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Medicinal and Nutritional Potential of Guava Leaves: A Natural Remedy for Health and Wellness

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Authors' contributions

This work was carried out in collaboration among all authors. All authors read and approved the final manuscript.

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Review Article

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ABSTRACT

Psidium guajava (guava), a tropical fruit of the Myrtaceae family, is renowned for its nutritional richness and medicinal properties. Cultivated widely in tropical and subtropical regions, it plays a vital role in traditional medicine across India, Pakistan, South America, and other countries. Various parts of the guava tree, such as its leaves, fruits, bark, and roots, are utilized to treat ailments like diabetes, diarrhea, and stomach disorders. Guava leaves are particularly notable for their high content of bioactive compounds, including flavonoids, tannins, phenolic acids, and essential oils. These compounds provide a range of pharmacological benefits, such as antioxidant, antidiabetic, anticancer, antimicrobial, and antidiarrheal activities. Phenolic compounds like quercetin and gallic acid, along with essential oils, contribute to reducing oxidative stress, improving insulin sensitivity,

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and combating microbial infections. Rich in nutrients like vitamins C and B, calcium, potassium, and magnesium, guava leaves also offer significant health benefits, including enhanced immunity, improved bone strength, and better metabolic regulation. This review highlights the therapeutic potential of guava leaves as a natural and sustainable resource, emphasizing their role in modern nutraceuticals and pharmaceuticals for promoting health and managing chronic diseases.

Keywords: Pharmaceuticals; Psidium guajava; antioxidant; microbial infections.

1. INTRODUCTION

Psidium guajava (commonly known as guava) belongs to Myrtaceae family is a traditional plant which is rich in nutrition and has many medicinal properties. This fruit is also termed as “The fruit of the poor guy” or “Tropical apple” (Adhau and Salvi, 2014). Guava is found to be grown in tropical and sub-tropical regions of many countries and is considered as an important fruit in India, Pakistan, Indonesia, Bangladesh and South America. In India, guava can be grown in all parts of the country. Uttar Pradesh, Madhya Pradesh, Maharashtra and Bihar are considered as some important states for growing guava and Allahabad district of Uttar Pradesh is famous for producing guava’s excellent quality around the world (Jolhe et al., 2020). The different parts of guava tree like fruit, stem, bark, leaves and roots are often used for the treatment of diabetes, stomachache, diarrhea and other health issues (Seshadri et al., 2020).

Industrial waste often harms the environment, but some types of waste, like agricultural byproducts, are rich in valuable bioactive compounds that can be repurposed for health benefits. Guava leaves are considered to be one of the non-conventional food products as they are not commonly used by people as its health benefits are not very well known (Kumar et al., 2021; Joseph & Priya 2011; Worku et al., 2024). They are widely used in teas, capsules, and essential oils, offering therapeutic effects like improving insulin function and protecting against oxidative damage. Rich in flavonoids, tannins, and other compounds, guava leaves and other parts of the plant have been shown to provide antibacterial, antioxidant, antidiabetic, and anti-inflammatory benefits (Delorino et al., 2021; Seun et al., 2022). This makes guava an important resource in traditional and modern medicine for promoting health and well-being (Rehman MA and Khan I; 2022).

2. TAXONOMY STUDY

Fig. 1. Guava tree and guava leaves

Table 1. Taxonomical Classification of *Psidium guajava* Linn.

Kingdom	**Plantae**
Order	Myrtales
Family	Myrtaceae
Subfamily	Myrtoideae
Genus	Psidium
Species	Guajava
Binominal name	*Psidium guajava* Linn.

3. NUTRITIONAL PROFILE

Guava leaves are rich in both macro and micro nutrients. They leaves are a powerhouse of nutrients which offers a rich source of proteins, minerals, and vitamins. They contain 9.73% protein on a dry weight basis, along with essential amino acids, making them an excellent plant-based option for sustainable nutrition. In addition, they are packed with vital minerals like calcium, potassium, magnesium, and iron, as well as vitamins C and B. These nutrients make guava leaves highly beneficial for health (Lonnie M *el al*., 2018). Calcium and phosphorus contribute to stronger bones and help prevent conditions like osteoporosis, while vitamin C boosts immunity and supports healthy blood vessels. Vitamin B plays a key role in improving blood circulation, nerve function, and cognitive health. With their high nutritional value, guava leaves have great potential as a sustainable and versatile dietary supplement for improving overall health and addressing nutrient deficiencies (Khadhri A et al., 2014).

4. PHYTOCHEMICAL PROFILE

Guava leaves are a valuable source of essential oils packed with numerous beneficial compounds. These oils contain important elements like α-pinene, limonene, menthol, and caryophyllene, along with unique acids such as guavavolic acid and ursolic acid. The leaves also have other key substances like tannins, chlorophyll, and mineral salts (Rasouli H et al., 2017). Research shows that guava leaf oil includes antibacterial compounds such as quercetin and its derivatives, making it useful for fighting infections. Additionally, advanced analysis (GC-MS) has revealed around 60 active components in the oil, with major ones being copaene, caryophyllene, azulene, and oleanolic acid (Luca SV et al., 2020).

Guava leaves are a natural treasure trove of medicinal properties, widely used in traditional medicine for their ability to manage blood sugar levels. They are packed with beneficial compounds like proteins, essential oils, vitamins, minerals, and secondary metabolites such as phenolic acids, flavonoids, and saponins. These compounds, especially phenolic compounds like quercetin, are responsible for the antioxidant and blood sugar-lowering effects of guava leaves. Many studies have identified over 70 different phenolic compounds in guava leaves, along with other bioactives like flavonoids, triterpenoids, sesquiterpenoids, gallic acid, alkaloids, tannins, saponins, rutin, catechin, and chlorogenic acid. These components help fight chronic diseases such as diabetes, cancer, heart disease, and neurodegenerative disorders by regulating processes like cell growth, enzymatic activity, and oxidative stress (Liu CW et al., 2014). Many researches use advanced techniques which highlight the therapeutic potential of these bioactive compounds that confirms their ability to support better health. The rich combination of natural oils, acids, and antibacterial properties in guava leaves highlights their potential for health benefits and medicinal uses.

5. PHARMACOLOGICAL PROPERTIES

Pharmacological properties are the biological effects and therapeutic benefits that a substance or compound has on the body. These properties determine how a substance interacts with biological systems and its potential use in treating or preventing diseases. Here are the key pharmacological properties often discussed for natural compounds, including guava leaves:

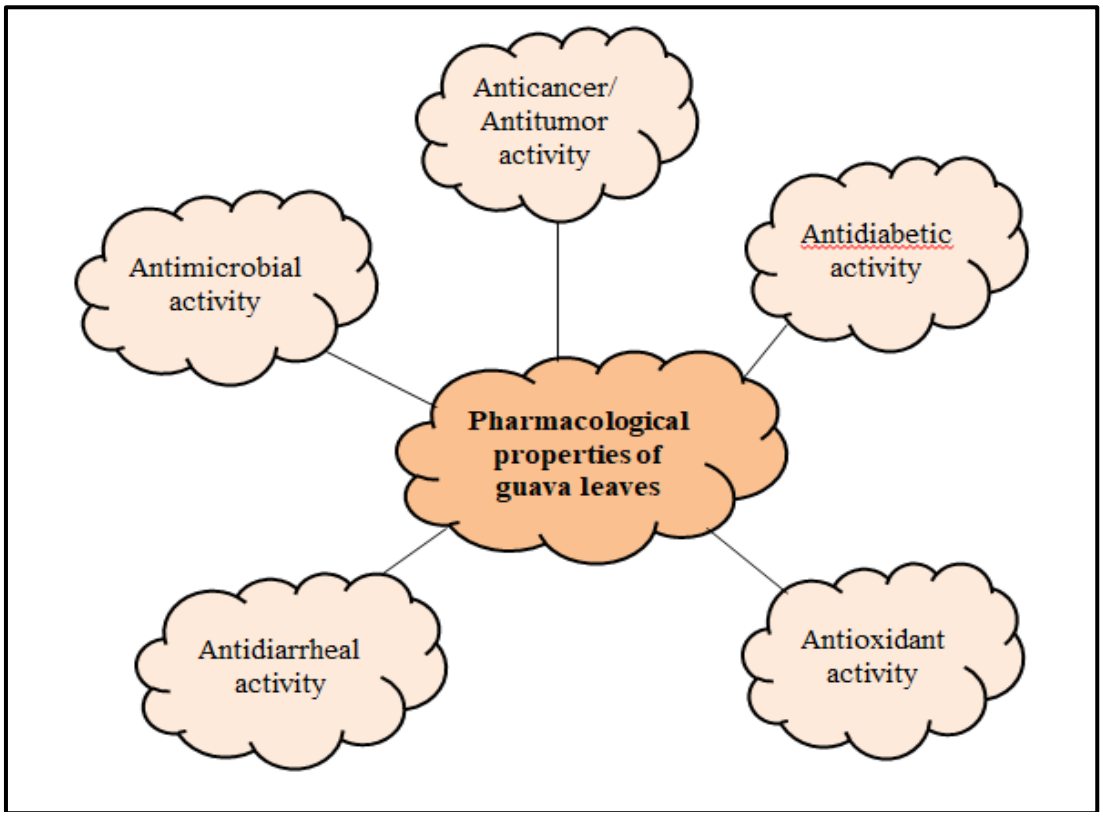

Fig. 2. Pharmacological properties of guava leaves

5.1 Anticancer/ Antitumor Activity

Cancer is a disease which causes some cell divides abnormally in an uncontrollable manner and damages body tissues. It can be the result of many external and internal factors involved in the uncontrolled production of reactive oxygen species (ROS). This can lead to formation of tumor, break and restructure of chromosome, cross linkage of DNA, degradation of nucleic acid, base mutations, DNA or RNA strands breakdown and damage of cell membrane (Gonzalez et al., 2018). Guava leaves are rich in flavonoids, triterpenoids, tannins, glycosides, sesquiterpenes, psiguadials, volatile oils and miscellaneous quinones (Jiang et al., 2020). The presence of terpenoids and flavonoids helps in showing antitumor effects by hindering tumor angiogenesis and cell proliferation, regulating immune system, repressing transferring of signals and adhesion of tumor cells (Biswas et al., 2019). Also, Psiguadial D and Psiguadial C works in inhibition of human hepatoma cells (HepG2) and protein tyrosine phosphatase 1B (PTP1B) (Shao et al., 2012).

Many studies proposed that guava leaves show inhibitory effect against cancer cell lines. One study was conducted to evaluate the anticancer and anti-angiogenic activities of guava leaves extract against colorectal cancer by hindering angiogenesis. The presence of flavonoids, vitamin E and β-caryophyllene in guava leaves extract showed anti-proliferation against cell lines Caco-2, HT-29 and SW480 for human colon carcinoma. B-caryophyllene shows antiangiogenic property and its interaction with HIF-1α factor helps in balancing biological pathways connected to tumor development, hypoxia and angiogenesis related to tumor (Lok et al., 2020).

5.2 Antidiabetic Activity

Diabetes is one of the chronic diseases in which there is high blood glucose level in body. This condition occurs either if pancreas is not able to produce enough insulin or if body is not able to use the produced insulin (Punia and Kumar, 2021). Antidiabetic properties are shown by guava leaves due to the presence of flavonoids and polysaccharides in it. A study was conducted to see the flavonoids effect present in guava leaves on anti-hyperglycemic and liver protective effect on diabetic mice. The results showed that the morphology of hepatocyte and β-cells

function of pancreatic islets were improved due to guaijaverin and avicularin flavonoids in guava leaves extract (Zhu et al., 2020).

5.3 Antioxidant Activity

Oxygen plays a very important role in living organism as it is required by cells for the production of energy. Since, many metabolic processes takes place in human body which leads to the production of free radicals that leads to various disorders (Stefanis et al., 1997). Guava leaves are a rich source of phenolic compounds like gallic acid, ellagic acid, taxifolin, pyrocatechol, ferulic acid and others that plays an antioxidant role (Farag et al., 2020). Also, the presence of bioactive compounds like corilaginoline alkaloids, isoquinoline and laempfertin as well as flavonoids like quercetin, rutin, kaempferol, hesperetin, catchin, quercitrin and apigenin also plays a key role in the antioxidant properties which helps in reducing the harmful free radical effect (Taha et al., 2019). Guava leaves area also a good source of essential oils that moderately works as an antioxidant (Lee et al., 2012). Oxidative stress was also found to be reduced due to the presence of polysaccharides present in guava leaves. They inhibit reactive oxygen species (ROS) formation, reducing peroxidation of lipid and cell death (Kim et al., 2016). A study was conducted in which crude polysaccharides of guava leaves were used to synthesize silver nanoparticles, which showed high DPPH radical and ABTS radical cation-scavenging activity (Wang et al., 2017).

5.4 Antidiarrheal Activity

Diarrhea is a very common problem in which the suffering people experience loose or watery stool and dehydration is considered as a serious side effect of it. The main causes of diarrhea are seen that is either caused due to heavy medications, poor food absorption, some allergies to foods, infected virus etc. The focus in developing countries is to develop drug using phytochemicals derived from medicinal plants to get minimal side effects while treating (Kim, 2005). Many researches had shown that guava leaves shows good antidiarrheal properties. A study was conducted to see antidiarrheal effects of ethanol extract of guava leaves on Wistar rats and the results showed that concentration of 750 and 500 mg/kg extract dosage showed antidiarrheal potential on castor oil-fed rats (Mazumdar et al., 2015). Also, the same activity was conducted with aqueous extract of guava leaves in rodents and the results showed that when 52-410 mg/kg of doses at guava leaves extract taken orally, fought against diarrhea and removed unwanted gastric products (Ojewole et al., 2008). In another study, antidiarrheal activity of water extract of guava and green tea leaves combination were seen in Swiss Webster mice and the results showed the reduction in diarrhea (Dewi et al., 2013). Based on all the above studies, it can be said that guava leaves have good antidiarrheal properties.

5.5 Antimicrobial Activity

Infection takes place when a microorganism enters in any person's body and causes harm. Some examples of infection occurs due to microbes are urinary tract infection, pneumonia, septicemia etc. Food borne diseases also occur due to pathogens like *Salmonella*, *Bacillus*, *Escherichia coli*, *Shigella*, *Clostridium*, *Pseudomonas* and *Staphylococcus* that also about the human health (Ullah et al., 2020). Bioactive compounds present in plants hinder in development of cell wall, reactive oxygen species (ROS) production, approaching adenosine triphosphate (ATP) production, suppress replication and transcription of DNA, defeating bacterial toxins and so they are considered as antimicrobes (Mickymaray, 2019).

Guava leaves are rich in antimicrobial properties due to the presence of good essential oils, anti-inflammatory compounds, organic and inorganic antioxidants (Naseer et al., 2018). The maximum pharmacological activities are shown by a flavonoid named quercetin present in guava leaves. Also, the triterpenoids namely betulinic acid and lupeol create unfavorable conditions for fungal and bacterial pathogens to grow (Hirudkar et al., 2020). Aqueous extracts of guava leaves are found to contain flavonoids, glycosides, phenolic acid, terpenoids and saponins which are associated with antimicrobial activity. Ergosterol and glucosamine are inhibited by the compounds like gallic acid, quercetin, rutin, morin, kaempferol, avicularin and chlorogenic acid present in guava leaves (Das and Goswami, 2019).

6. CONCLUSION

Guava (*Psidium guajava*) leaves are a remarkable natural resource with diverse therapeutic applications, owing to their rich

content of bioactive compounds and nutrients. They exhibit significant pharmacological properties, including antioxidant, antidiabetic, anticancer, antimicrobial, and antidiarrheal activities. These benefits make guava leaves highly effective in managing chronic conditions like diabetes, cancer, and cardiovascular diseases, while also improving immunity and reducing oxidative stress. With their nutritional and medicinal potential, guava leaves represent a sustainable and versatile solution for enhancing health. Future research should focus on developing innovative nutraceutical and pharmaceutical applications to maximize their benefits and address global health challenges.

DISCLAIMER (ARTIFICIAL INTELLIGENCE)

Authors declare that NO generative AI technologies such as Large Language Models (ChatGPT, COPILOT, etc.) and text-to-image generators have been used during the writing or editing of this manuscript.

COMPETING INTERESTS

Authors have declared that no competing interests exist.

REFERENCES

Adhau, G. W., & Salvi, V. M. (2014). Foundation and quality acceptable properties of guava cheese. *International Journal of Advanced Research, 2*(11), 665-669.

Biswas, S., Talukdar, P., & Talapatra, S. N. (2019). Presence of phytochemicals in fruits and leaves of guava (*Psidium guajava* Linn.) for cancer prevention: A mini review. *Journal of Drug Delivery and Therapeutics, 9*(4-s), 726-729.

Das, M., & Goswami, S. (2019). Antifungal and antibacterial property of guava (*Psidium guajava*) leaf extract: Role of phytochemicals. *International Journal of Health Sciences Research, 9*(2), 39-45.

Delorino, S. B., Ogalesco, M. L., Rebadulla, K. R., Rongcales, M. T. A., Salubre, V. J. I. A., Talacay, M. K. S., & Tuballas, Z. B. (2021). Wound healing efficacy of guava leaf extract. *Journal of Pharmaceutical Research International, 32*(41), 27-35. Available: https://doi.org/10.9734/jpri/2020/v32i41310 41

Dewi, P. S., Sutjiatmo, A. B., & Nurdiansyah, A. (2013). Antidiarrheal activity of water extracts of guava leaves (*Psidium guajava* L.) and water extracts of green tea leaves (*Camellia sinensis* L.) combination in Swiss Webster mice. *Acta Pharm. Indones, 38*, 67-70.

Farag, R. S., Abdel-Latif, M. S., Abd El Baky, H. H., & Tawfeek, L. S. (2020). Phytochemical screening and antioxidant activity of some medicinal plants' crude juices. *Biotechnology Reports, 28*, e00536.

Gonzalez, H., Hagerling, C., & Werb, Z. (2018). Roles of the immune system in cancer: From tumor initiation to metastatic progression. *Genes & Development, 32*(19-20), 1267-1284.

Hirudkar, J. R., Parmar, K. M., Prasad, R. S., Sinha, S. K., Jogi, M. S., Itankar, P. R., & Prasad, S. K. (2020). Quercetin, a major biomarker of *Psidium guajava* L., inhibits SepA protease activity of *Shigella flexneri* in treatment of infectious diarrhoea. *Microbial Pathogenesis, 138*, 103807.

Jiang, L., Lu, J., Qin, Y., Jiang, W., & Wang, Y. (2020). Antitumor effect of guava leaves on lung cancer: A network pharmacology study. *Arabian Journal of Chemistry, 13*(11), 7773-7797.

Jolhe, P., Sahu, G. D., & Kumar, V. (2020). Preparation and evaluation of guava jelly (Psidium guajava). *Journal of Pharmacognosy and Phytochemistry, 9*(6), 2061-2063.

Joseph, B., & Priya, M. (2011). Review on nutritional, medicinal and pharmacological properties of guava (*Psidium guajava* Linn.). *International Journal of Pharma and Bio Sciences, 2*(1), 53-69.

Khadhri, A., El Mokni, R., Almeida, C., Nogueira, J. M., & Araújo, M. E. (2014). Chemical composition of essential oil of *Psidium guajava* L. growing in Tunisia. *Industrial Crops and Products, 52*, 29-31.

Kim, H. S. (2005). Do not put too much value on conventional medicines. *Journal of Ethnopharmacology, 100*(1-2), 37-39.

Kim, S. Y., Kim, E. A., Kim, Y. S., Yu, S. K., Choi, C., Lee, J. S., Kim, Y. T., Nah, J. W., & Jeon, Y. J. (2016). Protective effects of polysaccharides from *Psidium guajava* leaves against oxidative stresses. *International Journal of Biological Macromolecules, 91*, 804-811.

Kumar, M., Tomar, M., Amarowicz, R., Saurabh, V., Nair, M. S., Maheshwari, C., Sasi, M., Prajapati, U., Hasan, M., Singh, S., &

Changan, S. (2021). Guava (*Psidium guajava* L.) leaves: Nutritional composition, phytochemical profile, and health-promoting bioactivities. *Foods, 10*(4), 752.

Lee, W. C., Mahmud, R., Pillai, S., Perumal, S., & Ismail, S. (2012). Antioxidant activities of essential oil of *Psidium guajava* L. leaves. *APCBEE Procedia, 2*, 86-91.

Liu, C. W., Wang, Y. C., Lu, H. C., & Chiang, W. D. (2014). Optimization of ultrasound-assisted extraction conditions for total phenols with anti-hyperglycemic activity from *Psidium guajava* leaves. *Process Biochemistry, 49*(10), 1601-1605.

Lok, B., Sandai, D., Baharetha, H. M., Nazari, V. M., Asif, M., Tan, C. S., Majid, A. A., & Tan, J. (2020). Anticancer effect of *Psidium guajava* (guava) leaf extracts against colorectal cancer through inhibition of angiogenesis. *Asian Pacific Journal of Tropical Biomedicine, 10*(7), 293-307.

Lonnie, M., Hooker, E., Brunstrom, J. M., Corfe, B. M., Green, M. A., Watson, A. W., Williams, E. A., Stevenson, E. J., Penson, S., & Johnstone, A. M. (2018). Protein for life: Review of optimal protein intake, sustainable dietary sources and the effect on appetite in ageing adults. *Nutrients, 10*(3), 360.

Luca, S. V., Macovei, I., Bujor, A., Miron, A., Skalicka-Woźniak, K., Aprotosoaie, A. C., & Trifan, A. (2020). Bioactivity of dietary polyphenols: The role of metabolites. *Critical Reviews in Food Science and Nutrition, 60*(4), 626-659.

Mazumdar, S., Akter, R., & Talukder, D. (2015). Antidiabetic and antidiarrhoeal effects of ethanolic extract of *Psidium guajava* (L.) Bat. leaves in Wistar rats. *Asian Pacific Journal of Tropical Biomedicine, 5*(1), 10-14.

Mickymaray, S. (2019). Efficacy and mechanism of traditional medicinal plants and bioactive compounds against clinically important pathogens. *Antibiotics, 8*(4), 257.

Naseer, S., Hussain, S., Naeem, N., Pervaiz, M., & Rahman, M. (2018). The phytochemistry and medicinal value of *Psidium guajava* (guava). *Clinical Phytoscience, 4*(1), 1-8.

Ojewole, J. A., Awe, E. O., & Chiwororo, W. D. (2008). Antidiarrhoeal activity of *Psidium guajava* Linn. (Myrtaceae) leaf aqueous extract in rodents. *Journal of Smooth Muscle Research, 44*(6), 195-207.

Punia, S., & Kumar, M. (2021). Litchi (*Litchi chinenis*) seed: Nutritional profile, bioactivities, and its industrial applications. *Trends in Food Science & Technology, 108*, 58-70.

Rasouli, H., Farzaei, M. H., & Khodarahmi, R. (2017). Polyphenols and their benefits: A review. *International Journal of Food Properties, 20*(sup2), 1700-1741.

Rehman, M. A., & Khan, I. (2022). Medicinal and pharmacological potential of Guava leaf powder: A review. *International Journal of Natural Medicine and Health Sciences, 1*(2).

Seshadri, V. D., Balasubramania, B., Al-Dhabi, N. A., Esmail, G. A., & Arasu, M. V. (2020). Essential oils of *Cinnamomum loureirii* and *Evolvulus alsinoides* protect guava fruits from spoilage bacteria, fungi and insect (*Pseudococcus longispinus*). *Industrial Crops and Products, 154*, 112629.

Seun, E. T., Abdulrazaq, K. O., Sharaibi, O. J., Chijindu, P. C. I., Esan, O. O., Ogun, M. L., Fadiora, A., & Oke, O. A. (2022). Effects of *Psidium guajava* L. leaf powder and *Aloe vera* L. gel on shelf life of *Citrus sinensis* L. fruits. *European Journal of Nutrition & Food Safety, 14*(7), 35-40. Available: https://doi.org/10.9734/ejnfs/2022/v14i730514

Shao, M., Wang, Y., Jian, Y. Q., Huang, X. J., Zhang, D. M., Tang, Q. F., Jiang, R. W., Sun, X. G., Lv, Z. P., Zhang, X. Q., & Ye, W. C. (2012). Guadial A and psiguadials C and D, three unusual meroterpenoids from *Psidium guajava*. *Organic Letters, 14*(20), 5262-5265.

Stefanis, L., Burke, R. E., & Greene, L. A. (1997). Apoptosis in neurodegenerative disorders. *Current Opinion in Neurology, 10*(4), 299-305.

Taha, T. F., Elakkad, H. A., Gendy, A. S. H., Abdelkader, M. A. I., & Hussein, S. S. E. (2019). In vitro bio-medical studies on *Psidium guajava* leaves. *Pharmacognosy Journal, 11*(4), 199-207.

Ullah, F., Ayaz, M., Sadiq, A., Ullah, F., Hussain, I., Shahid, M., Yessimbekov, Z., Adhikari-Devkota, A., & Devkota, H. P. (2020). Potential role of plant extracts and phytochemicals against foodborne pathogens. *Applied Sciences, 10*(13), 4597.

Wang, L., Xie, J., Huang, T., Ma, Y., & Wu, Z. (2017). Characterization of silver

nanoparticles biosynthesized using crude polysaccharides of *Psidium guajava* L. leaf and their bioactivities. *Materials Letters, 208*, 126-129.

Worku, L. A., Zebeaman, M., Bachheti, R. K., Bachheti, A., Rawat, Y. S., Husen, A., & Shiferaw, R. G. (2024). Ethnomedical use, phytochemistry, nutritional profile, commercial potential, and other potential applications of *Psidium guajava* (guava). *Journal of Food Quality, 2024*, 6076403.

Zhu, X., Ouyang, W., Lan, Y., Xiao, H., Tang, L., Liu, G., Feng, K., Zhang, L., Song, M., & Cao, Y. (2020). Anti-hyperglycemic and liver protective effects of flavonoids from *Psidium guajava* L. (guava) leaf in diabetic mice. *Food Bioscience, 35*, 100574.

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