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Java Plum (*Syzygium cumini* (L.)) Seeds Potentials in Medicinal Uses: A Systematic Literature Review

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A B S T R A C T

Java plum seed contains several active compounds, including flavonoids, tannins, and saponins, which are believed to be responsible for its medicinal properties. This study aimed to conduct a systematic literature review to explore the potential of Jamblang or Java plum seeds on health. The literature search process was carried out on various databases (PubMed, Web of Sciences, EMBASE, Cochrane Libraries, and Google Scholar) regarding the potential of jamblang seed in medicinal uses. This study follows the preferred reporting items for systematic reviews and meta-analysis (PRISMA) recommendations. Java plum seeds are believed to be beneficial for immune system support. Java plum seeds have anti-cancer properties. Studies have shown that these compounds can inhibit the growth of cancer cells and induce cell death. Java plum seeds have significant anti-inflammatory properties. They are thought to work by inhibiting the production of pro-inflammatory cytokines, which are molecules secreted by cells that are involved in inflammation.

1. Introduction

Java plum seed has long been used in traditional medicine to treat various ailments such as fever, diarrhea, and gastrointestinal problems. It is also believed to have anti-inflammatory, antioxidant, and anti-bacterial properties that can help to boost the immune system. In addition, it has been used to treat skin disorders, such as rashes and eczema. Studies have shown that Java plum seed contains several active compounds, including flavonoids, tannins, and saponins, which are believed to be responsible for its medicinal properties. It is also a good source of vitamin C, which can help to strengthen the immune system. It has also been used to treat headaches, toothaches, and digestive problems. Java plum seed is also believed to have potential anti-cancer properties. Studies have shown that the compounds in Java plum seed, such as flavonoids, tannins, and saponins, have antioxidant and anti-inflammatory properties, which can help to reduce the risk of cancer. Additionally, its vitamin C content helps to boost the immune system and fight off any infections. Finally, its traditional uses for treating headaches, toothaches, and digestive problems suggest that it can be beneficial for overall health.[1-3]

Java plum seed also contains essential minerals such as iron, calcium, and magnesium, which are important for the body's overall health. Additionally, its antioxidants and anti-inflammatory properties make it beneficial for skin health. Java plum seed is also known to be good for the heart and can help reduce cholesterol levels. Antioxidants have been

linked to reduced risk of chronic diseases such as heart disease, cancer, and diabetes. Its anti-inflammatory properties have been linked to reduced inflammation in the body, which is beneficial for overall health. Additionally, its essential minerals are important for healthy bones and organs. The antioxidants in Java plum seed are known to protect cells from damage and reduce oxidative stress on the body, which can lead to the development of these chronic diseases. The anti-inflammatory properties can also reduce inflammation in the arteries, which can reduce the risk of heart disease. Lastly, the essential minerals found in Java plum seed are important for regulating the function of certain organs, such as the kidneys and liver, and for maintaining strong bones. Java plum seed is also high in dietary fiber, which helps to promote healthy digestion and regulate blood sugar levels, and its vitamin C content helps boost the immune system.[4-7] This study aimed to conduct a systematic literature review to explore the potential of Jamblang or Java plum seeds on health.

2. Methods

The literature search process was carried out on various databases (PubMed, Web of Sciences, EMBASE, Cochrane Libraries, and Google Scholar) regarding the potential of jamblang seed in medicinal uses. The search was performed using the terms: (1) "jamblang" OR "java plum" OR" *Syzygium cumini*" OR" *Syzygium cumini* seed in medicinal uses" AND (2) "*Syzygium cumini*" OR "jamboline." The literature is limited to preclinical studies and published in English. The literature selection criteria are articles published in the form of original articles, an experimental study about medicinal uses of *Syzygium cumini*, the control group only received liquid without therapeutic effect or no treatment, studies were conducted in a timeframe from 2013-2023, and the main outcome was medicinal uses of *Syzygium cumini*. Meanwhile, the exclusion criteria were animal models that were not related to medicinal uses, the absence of a control group, and duplication of publications. This study follows the preferred reporting items for systematic reviews and meta-analysis (PRISMA) recommendations.

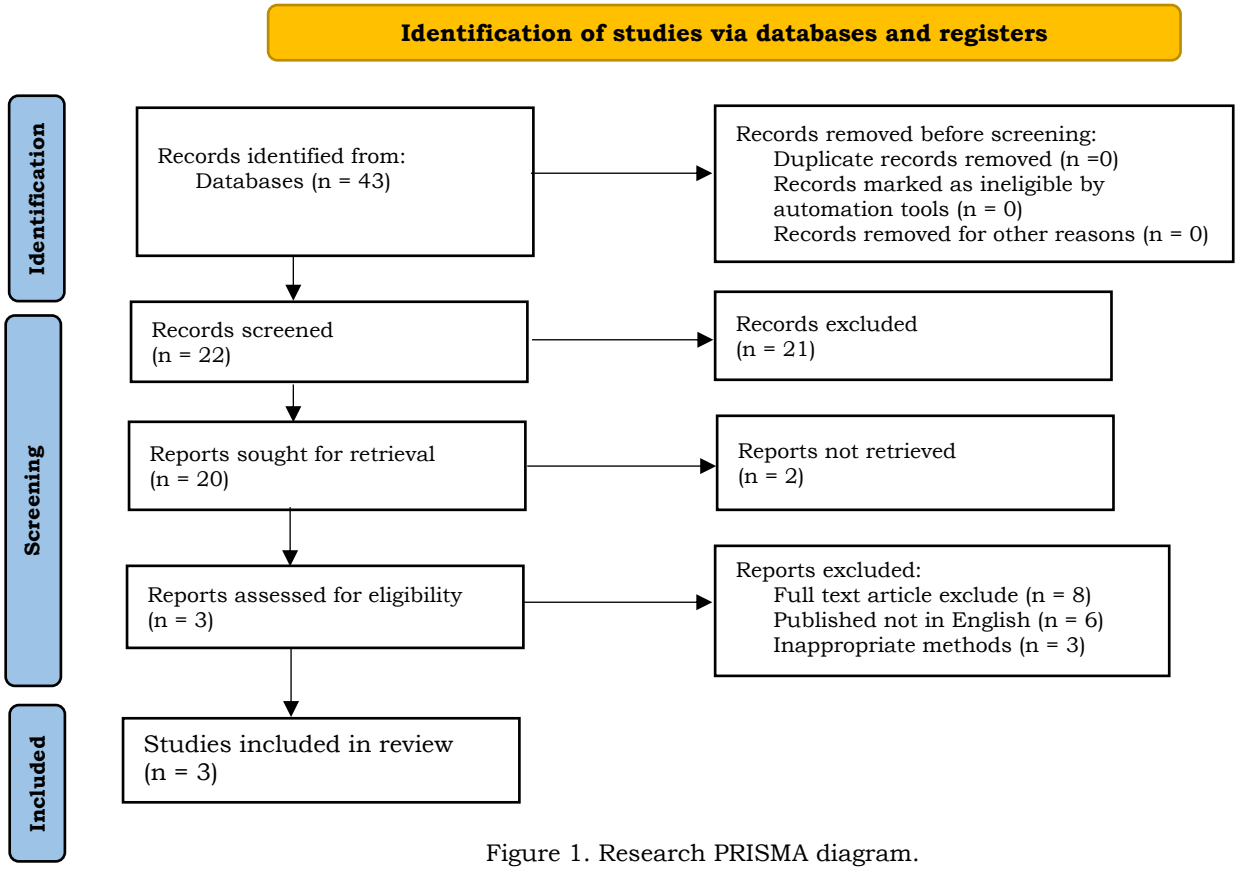

Figure 1. Research PRISMA diagram.

3. Results and Discussion

Potential Java plum seed in the immune system

Research has found that compounds in Java plums have antioxidant and anti-inflammatory properties, which can help boost the immune system. Additionally, the seeds contain vitamins and minerals which help support a healthy immune system. Java plum seeds are believed to be beneficial for immune system support. They contain compounds that can help reduce inflammation and support the body's natural defenses against infection. Additionally, the vitamins and minerals present in the seeds can help keep the immune system functioning optimally. Java plum seeds are rich in antioxidants, which can help protect the body from free radical damage. The antioxidants present in the seeds can help to reduce inflammation and support a healthy immune response. Additionally, the vitamins and minerals in the seeds can help to support the body's natural defense system against infection and illness. For instance, the high levels of vitamin C in Java plum seeds can help to reduce the symptoms of colds and other infections by boosting the immune system. Java plum seeds are also high in zinc, which plays an important role in immune system function. They also contain omega-3 fatty acids, which help to reduce inflammation and promote overall health. Vitamin C helps to stimulate the production of white blood cells, which are the primary defense cells of the immune system. Zinc helps to activate the T-cells, immune cells that help to fight off viruses and bacteria. Omega-3 fatty acids help to reduce inflammation by inhibiting the production of pro-inflammatory molecules. All of these vitamins and minerals work together to provide the body with a natural defense system against infection and illness. Vitamin C helps to increase the production of antibodies, which help to recognize and fight off foreign invaders. Zinc helps to activate the T-cells, which are important for recognizing and destroying invading organisms. Omega-3 fatty acids help to reduce inflammation, which can make it harder for the body to fight off infection and illness. Vitamin D helps to boost the production of antimicrobial peptides, which are molecules that help to protect against infection. Magnesium helps to regulate the immune response, ensuring it is not overactive or underactive. Vitamin A helps to strengthen mucosal barriers, which can help to protect against infection.[8-12]

Potential Java plum seed as anti-cancer

Research suggests that compounds derived from Java plum seeds have anti-cancer properties. Studies have shown that these compounds can inhibit the growth of cancer cells and induce cell death. These compounds can also be used to target and destroy tumor cells without harming healthy cells. In addition, the compounds can be used to reduce the side effects of chemotherapy and radiation therapy. The mechanism by which the Java plum seed compounds have anti-cancer properties is through the inhibition of the enzymes involved in the growth and spread of cancer cells. In addition, they can also interfere with the signaling pathways that are involved in the growth and spread of cancer cells. Finally, the compounds can also induce apoptosis of cancer cells. For example, Java plum seed compounds have been found to inhibit the activity of the enzyme telomerase, which is responsible for the elongation of telomeres and thus plays an important role in cancer progression. Additionally, Java plum seed compounds have been shown to modulate the expression of several cell-signaling pathways, including NF-KB, which is involved in the growth and spread of cancer cells.[13-15]

Finally, Java plum compounds have been found to induce apoptosis of cancer cells, resulting in their death. For example, researchers have found that Java plum seed extract can lower the expression of NF-KB in human breast cancer cells, thereby reducing their growth and proliferation. Apoptosis is a natural process in which cells go through death in an orderly and controlled way. Java plum seed compounds have

been found to induce apoptosis of cancer cells, meaning that they can cause the cells to die in the same way as if they had gone through the natural process. Additionally, the compounds have been shown to modulate the expression of NF-KB, which is a cell-signaling pathway involved in the growth and spread of cancer cells. As a result, the compounds can lower the expression of NF-KB, thus reducing the growth and proliferation of these cancer cells. Additionally, the compounds have been found to be cytotoxic, meaning that they can inhibit the growth and spread of cancer cells by disrupting the cell cycle and inducing cell death. Furthermore, the compounds have been shown to increase the sensitivity of cancer cells to chemotherapy drugs, thus enhancing the effectiveness of these treatments. For example, a study has found that treating multiple myeloma cells with the compounds in combination with the chemotherapy drug bortezomib led to a synergistic anti-cancer effect, where the combination was significantly more effective than either treatment alone. The compounds work by inhibiting certain proteins that are involved in cancer cell survival and proliferation, which makes them more susceptible to chemotherapy drugs. The synergistic effect of the combination of the compounds and the chemotherapy drug increases the efficacy of the treatment, leading to greater cancer cell death.[16-18]

Potential Java plum seed as anti-inflammatory

Studies have shown that the extracts from java plum seeds have significant anti-inflammatory properties. They are thought to work by inhibiting the production of pro-inflammatory cytokines, which are molecules secreted by cells that are involved in inflammation. Specifically, the extracts appear to block the activation of the transcription factor NF-kB, which regulates the expression of the genes that produce these cytokines. By blocking the activation of NF-kB, the production of pro-inflammatory cytokines is reduced, thus reducing inflammation. This reduction in inflammation has been linked to a variety of health benefits, including improved cardiovascular health and reduced risk of chronic diseases. The extracts can also help to reduce pain and swelling associated with inflammation. Inflammation is known to induce chronic diseases, such as cardiovascular diseases, diabetes, and obesity, so reducing inflammation could potentially help to reduce the risk of these conditions. Studies have shown that the anti-inflammatory properties of the extracts can help to reduce the production of pro-inflammatory cytokines and other molecules that are responsible for inflammation. This reduction in inflammation can help to reduce the risk of chronic diseases and improve overall health.[19]

In addition, reducing inflammation can help to reduce oxidative stress, which is a major factor in the development of chronic diseases. By reducing the levels of oxidative stress in the body, it can reduce the risk of these conditions and improve overall health. Oxidative stress is caused by an imbalance between the production of free radicals and the body's ability to counter their harmful effects. Inflammation is one of the main sources of this imbalance, which is why reducing inflammation is important for reducing oxidative stress. Free radicals are unstable molecules that damage cells and contribute to inflammation. When inflammation is reduced, the body is better able to neutralize the free radicals and reduce oxidative stress. This helps to reduce the risk of chronic diseases and improve overall health. Reducing inflammation can help to reduce the production of free radicals, which are the primary source of oxidative stress. Additionally, when inflammation is reduced, the body is better able to repair itself and fight off infection, which also helps to reduce oxidative stress. This helps to create a healthier balance in the body and reduces the risk of developing chronic diseases.[20]

4. Conclusion

Jamblang seeds or Java plum (*Syzygium cumini*) have the potential to improve the body's immune system as an anti-cancer and as anti-inflammatory.

5. References

1. Sheth NR, Jain N, Nathani AH. Phytopharmacological potential of *Syzygium cumini*: A review. J Appl Pharm Sci. 2013; 3(8): 176-81.
2. Singh AP, Lall RK, Bajpai V. Pharmacological activities of *Syzygium cumini*: A review. Int J Pharm Sci Res. 2017; 8(9): 3526-35.
3. Devi KB, Bhandari A, Sharma A. Traditional uses, phytochemistry, and pharmacological properties of *Syzygium cumini*: A review. J Med Plants Stud. 2019; 7(2): 26-31.
4. Vijayan N, Thirunavukkarasu P, Sakthisekaran D. Antitumor activity of *Syzygium cumini* against Dalton's lymphoma ascites tumor in mice. Biol Pharm Bull. 2005; 28(6): 937-9.
5. Kumar D, Kumar S, Kohli S. Evaluation of antidiabetic and antioxidant activity of *Syzygium cumini* seeds in streptozotocin-induced diabetic rats. J Tradit Complement Med. 2017; 7(1): 65-70.
6. Verma N, Singh AP, Amresh G. Antihyperglycemic activity of *Syzygium cumini* seed extracts on streptozotocin-induced diabetic rats. Food Chem Toxicol. 2009; 47(6): 1426-31.
7. Kirtikar KR, Basu BD. Indian medicinal plants. 2nd ed. Allahabad, India: Lalit Mohan Basu; 1918.
8. Prasad SK, Tyagi AK. *Syzygium cumini*: A review of its phytochemical constituents and traditional uses. Asian J Pharm Clin Res. 2015; 8(3): 16-20.
9. Baliga MS, Fernandes S, Thilakchand KR. Scientific validation of the antidiabetic effects of *Syzygium cumini* and its relationship to antioxidant potential. Diabetol Croat. 2013; 42(1): 33-42.
10. Tiwari P, Kumar B, Kaur M. Phytochemical screening and extraction: A review. Int Pharm Sci. 2011; 1(1): 98-106.
11. Sharma P, Sharma JD, Sharma P. Antimicrobial activity of *Syzygium cumini* seeds. Int J Green Pharm. 2008; 2(2): 111-3.
12. Shubha R, Abhilash M, Patil R. Pharmacognostic studies of *Syzygium cumini* (L.) Skeels seeds. Pharmacogn J. 2010; 2(12): 337-41.
13. Choudhary GP, Patil KS, Malik MY. Evaluation of antifungal activity of *Syzygium cumini* (L.) Skeels against Candida albicans: An in vitro study. J Ayurveda Integr Med. 2016; 7(1): 36-40.
14. Vinutha B, Prashanth D, Salma K. Screening of selected Indian medicinal plants for acetylcholinesterase inhibitory activity. J Ethnopharmacol. 2007; 109(2): 359-63.
15. Harsha SN, Anilakumar KR. In vitro free radical scavenging and DNA damage protective property of *Syzygium cumini* Skeels. J Food Sci Technol. 2013; 50(4): 729-34.
16. Patil SB, Takalikar SS, Joglekar MM. Antihyperglycemic activity of *Syzygium cumini* seed kernel on streptozotocin-induced diabetic rats. Food Chem Toxicol. 2011; 49(10): 2650-4.
17. Devi LS, Singh TD, Singh RS. Hepatoprotective activity of *Syzygium cumini* against carbon tetrachloride-induced hepatic damage in rats. Fitoterapia. 2006; 77(5): 439-44.
18. Manikandan R, Thiagarajan R, Beulaja S. *Syzygium cumini* seed extract protects liver against hepatic oxidative stress in rats. J Med Food. 2006; 9(4): 525-8.
19. Varsha MK, Naresh K. Evaluation of antimicrobial activity of *Syzygium cumini* (L.) Skeels seed extracts against selected

microorganisms. Int J Pharm Sci Res. 2015; 6(9): 3936-41.

20. Jadhav VM, Thorat RM, Kadam VJ. An overview of the recent trends on *Syzygium cumini*: A potential medicinal tree. Asian Pac J Trop Dis. 2012; 2(2): 163-9.