.[11]

Extraction of Grape Seeds

Grape Seeds Extract was obtained by using maceration method

⇩

Maceration method was performed with a ratio of 1:5 with Water, Acetone and Ethanol

⇩

25 g of Grape Seed powder with 125 ml of ethanol was kept for 72 hours at room temperature

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After that, it was filtered with filter paper

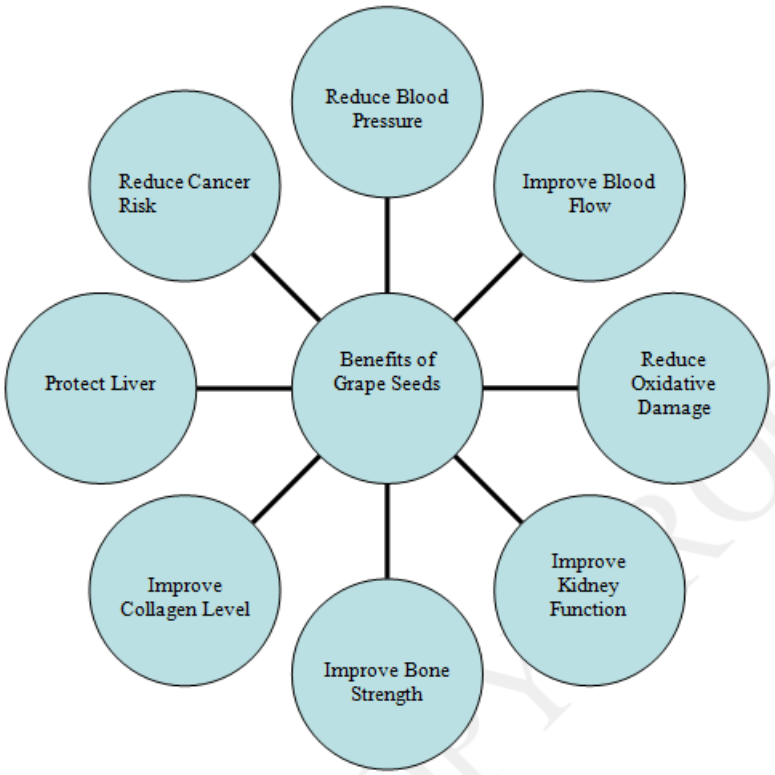
⇩

Extract was evaporated by using rotary evaporator

⇩

80% of extract was obtained.[12]

Grape Seeds Extract was obtained by using maceration method



Nutritive Value

It has been proposed that vitamin C exists. Ascorbic acid, a type of vitamin, is essential for normal growth and a variety of physiological processes. Anti-aging, anti-inflammatory, and photoprotective effects are also present. Vitamin C is required for the manufacture of collagen, neurotransmitters, and carnitine. It also promotes keratinocyte development, inhibits MMP activity, and has a role in protein metabolism and immune system activity. The average adult's ascorbic acid reserve, or pool, is believed to be 1.2 to 2.0 grammes across the body. This ascorbic acid pool will be depleted if all sources of vitamin C are removed from a person's diet. between 4 and 12 weeks As a result, vitamin C-mediated metabolic pathways would be significantly disturbed, and health would suffer as a result. Vitamin C shortage can lead to a variety of health problems, the most serious of which is scurvy. Vitamin C is, in fact, essential for overall skin health. It has high linoleic acid content important for prostaglandin systhesis, which has an influence on platelet aggregation and inflammation processes and low values of cholesterol. Grape-seed oil fed to liver and liver and brain – injured rats had a protective effect on acute liver injury, which was attributed to the oils potent antioxidant, anti-inflammatory, and antiapoptotic activities. Grape-seed oil fed to liver and liver and brain – injured rats had a protective effect on acute liver injury, which was attributed to the oils potent antioxidant, anti-inflammatory, and antiapoptotic activities.

Phytochemistry

V. vinifera (Tintal del pais) grape seeds were (+)-catechin (11%) followed by (−)-epicatechin (10%), (−)-epicatechin-3-O-gallate (9%), epicatechin 3-O-gallate-(4β→8)-catechin (B1-3-O-gallate) (7%), epicatechin-(4β→8)-epicatechin (dimer B2) (6(per cent). These findings were also consistent with prior research on polyphenols in grape seeds from other grape species on Greek islands. Anastasiadi and colleagues. The total phenolic content of grape seeds ranged from 325 to 812 mg/g gallic acid equivalents, according to the study. Grape seeds include 14 dimeric procyanidins, 11 trimeric procyanidins, and one tetrameric procyanidin.[13]

Phytochemical Screening

S. No	Phytoconstituents	Chemical Tests	Vitis vinifera
1	Alkaloids	Wagner's test	Present
		Dragendorff's test	
		Mayer's test	
		Hager's test	
2	Carbohydrate	Benedict's test	Present
		Fehling's test	
		Molish's test	
3	Flavonoids	Shinoda test	Present
		Alkaline reagent test	
		Lead acetate test	
4	Saponins	Froth test	Present
		Foam test	
5	Glycosides	Modified Borntrager's test	Present
6	Phenols	Ferric chloride test	Present
7	Phytosterols	Salkowski test	Present
8	Tannins	Gelatin test	Present
9	Proteins and amino acids	Xanthoproteic test	Present
		Ninhydrin test	Present

Antioxidant Activity

Different methods including the 1,1-diphenyl-2-picryhidrazyl (DPPH) method and oxygen radical absorbance capacity (ORAC) have been employed to evaluate the antioxidant capacity of phenolic compounds from grape seeds. Poudel et al. According to the study, grape seed extract has an antioxidant capacity of 17 to 92 mmol Trolox® antioxidant equivalent (TE)/g when tested with DPPH. The ORAC technique yielded 42 mmol TE/g. Pastrana-Bonilla and Grape seeds had the highest antioxidant capacity (281 M Trolox equivalent antioxidant capacity (TEAC)/g Antioxidants 2017, 6, 71 4 of 11 of FW), followed by leaves (236 M TEAC/g of FW), skins (13 M TEAC/g of FW), and pulps (2.4 M TEAC/g of FW), indicating that grape seeds extracts could be a promising antioxidant for dietary

supplement. Similarly, two studies also confirmed the antioxidant activity of grape seed extract by using β-carotene linoleate, linoleic acid peroxidation, DPPH, and phosphomolybdenum complex methods. Puiggròs et al. reported that grape seed procyanidin extracts modulated the expression of antioxidant systems, suggesting that grape seed procyanidin extracts might improve the cellular redox status via glutathione synthesis pathways.

Hepatoprotective effects

It has been shown that pre-exposure of grape seed extract(3 or 7 days, 100mg/kg, p.o.), followed byhepatotoxic doses of acetaminophen (400 and 500 mg/ kg, i.p.) significantlyattenuatedacetaminophen-induced hepaticDNAdamage, apoptotic and necrotic cell death ofliver cells, and counteracted the influence of acetami- nophen-induced changesin bcl-XLexpression inmice. In one study, grape seed extract(50 mg/kg a dayorally for 28 days) protected the liverfromoxidative damage following bileductligationinrats. Also, inanotherstudy, administrations of grape seed extract at a dose of 50 mg/kg/dayorallyfor15daysbeforeischemia/reperfusion injury and repeated before the reperfusion period, re- duced hepatic ischemia/reperfusion injuryin rats.

Anticarcinogenic effects

Topical application of a polyphenolicfraction isolated from grape seeds or commercialgrape seedsre- sulted inhighlyeffective protection against phorbol esterinduced tumor promotion inchemical carcinogeninitiated mouse skin. This effect maybelargely due to the significant antioxidant activityoftheprocyanidins. In recent studies, mixed polyphenolic fractions on atoyopearlmatrix (TP-2, TP-4, and TP-6) from grapecell culture acted as potent catalytic inhibitorsin ahuman DNA topoisomerase II assay for cancer chemoprevention. Treatments that combined anthocyaninrichfractions(TP-2; 0.5 or 2.0 Ïg of dried material/ml), fractions containingcatechins, procyanidin dimers, andflavanones(TP-4; 0.25 Ïg of dried material/ml), and/orfractions enrichedwith procyanidin oligomers and polymers (TP-6; 0.15 or 0.5 Ïg of dried material/ml)showedadditive effectstoward catalytic inhibition of the enzyme. TP-6, a procyanidin-rich fraction, and itssubfractionswere selectivelycytotoxic tocancerous cell lines tested (maximal toxicity = 67.2%; ED (50) = 50.5 ÏM). The red grape skin polyphenolic extract(25 Ïg/ml) also prevented and inhibited angiogenesis in the Matrigelmodel by decreasing the basal motility of endothelialand cancer cells, and reversing the chemot- actic effectofsphingosine-1-phosphate (S1P) and vas- cular endothelial growth factor(VEGF).

Antimicrobial and antiviral effects

Gallic acid, hydroxycinnamicacids, flavanols 9, trans-resveratrol, and tannins have all been shown to have antimicrobial activity in grapes. Grape seed extract has also been shown to have antilisterial properties (1 percent). Within 10 minutes, theseed and skin of Ribier grapes extracts reduced L.monocytogenes levels from 106107CFU/ml to undetectable colonies.[15]

CONCLUSION

Immune system supplements and meals to enhance the immune system have become more popular around the world. According to researchers 61 percent of consumers in North America, 56 percent in Europe, 50 percent in Africa, 48 percent in Asia Pacific, and 45 percent in South America have made adjustments to their diets and habits in the last year to strengthen their immunity. A number of botanical compounds have been discovered as being used increasingly frequently in new products with immunity claims. One of the major factors driving the growth of the immunity boosting food products market is people's growing awareness of their own health and fitness. Stress, smoking, and other harmful lifestyle-related issues, such as a lack of sufficient and timely nutrition, The body's metabolic rate is increased when enough amounts of health and immune-boosting foods are consumed. As a result, the benefits of Moringa leaves and Grape Seeds having antioxidant qualities good for strengthening immunity are summarised in this review.

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