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Literature Study: The Effect of Telang Flower (Clitoria ternatea L.) on Human Health

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Abstract

This study aims to evaluate and summarize the findings from studies related to the effects of butterfly pea flowers (Clitoria ternatea L.) on human health, particularly those related to their therapeutic properties, including antioxidant, anti-inflammatory, neuroprotective, and relaxing effects. The research method used in this study is Systematic Literature Review (SLR). This approach was chosen because of its ability to systematically identify, evaluate, and summarize relevant research results on butterfly pea flowers. Article searches were conducted through academic databases such as PubMed, ScienceDirect, and Google Scholar, focusing on studies that discuss the effects of butterfly pea flowers on human health. Based on the analysis results of various existing studies, butterfly pea flowers show great potential in supporting human health. The content of bioactive compounds, such as flavonoids, anthocyanins, and alkaloids, provides various significant therapeutic benefits. Flavonoids and anthocyanins have strong antioxidant properties, play a role in fighting free radicals, and preventing oxidative damage that can cause degenerative diseases. In addition, these compounds have anti-inflammatory effects that are beneficial in managing inflammatory conditions such as arthritis, asthma, and heart disease. Butterfly pea flowers also show neuroprotective effects that can protect nerve cells, improve cognitive function, and protect the brain from neurodegenerative diseases such as Alzheimer's and Parkinson's. Alkaloids in butterfly pea flowers also have a relaxing effect that can help reduce anxiety and stress, and improve mental well-being. Although the results obtained are very promising, most studies are still limited to laboratory or animal trials, and further research, especially clinical trials in humans, is needed to confirm their effectiveness, proper dosage, and long-term safety.

Keywords: *Butterfly Pea Flower, Clitoria ternatea, Health, Active Compounds.*

INTRODUCTION

Butterfly Pea Flower (Clitoria ternatea L.) is a climbing plant that comes from the Fabaceae family and thrives in tropical and subtropical regions,

including Indonesia, India, and Thailand. This plant is known by local names such as telang or kecombrang in Indonesia, and "butterfly pea" in English, because the shape of its petals resembles a butterfly (Warsita, KS 2024). In addition to being used as an ornamental plant, Butterfly Pea Flower has long been used in traditional medicine. This flower contains anthocyanin compounds that have antioxidant properties, which play an important role in fighting free radicals and maintaining body health. In addition, butterfly pea flower extract is known to be beneficial for improving eye health, preventing cataracts, and helping relieve stress and anxiety (Sari, DP 2023). This plant also has anti-inflammatory properties that can relieve inflammation, and is used in hair care to prevent hair loss and stimulate hair growth. Thanks to its distinctive blue color, butterfly pea flowers are often used as natural dyes for food and textiles. Although it has been used in traditional medicine, further research is still needed to ensure its effectiveness and safety in the modern medical world. Overall, Butterfly Pea Flower is a plant that is rich in benefits and potential, both in the health and industrial sectors.

For centuries, the Butterfly Pea flower (Clitoria ternatea L.) has been widely used for various purposes, both in cultural rituals and as a herbal medicine (Rahmawati, et al. 2024). In many Asian cultures, especially in Indonesia, India, and Thailand, this flower is used in various traditions and celebrations, and is believed to have certain properties in maintaining health. In traditional medicine, the Butterfly Pea flower has been used to treat health problems such as digestive disorders, inflammation, and skin problems, and is believed to improve memory and sleep quality. However, with the advancement of science and technology, more and more scientific research is being conducted to explore the medical potential of the Butterfly Pea flower which has been known in the community (Septiani, FA, & Purnamasari, R. 2025). Modern studies show that the Butterfly Pea flower contains bioactive compounds such as anthocyanins, flavonoids, and alkaloids, which have various health benefits, including antioxidant, anti-inflammatory, and antimicrobial properties (Yurisna, et al. 2022). Research also shows that butterfly pea flowers have the potential to improve cognitive function, maintain eye health, and have beneficial effects on heart health and the nervous system (Badi'ah, N. 2024).

As scientific evidence supporting the efficacy of the Butterfly Pea flower increases, this plant is increasingly popular in the world of alternative medicine and health products (Dianatasya, A. 2020). However, more research is still needed to ensure the effectiveness and safety of the Butterfly Pea flower in wider medical use. Thus, scientific advances provide hope for developing the use of Butterfly Pea flowers as part of modern, evidence-based medicine (Ersila, 2024). Research related to Butterfly Pea flowers began to develop rapidly in the late 20th century, focusing on the content of bioactive compounds in this plant. Compounds such as flavonoids, anthocyanins, and alkaloids found in Butterfly Pea flowers are known to have various benefits for the human body. For example, anthocyanins are known to have strong antioxidant effects, which can help fight oxidative stress associated with various degenerative diseases. In

addition, Butterfly Pea flowers are also believed to improve memory and brain function, which is one of the reasons further research on this plant is increasing. As research develops, Butterfly Pea flowers are increasingly known as plants that have broad therapeutic effects, indicating that this plant has various positive effects on human health. The petals of the butterfly pea flower, in particular, have broad functional activities, including as an antioxidant, antidiabetic, antiobesity, anticancer, anti-inflammatory, and antibiotic (Marpaung, AM 2020).

Despite the abundant evidence supporting the benefits of Butterfly Pea (Clitoria ternatea L.) flowers for human health, there is still a gap in understanding the molecular mechanisms underlying their therapeutic effects. Although the plant has been known in traditional medicine and some modern studies have shown great potential in improving health, most of these findings have not sufficiently explained in detail how the bioactive compounds in Butterfly Pea flowers work at the molecular level to produce these therapeutic effects. This includes how compounds such as anthocyanins, flavonoids, and alkaloids interact with human cells and body systems to provide the reported health benefits.

Therefore, it is important to conduct a systematic literature review to identify and summarize existing research findings. This literature review will serve as an approach to collect data from relevant scientific studies, thus providing a clearer picture of the potential of butterfly pea flower in various health fields. By integrating findings from various studies, this review will not only strengthen the existing scientific evidence but also identify the remaining knowledge gaps regarding the mechanism of action of butterfly pea flower. Through a comprehensive literature review, we can dig deeper into the properties of butterfly pea flower that can be beneficial in medicine, such as antioxidant, anti-inflammatory, and antimicrobial effects. These properties have indeed been widely mentioned in various studies, but the molecular mechanisms underlying these effects still need to be better understood. A comprehensive literature review will help clarify how the bioactive compounds in butterfly pea flower interact with body cells, how they affect the biochemical processes involved in reducing inflammation, protecting against oxidation, and inhibiting the growth of pathogenic microorganisms.

Thus, a comprehensive literature review will be essential in providing a clearer understanding of the benefits of butterfly pea flower, strengthening scientific evidence, and encouraging further research that can confirm the therapeutic potential of this plant for the treatment of various medical conditions. A systematic literature review can also open up opportunities for further in-depth research, which in turn can improve the application of butterfly pea flower in the field of medicine and modern medicine. With a deeper understanding of the therapeutic properties of butterfly pea flower, we can maximize its potential in supporting human health and design more effective evidence-based medical interventions. In this paper, the authors aim to evaluate and analyze the effects of butterfly pea flower on human health based on

previous studies. This study will also provide insights into the strengths and weaknesses of the various existing studies, as well as suggest directions for further research that needs to be done to explore the potential of this plant more deeply.

Research methodology

This study uses a literature study method (Systematic Literature Review/SLR) to evaluate and analyze the effects of Butterfly Pea flowers on human health. The SLR method was chosen because this approach allows researchers to systematically identify, evaluate, and summarize research results that are relevant to the topic being studied. This process involves several stages, starting with searching for relevant articles through academic databases such as PubMed, ScienceDirect, and Google Scholar.

The selection process was carried out using strict inclusion and exclusion criteria to ensure that only quality and relevant articles were included in this review (Husni, et al. 2024). The inclusion criteria used in this study included articles published in peer-reviewed international journals, as well as studies discussing the effects of Butterfly Pea flowers on human health. Articles that did not meet these criteria, such as those that did not discuss the medical effects of Butterfly Pea flowers or those published in unaccredited journals, were excluded from the analysis. After identifying relevant articles, the authors conducted data analysis by categorizing the main findings based on the reported therapeutic effects, such as antioxidant, anti-inflammatory, neuroprotective, and others. This analysis aims to provide a clear picture of the medical potential of Butterfly Pea flowers and to identify areas that require further research.

RESULTS AND DISCUSSION

Functional and Nutritional Characteristics of Butterfly Pea Flowers

Butterfly Pea Flower (Clitoria ternatea L.) has various functional characteristics and nutritional content that are beneficial for human health. This plant is known for being rich in antioxidant compounds, such as flavonoids and anthocyanins, which can fight free radicals in the body. In addition to its effects on brain health, Butterfly Pea Flower also has benefits for skin and hair health (Septiani, FA, & Purnamasari, R. 2025). Several studies have shown that Butterfly Pea flower extract can help improve skin quality, reduce wrinkles, and stimulate hair growth. This is thanks to its antioxidant and anti-inflammatory properties, which help protect the skin from damage caused by UV exposure and accelerate the skin regeneration process. These free radicals can cause cell damage that leads to degenerative diseases and premature aging. In addition, Butterfly Pea flowers have anti-inflammatory properties that can help reduce inflammation in the body, useful in relieving conditions such as arthritis and other inflammatory diseases. Butterfly Pea flowers are also known to improve cognitive function, improve memory, and help concentration, making them useful for people who need mental support, such as students or the elderly. Not only that, Butterfly Pea flowers have calming properties that help reduce stress and anxiety, and improve

sleep quality. In addition to the benefits for mental health, Butterfly Pea flowers also contain antibacterial and antifungal compounds that help the body fight infection. Research also shows that Butterfly Pea flowers can support diabetes management by lowering blood sugar levels, and have detoxification abilities that help the body eliminate toxins. With these various benefits, Butterfly Pea flowers are a natural choice that supports overall body health.

Antioxidants

Butterfly pea flower (Clitoria ternatea L.) is a plant rich in bioactive compounds, including flavonoids, anthocyanins, and phenolic acids, all of which have antioxidant properties that are very beneficial for body health (Kok, et al. 2023). Antioxidants themselves are compounds that play an important role in fighting free radicals, which are unstable molecules that can damage body cells. These free radicals are formed in the body due to normal metabolic processes, but can also be triggered by external factors such as pollution, UV exposure, stress, and unhealthy foods. When free radicals are excessive, they can cause damage to DNA, proteins, and fats in the body, which can ultimately accelerate the aging process and increase the risk of various chronic diseases such as cancer, diabetes, and heart disease (Irianti, TT, & Nuranto, S. 2021).

Flavonoids found in butterfly pea flowers are a group of polyphenol compounds that have the ability to neutralize free radicals. This compound works by providing electrons to free radicals, so that the free radicals become stable and can no longer damage body cells. In addition, flavonoids also have anti-inflammatory properties that can reduce inflammation in the body, which is often the cause of various degenerative diseases (Sumartini, S. 2020). Anthocyanins, which give blue color to butterfly pea flowers, are also very effective compounds in overcoming free radicals. This compound works by reducing oxidation in the body, which can prevent damage to cells and tissues. In addition, anthocyanins are also known to have the ability to improve cognitive function and protect brain cells from oxidative damage, thus playing a role in maintaining the health of the nervous system. Phenolic acid, which is also contained in butterfly pea flowers, has an important role in protecting the body from oxidative damage. This compound functions to bind free radicals, thus preventing them from damaging body cells. Phenolic acids are also known to increase immunity by increasing the activity of antioxidant enzymes in the body, which helps strengthen the immune system and protect the body from infection and inflammation (Arifah, EN 2024).

With flavonoids, anthocyanins, and phenolic acids that work synergistically, butterfly pea flowers provide great health benefits. Consuming butterfly pea flowers regularly can help the body fight free radicals, prevent damage to body cells, and maintain the health of vital organs. In addition, the antioxidant effects of butterfly pea flowers can also slow down the aging process, maintain skin elasticity, and reduce signs of premature aging. Overall, butterfly pea flowers function as the body's natural protector, which helps improve the quality of life by maintaining health balance and preventing various health problems caused by oxidative stress.

Anti-inflammatory

Butterfly pea flower extract (Clitoria ternatea L.) is known to have strong anti-inflammatory properties, which come from the bioactive compounds it contains, such as flavonoids and anthocyanins. These anti-inflammatory properties are very useful in overcoming inflammation that occurs in the body, which is often the main cause of various poor health conditions. Chronic inflammation can contribute to various degenerative diseases and conditions that damage the overall health of the body. One way these compounds work is by reducing the levels of pro-inflammatory cytokines, which are proteins that play a role in triggering and worsening the inflammatory process in the body (Suryawati, 2023, November). In addition, these compounds can also inhibit the activity of certain enzymes, such as cyclooxygenase (COX) and lipoxygenase (LOX), which are involved in the production of molecules that trigger inflammation, such as prostaglandins and leukotrienes.

By reducing cytokine production and inhibiting inflammatory enzymes, butterfly pea flower extract can effectively reduce the inflammatory process in the body. This makes butterfly pea flowers a natural ingredient that has the potential to overcome various inflammatory diseases, such as arthritis, asthma, and inflammatory bowel disease. These diseases are often accompanied by chronic inflammation that causes pain, swelling, and impaired body function (Asichah, S. 2024). In addition, the anti-inflammatory properties of butterfly pea flowers also have long-term benefits in reducing the risk of developing other chronic diseases related to inflammation. Heart disease, for example, is often influenced by inflammation in the blood vessels, which can cause plaque buildup and narrowing of the arteries, increasing the risk of heart attack and stroke. Likewise, type 2 diabetes is associated with systemic inflammation that affects glucose metabolism and insulin resistance. By reducing inflammation, butterfly pea flower extract can help reduce the risk of these diseases. Overall, butterfly pea flower extract offers great potential as a natural anti-inflammatory agent that can support the management of various inflammatory conditions, as well as play a role in the prevention of chronic diseases related to inflammation (Ajeng, DAS 2022).

Antibacterial and Antifungal

Butterfly pea flowers (Clitoria ternatea L.) are known to have significant antibacterial and antifungal effects, which come from their bioactive compound content, such as flavonoids and anthocyanins. These compounds play a role in inhibiting the growth and development of pathogenic microorganisms, including bacteria and fungi that can cause various infections in the human body. The antibacterial and antifungal effects of butterfly pea flowers make them a useful natural alternative to fight infections by disease-causing microorganisms (Marpaung, AM 2020). Flavonoids and anthocyanins in butterfly pea flowers work by disrupting the integrity of pathogenic microorganism cells. In the case of bacteria, these compounds can affect bacterial cell membranes, inhibit cell wall

synthesis, and disrupt bacterial energy metabolism, thereby inhibiting their growth. The antibacterial effects of butterfly pea flowers can help fight various infections caused by pathogenic bacteria, such as Staphylococcus aureus, which can cause skin infections, and Escherichia coli which often causes urinary tract infections and diarrhea.

In addition, butterfly pea flowers also have antifungal effects that can help overcome fungal infections. Bioactive compounds in butterfly pea flowers work by damaging the cell walls of fungi, inhibiting protein synthesis, and disrupting the activity of enzymes that are important for the survival of fungi. One of the fungal infections that can be treated with butterfly pea flower extract is an infection caused by Candida albicans, a fungus that causes candidiasis that can attack various parts of the body, such as the mouth, digestive tract, and genital organs. Thus, the use of butterfly pea flower extract as an antibacterial and antifungal agent can be an effective natural choice to overcome infections caused by pathogenic bacteria and fungi. It also provides additional benefits in supporting overall body health, as it can help maintain the balance of microorganisms in the body, reduce inflammation caused by infection, and speed up the healing process. As a natural alternative, butterfly pea flowers offer a safer solution with minimal side effects compared to the use of antibiotics and chemical antifungals.

Improve Brain Function

Butterfly pea flower (Clitoria ternatea L.) is believed to have the ability to improve cognition and improve brain function, thanks to its bioactive compounds, such as flavonoids and anthocyanins. These compounds have neuroprotective effects, meaning they can protect nerve cells from damage and support overall brain health. One of the main ways these compounds work is by increasing blood flow to the brain. This increased blood flow brings more oxygen and nutrients to brain cells, which is important for optimal cognitive function, including memory, concentration, and thinking ability (Syifa, EV 2023).

In addition, flavonoids and anthocyanins also play a role in reducing inflammation in the brain and fighting oxidative stress. Oxidative stress occurs when free radicals or other harmful molecules damage body cells, including nerve cells. This condition can accelerate aging and contribute to various brain health problems. With the antioxidant properties of flavonoids and anthocyanins, butterfly pea flowers help reduce damage caused by free radicals, thereby protecting nerve cells and supporting better brain function. Several studies have also shown that consuming butterfly pea flowers can potentially reduce the risk of neurodegenerative diseases, such as Alzheimer's and Parkinson's. These diseases are characterized by the degeneration of nerve cells in the brain, which causes decreased cognitive abilities, memory impairment, and motor problems. By fighting inflammation and oxidative stress, butterfly pea flowers can help slow the progression of these diseases and support healthier brain function in old age.

Overall, butterfly pea flowers with bioactive compounds such as flavonoids and anthocyanins provide great benefits for brain health. Consuming

butterfly pea flowers regularly can help improve memory, concentration, and other cognitive abilities, as well as protect the brain from damage caused by internal and external factors. This makes butterfly pea flowers a natural choice that is beneficial for improving quality of life and maintaining long-term brain health.

Relaxation and Antidepressants

Butterfly pea flowers (Clitoria ternatea L.) are known to have a calming effect that can help reduce anxiety and stress. Bioactive compounds contained in butterfly pea flowers, such as flavonoids and anthocyanins, play a role in providing a relaxing effect on the nervous system. These compounds work by affecting the central nervous system to relieve tension and increase feelings of calm. Flavonoids, in particular, have been shown to have anxiolytic (calming) properties, which help reduce anxiety levels by reducing the body's response to stress and improving the balance of neurotransmitters in the brain. This calming effect can help reduce feelings of anxiety and stress that are often caused by external factors, such as work pressure, personal problems, or other environmental factors.

In addition, butterfly pea flowers also have the potential as natural antidepressants. Several studies have shown that consuming butterfly pea flowers can increase levels of neurotransmitters such as serotonin and dopamine. Both of these neurotransmitters are very important in regulating mood, emotions, and feelings of well-being in general. Serotonin is known as the "happiness hormone" because of its role in increasing feelings of happiness and reducing symptoms of depression, while dopamine plays a role in motivation, pleasure, and emotional regulation. By increasing serotonin and dopamine levels, butterfly pea flowers can help reduce symptoms of depression and improve mood, making them a natural alternative to support mental health. Overall, butterfly pea flowers can provide significant benefits in reducing anxiety, stress, and depression. With its calming effect on the nervous system and its ability to increase levels of neurotransmitters that support emotional balance, butterfly pea flowers can help improve overall mental well-being. Therefore, butterfly pea flowers are not only beneficial for physical health, but also play a role in maintaining mental health, helping to create a calmer mind and more stable emotions.

Antidiabetic

Several studies have shown that butterfly pea flowers (Clitoria ternatea L.) have the potential to help lower blood sugar levels, which provides significant benefits for people with diabetes. Butterfly pea flower extract contains bioactive compounds such as flavonoids and anthocyanins, which can increase insulin production and secretion. Insulin is a hormone that functions to regulate blood glucose levels, and increased insulin production can help lower blood sugar levels in people with diabetes. Thus, butterfly pea flowers play an important role in supporting diabetes management naturally. In addition, butterfly pea flowers also have antioxidant and anti-inflammatory properties that can help protect

body cells, including pancreatic cells, from further damage. The pancreas is the organ that produces insulin, and damage to the pancreas can worsen diabetes. The bioactive compounds in butterfly pea flowers, especially flavonoids and anthocyanins, work by reducing oxidative stress and inflammation that can damage pancreatic cells. This reduction in oxidative stress is very important, because free radicals produced by metabolic processes and inflammation can damage various body cells, including pancreatic cells that produce insulin (Mendrofa, et al. 2024).

Research also shows that the use of butterfly pea flower extract can increase serum levels of antioxidant enzymes such as catalase (CAT) and superoxide dismutase (SOD). These enzymes function to reduce free radical damage, as well as help reduce inflammation in the body. By increasing CAT and SOD levels, butterfly pea flowers can strengthen the body's defense system against oxidative stress, which often occurs in people with diabetes. With a combination of hypoglycemic, antioxidant, and anti-inflammatory properties, butterfly pea flowers can be an effective alternative therapy in the management of diabetes. The use of butterfly pea flower extract can help lower blood sugar levels, protect pancreatic cells from damage, and improve overall body well-being. Therefore, butterfly pea flowers offer potential as a natural approach to helping people with diabetes to keep blood sugar levels under control and prevent complications associated with this disease.

Detoxification

Butterfly pea flowers (Clitoria ternatea L.) have the ability to help the body's detoxification process, which is a natural process by which the body removes toxins and harmful substances that build up due to exposure to pollution, unhealthy foods, or metabolic byproducts. Bioactive compounds contained in butterfly pea flowers, such as flavonoids and anthocyanins, play an important role in supporting this detoxification. Flavonoids and anthocyanins work by improving liver function, which is the main organ responsible for processing and removing toxins from the body. These compounds help stimulate the production of detoxification enzymes in the liver, which function to convert toxins into forms that are more easily excreted from the body through urine or feces. In addition, flavonoids and anthocyanins have strong antioxidant properties, which help protect liver cells from oxidative damage caused by exposure to toxins. Oxidative damage can occur when free radicals attack body cells, including liver cells, which reduces the liver's ability to function optimally in the detoxification process. By protecting the liver from this damage, butterfly pea flowers help maintain liver health and improve the body's ability to eliminate toxins. Thus, consuming butterfly pea flowers can support the body in the detoxification process, maintain liver health, and increase the body's ability to remove accumulated toxins. In addition, butterfly pea flowers also help improve the balance of the body's overall system by reducing oxidative stress and improving the immune system. Therefore, butterfly pea flowers can be a natural

choice to support body health and help cleanse toxins that can affect long-term health (Afianto, R. 2024).

However, despite the many benefits found in existing studies, further research is still needed to confirm the right dosage and long-term effects of using butterfly pea flowers in medicine. Most of the existing studies are still limited to animal trials or laboratory tests, so further research is needed involving clinical trials in humans to better understand the effects of butterfly pea flowers directly in medicine and health.

CONCLUSION

Based on the results of analysis of various existing studies, butterfly pea flowers (Clitoria ternatea L.) have great potential in supporting human health through their bioactive compound content, including flavonoids, anthocyanins, and alkaloids. These compounds provide various significant therapeutic benefits, which can support overall body health. Flavonoids and anthocyanins, for example, have strong antioxidant properties, which play a role in fighting free radicals and preventing oxidative damage that can damage body cells and cause various degenerative diseases. In addition, these compounds also have anti-inflammatory effects that can help reduce inflammation in the body, which plays an important role in managing various inflammatory conditions, such as arthritis, asthma, and heart disease. In addition to antioxidant and anti-inflammatory effects, butterfly pea flowers also show neuroprotective properties, which means they can protect nerve cells from damage and improve overall brain health. This is very useful for improving cognitive function and protecting the brain from neurodegenerative diseases, such as Alzheimer's and Parkinson's. The alkaloids contained in butterfly pea flowers also contribute to providing a relaxing and calming effect, which can help reduce anxiety and stress, as well as improve mental well-being. Although there are many benefits that can be obtained from butterfly pea flowers, further research is still needed to understand the molecular mechanisms underlying these effects. Although the results of existing research are very promising, most studies are still limited to laboratory or animal trials. Therefore, further research is needed, especially clinical trials in humans, to confirm the safety, proper dosage, and long-term effectiveness of butterfly pea flowers. This more in-depth research will be very important to ensure that butterfly pea flowers can be used safely and effectively as an alternative therapy to support human health.

BIBLIOGRAPHY

Afianto, R. (2024). The Effect of Butterfly Pea Flower Extract (Clitoria Ternatea L.) on the Image of Liver Cell Necrosis Experimental Study on Male White Rats of Wistar Strain (Rattus Norvegicus) Induced by MSG (Doctoral Dissertation, Sultan Agung Islamic University Semarang).http://repository.unissula.ac.id/34595/

AJENG, DAS (2022). In Vivo Activity Test of Sunscreen Cream with Active Ingredients Combination of Butterfly Pea Flower Extract (Clitoria Ternatea)

and Aloe Vera (Aloe Vera) on Mice (Mus Musculus) (Doctoral Dissertation, Uin Raden Intan Lampung).http://repository.radenintan.ac.id/21024/
Arifah, EN (2024). Physical Properties Test of Face Toner Preparations from Butterfly Pea Flower Extract (Clitoria Ternatea L.) (Doctoral dissertation, Harapan Bersama Polytechnic).http://eprints.poltektegal.ac.id/4517/
Asichah, S. (2024). The Effect of Giving Butterfly Pea Flower Extract Gel (Clitoria Ternatea L.) on Interleukin-10 (Il-10) and Glutathione Peroxidase (GPx) Levels (Experimental in vivo study on male Wistar rats exposed to UV-B rays) (Doctoral dissertation, Sultan Agung Islamic University, Semarang).http://repository.unissula.ac.id/33935/
Badi'ah, N. (2024). The Effect of Consuming Butterfly Pea Flower Tea (CLITORIA TERNATEA) on Reducing Blood Pressure in Elderly People with Hypertension (At the Elderly Health Post, Sekoto Village, Badas District, Kediri Regency) (Doctoral dissertation, ITSKes Insan Cendekia Medika Jombang).https://repository.itskesicme.ac.id/id/eprint/7722/
Dianatasya, A. (2020). Analysis of Vitamin C Levels in Infused Water of Butterfly Pea Flowers (Clitoria Ternatea) and Lemon (Citrus Limon) (Study at Koala Regency Semolowaru Bahari Housing, Surabaya) (Doctoral dissertation, STIKES Insan Cendekia Medika Jombang).https://repository.itskesicme.ac.id/id/eprint/4056/
Ersila, Wahyu, And S. St. (2024) "The Role of Cadres in Optimizing Food Security in Pregnant Women." Challenges and Problems of Public Health Science (2024): 27.https://shorturl.at/7u1kC
Husni, M., Baidah, B., Asnuriyati, W., & Mawarni, T. (2024). The Relationship Between Mental Health and Quality of Life in Individuals with Chronic Diseases. Journal of Education and Teaching Review (JRPP), 7(3), 11385-11392.http://journal.universitaspahlawan.ac.id/index.php/jrpp/article/view/32553
Irianti, TT, & Nuranto, S. (2021). Antioxidants and health. Ugm Press.https://shorturl.at/4YGE3
Kok, T., Jayani, NIE, Rani, KC, Dahliana, A., Budhyantoro, A., & Ningrum, IS (2023). Toga and Processed Products.http://repository.ubaya.ac.id/43940/
Marpaung, AM (2020). Review of the benefits of butterfly pea flowers (clitoria ternatea l.) for human health. Journal of Functional Food and Nutraceutical, 63-85.http://journal.sgu.ac.id/jffn/index.php/jffn/article/view/30
Marpaung, AM (2020). Review of the benefits of butterfly pea flowers (clitoria ternatea l.) for human health. Journal of Functional Food and Nutraceutical, 63-85.http://journal.sgu.ac.id/jffn/index.php/jffn/article/view/30
Mendrofa, DS, Zega, AI, & Karota, E. (2024). Effectiveness of Butterfly Pea Flower Extract (Clitoria Ternatea L.) to Lower Blood Sugar Levels: Literature Review. Journal of the Indonesian National Nurses Association (JPPNI), 9(1), 50-63.https://jurnal-ppni.org/ojs/index.php/jppni/article/view/586
Rahmawati, M., Zaitun, Z., & Hayati, M. (2024, December). Training on the Utilization of Butterfly Pea Flowers in Food Products in Krueng Lamkareung Village, Aceh Besar Regency. In National Seminar on Research

and Community Service of Agricultural Product Technology (Vol. 4, Pp. 6-10).https://jurnal.usk.ac.id/THPConf/article/view/41887
Sari, DP (2023). Prebiotic Potential and Stability of Butterfly Pea Flower Extract (Clitoria ternatea L.) Encapsulated with Maltodextrin and Gelatin on the Growth of Lactobacillus bulgaricus (Doctoral dissertation, Duta Wacana Christian University).https://katalog.ukdw.ac.id/id/eprint/8031
Septiani, FA, & Purnamasari, R. (2025). Butterfly Pea Plant: Natural Wealth for Health. CV. Gita Lentera.https://shorturl.at/xLvQE
Septiani, FA, & Purnamasari, R. (2025). Butterfly Pea Plant: Natural Wealth for Health. CV. Gita Lentera.https://shorturl.at/wSxlj
Sumartini, S. (2020). Analysis of butterfly pea flowers (clitoria ternatea) with pH variations using the liquid chromatograph-tandem mass spectrometry (lc-ms/ms) method. Pasundan Food Technology Journal (PFTJ), 7(2), 70-77.https://journal.unpas.ac.id/index.php/foodtechnology/article/view/2983
Suryawati, AAMA, & Santika, IWM (2023, November). Potential and Pharmacological Effectiveness of Butterfly Pea Flower Extract (Clitoria ternatea L.) as an Antidiabetic Supplement: A Systematic Review. In Proceeding of the National Pharmacy Workshop and Seminar (Vol. 2, pp. 61-76).https://shorturl.at/Aqm3c
Syifa, EV (2023). The Effect of Comparison of Butterfly Pea Flowers (Clitoria Ternatea L) and Dried Lemon (Citrus Lemon) on the Physicochemical Properties of Tisane (Doctoral dissertation, Faculty of Engineering, Unpas).http://repository.unpas.ac.id/63125/
Warsita, KS (2024). Ethnobotany of Ecoprint Dye Plants by the Community of Tempurejo and Ambulu Districts, Jember Regency, East Java Province (Doctoral dissertation, Maulana Malik Ibrahim State Islamic University).http://etheses.uin-malang.ac.id/63864/
Yurisna, VC, Nabila, FS, Radhityaningtyas, D., Listyaningrum, F., & Aini, N. (2022). Potential of butterfly pea flower (Clitoria ternatea L.) as antibacterial in food products. JITIPARI (Scientific Journal of Food Technology and Industry UNISRI), 7(1),68-77.https://ejurnal.unisri.ac.id/index.php/jtpr/article/view/5738

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