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One Health and Ethnopharmacological Exploration: Medicinal Plants for the Treatment of Rabies in Kualin, East Nusa Tenggara

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ABSTRACT
Rabies is a zoonotic disease caused by the rabies virus and can be fatal if not treated promptly. In Kualin, East Nusa Tenggara, residents have long utilized traditional medicinal plants to treat rabies. This research aims to explore the types of medicinal plants used by the Kualin community for rabies treatment and investigate their properties and methods of use. The research method employed is descriptive qualitative, involving interviews and direct observation. The results indicate that several plants are commonly used, including soursop *(Annona muricata)*, turmeric *(Curcuma longa)*, ginger *(Zingiber officinale)*, gotu kola leaves *(Centella asiatica)*, and tobacco *(Nicotiana tabacum)*. This ethnopharmacological knowledge should be preserved and developed as part of local wisdom in managing public health. Further research is necessary to identify and test the effectiveness of the medicinal plants used by the community in treating rabies.

Keywords: Ethnopharmacology, Rabies, Medicinal Plants, Kualin, NTT.

I. Introduction

Rabies is a zoonotic disease caused by the rabies virus, which can be fatal if not treated promptly. In East Nusa Tenggara, particularly in the Kualin area, rabies cases frequently occur, primarily due to bites from infected animals. The local community often relies on traditional medicine as a complementary approach to medical treatment for managing the effects of animal bites. This traditional medicine includes using various medicinal plants passed down through generations, which are believed to help alleviate symptoms and enhance the immune system. Etnopharmacological research in this region aims to document and scientifically validate the efficacy of medicinal plants used by the community in addressing rabies cases and other diseases. Thus, knowledge of traditional medicine can be preserved and utilized more broadly within public health (Kemenkes, 2019).

Rabies is a zoonotic disease transmissible from animals to humans, caused by a virus from the Lyssavirus genus. This virus attacks the central nervous system and is almost always fatal once clinical symptoms appear. The transmission of this infection typically occurs through the saliva of rabies-infected animals (HPR), such as dogs, bats, cats, and monkeys, usually through bites, scratches, or direct contact with mucous membranes, such as those in the eyes, mouth, or open wounds. In Indonesia, particularly in East Nusa Tenggara, rabies cases are frequently reported and pose a serious concern for public health. The community in this area often relies on traditional medicine as a complementary treatment following exposure to animal

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bites. Therefore, it is essential to conduct ethnopharmacological studies to document and evaluate the potential of medicinal plants used by the local community in addressing the impacts of rabies and to enhance understanding of existing traditional medicine. Rabies is a zoonotic disease transmissible from animals to humans, caused by the lyssavirus. Once clinical symptoms appear, the lyssavirus attacks the central nervous system and is nearly 100% fatal. This infection is transmitted through the saliva of rabies-infected animals (HPR), such as dogs, bats, cats, and monkeys, typically through bites, scratches, or direct contact with mucous membranes (eyes, mouth, or open wounds) (Yamada et al., 2019).

Rabies is a severe infection that affects the central nervous system and is caused by the rabies virus. The primary carriers of this virus are dogs, although cats and monkeys also play a role in its transmission. The incubation period for rabies typically ranges from 2 to 3 months, but it can vary from 1 week to 1 year depending on the location of the bite, specifically how close it is to the brain. Approximately 40% of bites from animals suspected of being rabid occur in children under the age of 15. Immediate treatment following exposure is crucial to prevent the progression of this disease (Amoako et al., 2021). The One Health concept generally refers to an integrated approach to designing and implementing programs, policies, legislation, and research involving various sectors, including human health, animal health, agriculture, and the environment. This approach emphasizes the importance of communication and collaboration among disciplines for better public health outcomes. By recognizing that human, animal, and ecosystem health are interconnected, One Health aims to address global health challenges holistically and sustainably (Aditama, 2022). The One Health approach integrates human, animal, and environmental health and is essential in managing this outbreak. Ethnopharmacological studies can provide insights into local communities' use of traditional medicine in the early management of rabies. The One Health approach is a cross-disciplinary concept that acknowledges human, animal, and environmental health interconnections. In ethnopharmacology, the One Health approach allows for an understanding of the relationship between local communities' use of traditional medicines and the health of humans and animals, as well as their impact on the environment. For example, using medicinal plants in traditional medicine can have positive or negative effects on the health of humans and animals and the sustainability of natural resources.

Ethnopharmacology is the study of the use of medicinal plants by traditional communities for the treatment of diseases. Medicinal plants hold significant potential for the development of alternative therapies, especially in the context of traditional medicine. Knowledge about medicinal plants is often localized and influenced by the culture and practices of the local community. In East Nusa Tenggara, knowledge of medicinal plants is passed down through generations and has become an integral part of the local culture (Korassa et al., 2023). This research aims to inventory the medicinal plants used for the management of rabies, as well as their efficacy and methods of use. Ethnopharmacology is a branch of pharmacology that examines the traditional use of medicinal substances derived from plants by indigenous or local communities. To date, research on rabies management has predominantly concentrated on medical and epidemiological aspects, with limited attention given to local knowledge concerning the use of medicinal plants within the One Health framework. Although numerous countries have launched rabies prevention initiatives, ethnopharmacological studies involving community participation in rabies management remain scarce.

Thus, further in-depth research is necessary to elucidate the role of ethnopharmacology in rabies prevention and treatment, particularly within the local context of Kualin. Rabies, including East Nusa Tenggara, constitutes Indonesia's significant public health challenge. The disease is primarily transmitted through the bite of infected animals, such as dogs. While medical interventions, particularly vaccination, are essential, communities frequently seek alternative treatments through traditional medicinal plants. This practice reflects ethnopharmacological knowledge that has been transmitted across generations. Although a substantial body of research has addressed the use of medicinal plants in various regions of Indonesia, relatively few studies have explicitly focused on rabies management through an ethnopharmacological approach in Kualin, East Nusa Tenggara. This study seeks to address this gap by investigating the types of medicinal plants utilized by the local community to treat rabies. The objectives of this study are as follows: (1) To identify the types of medicinal plants employed by the Kualin community for rabies treatment, (2) To assess

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the therapeutic efficacy and application methods of these medicinal plants, (3) To document local ethnopharmacological knowledge as a means of preserving cultural heritage.

II. Research Method

This study adopts a qualitative descriptive approach, utilizing interviews and observation methods. Interviews were conducted with 20 respondents, consisting of community members and practitioners of traditional medicine in the Kualin area. The collected data were then analyzed qualitatively to identify various types of plants, their properties, and methods of use. Through this analysis, it is hoped that a deeper understanding of the role of plants in traditional medicine and their contribution to the health of the local community can be achieved.

III. Results and Discussion

This study was conducted in Kualin District, South Central Timor Regency, East Nusa Tenggara, from June to August 2024, involving 20 respondents. Through interviews, several medicinal plants frequently mentioned by respondents were identified. As previously noted, ethnopharmacology is the science that studies the use of medicinal plants and traditional healing practices within communities. In East Nusa Tenggara, local communities possess rich knowledge regarding using medicinal plants to treat various diseases, including rabies. Based on the interview results, several plants were commonly reported by the respondents, including: soursop leaves (*Annona muricata*), turmeric (*Curcuma longa*), ginger (*Zingiber officinale*), gotu kola leaves (*Centella asiatica*), moringa leaves (*Moringa oleifera*), and tobacco (*Nicotiana tabacum*).

Table 1. Plants Commonly Used for Initial Rabies Treatment in Kualin, Soe, East Nusa Tenggara

No.	Plant Name	Scientific Name	Medicinal Properties	Active Compounds
1	Soursop Leaves	Annona muricata	Antiviral	Annonaceous acetogenins
2	Turmeric	Curcuma longa	Anti-inflammatory	Curcumin
3	Ginger	Zingiber officinale	Immunomodulatory	Gingerol
4	Gotu Kola Leaves	Centella asiatica	Enhances immune response	Asiaticoside
5	Moringa Leaves	Moringa oleifera	Antibacterial	Moringin
6	Tobacco	Nicotiana tabacum	Antibacterial, Anti-inflammatory	Nicotine, Nornicotine

1. Soursop Leaves (*Annona muricata*) in Traditional Medicine

Soursop leaves (Annona muricata) are widely recognized in traditional medicine across various countries, including Indonesia. Although there is no direct scientific evidence linking soursop leaves to rabies treatment, several therapeutic properties of this plant may support the healing process and enhance overall health.

- Medicinal Properties of Soursop Leaves
  - Anti-inflammatory Properties: Soursop leaves contain active compounds such as acetogenins, flavonoids, and tannins, which exhibit anti-inflammatory effects. These properties are important for reducing inflammation in wounds caused by animal bites, helping accelerate healing.
  - Antimicrobial Effects: Some studies have shown that soursop leaf extracts possess antimicrobial properties that can help combat infections. While they do not directly eliminate the rabies virus, these properties may help prevent secondary infections at the bite site.

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- Immune System Enhancement: Soursop leaves are believed to boost the immune system. Strengthening the immune response may enable individuals exposed to rabies to resist infections better.
- Traditional Use: In traditional medicine practices, soursop leaves are often used as herbal decoctions or teas to support general health. It is commonly believed that using soursop leaves can aid in speeding up the recovery process after an animal bite.

- Methods of Use

Soursop leaves are typically prepared by boiling them in water or processing them into juice. In some communities, they are also consumed as herbal supplements. Soursop leaves should be regarded as a complementary therapy and should not replace appropriate medical treatments, such as rabies vaccination.

2. Turmeric *(Curcuma longa)* in Rabies Treatment

Turmeric (Curcuma longa) is one of the most widely used medicinal plants in traditional medicine, including rabies management. This plant is known for its various therapeutic properties that can aid in the healing process of wounds, particularly those caused by animal bites that may transmit the rabies virus.

- Benefits of Turmeric in Rabies Treatment

- Anti-inflammatory Properties: Turmeric contains curcumin as its main active compound, which exhibits strong anti-inflammatory effects. This is particularly important in wound treatment, as it can reduce inflammation in the affected area. Studies have shown that curcumin can accelerate healing by decreasing inflammation and promoting cell regeneration.
- Antiseptic Properties: Turmeric also possesses antiseptic qualities, helping prevent wound infections. Applying turmeric topically to animal bite wounds may help protect against bacterial and viral infections, including rabies.
- Immune System Enhancement: Turmeric is believed to boost the immune system. Strengthening the body's immune defenses makes it more capable of fighting off infections and diseases, including potential infections following an animal bite.
- Traditional Use: In several regions of Indonesia, including East Nusa Tenggara, communities often use turmeric as an alternative treatment for wounds caused by animal bites. It is commonly believed that turmeric can help prevent the rabies virus from entering the body while awaiting medical treatment, such as vaccination.

- Methods of Use

Turmeric is typically used by boiling it or grinding it into a paste to be applied directly to wounds. Some communities also consume turmeric in traditional herbal drinks (jamu) or herbal beverages to obtain its systemic health benefits.

3. Ginger *(Zingiber officinale):* Used to Manage Infection Symptoms and Boost the Immune System

Ginger (Zingiber officinale) is a widely recognized herbal plant, especially in Asia, and is known for its medicinal benefits in traditional healing practices. Although there is no direct scientific evidence linking ginger to rabies treatment, it possesses several properties that can support the healing process and improve overall health, which may benefit individuals at risk of rabies exposure.

- Benefits of Ginger in Treatment

- Anti-inflammatory Properties: Ginger contains active compounds such as gingerol and shogaol, which have potent anti-inflammatory effects. These properties are crucial for reducing

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inflammation in wounds caused by animal bites. By minimizing inflammation, ginger can help accelerate the healing process.
- Antimicrobial Properties: Ginger also exhibits antimicrobial effects that can help fight infections. Although it does not directly kill the rabies virus, its antimicrobial nature can assist in preventing secondary infections in bite wounds.
- Immune System Enhancement: Ginger is believed to enhance the immune system. The body is better equipped to fight off infections and diseases, including potential infections following an animal bite, by strengthening immune responses.
- Traditional Use: In traditional medicine, ginger is often used in herbal remedies to promote overall health and treat various ailments. Communities frequently consume ginger as tea or herbal concoctions to benefit from its health-boosting properties.

- Methods of Use

Ginger is typically used by boiling it or preparing it into herbal drinks. Some traditional recipes combine ginger with other ingredients, such as honey or lemon, to enhance its flavor and therapeutic effects. Ginger should be considered a complementary approach alongside appropriate medical treatments, such as rabies vaccination.

4. Gotu Kola Leaves *(Centella asiatica)*: Supporting Wound Healing and Immune System Enhancement

Gotu kola (Centella asiatica) is a widely used herbal plant in traditional medicine across various countries, including Indonesia. It is well-known for its properties in wound healing and promoting overall health. Although no direct scientific evidence links gotu kola leaves to rabies treatment, several of its therapeutic properties can support the healing and recovery process following an animal bite.

- Benefits of Gotu Kola Leaves in Treatment

  - Promotes Wound Healing: Gotu kola has long accelerated wound healing. Active compounds in gotu kola, such as asiaticoside, are known to stimulate collagen synthesis and promote tissue regeneration, both of which are essential for healing wounds caused by animal bites.
  - Anti-inflammatory Properties: Gotu kola possesses anti-inflammatory properties that can help reduce inflammation around the wound area. This is crucial in managing the body's reaction to animal bites and preventing further infections.
  - Boosts the Immune System: Some studies indicate that gotu kola extract can enhance the immune system's function. By strengthening the immune response, individuals at risk of rabies exposure may be better equipped to fight infections.
  - Traditional Use: In traditional healing practices, gotu kola is often used as an herbal concoction or tea to support general health. Communities believe that using gotu kola can help accelerate the healing process following animal bites.

- Methods of Use

Gotu kola leaves are typically used to boil or process into juice. Some people also consume them in the form of herbal supplements. The use of gotu kola should be considered a complementary therapy alongside proper medical treatment, such as rabies vaccination.

5. Moringa Leaves *(Moringa oleifera)*: Supporting Healing and Immune Enhancement

Moringa leaves (Moringa oleifera) are widely recognized for their medicinal properties in traditional healing practices. Although no direct scientific evidence links moringa leaves to rabies treatment, several of

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their therapeutic properties can support the healing process and improve overall health, which may benefit individuals at risk of rabies exposure.

- Benefits of Moringa Leaves in Treatment

  - Anti-inflammatory Properties: Moringa leaves contain active compounds such as flavonoids and phenolic acids, which have anti-inflammatory effects. These properties are important for reducing inflammation in wounds caused by animal bites, helping to accelerate the healing process.
  - Antimicrobial Effects: Moringa oleifera is known for its antimicrobial properties that can help fight infections. Although it may not directly kill the rabies virus, these properties can help prevent secondary infections at the wound site.
  - Boosting the Immune System: Some studies suggest that moringa leaf extract can enhance immune system function. By strengthening immunity, individuals exposed to the risk of rabies may be better equipped to combat infections.
  - Traditional Use: In traditional medicine, moringa leaves are often prepared as herbal decoctions or teas to support overall health. Communities believe that using moringa leaves can help speed up recovery following an animal bite.

- Methods of Use

Moringa leaves are typically prepared by boiling or processed into juice. Some people also consume them in the form of herbal supplements. Moringa leaves should be considered a complementary therapy alongside proper medical treatment, such as rabies vaccination.

6. Tobacco (*Nicotiana tabacum*)

Tobacco (Nicotiana tabacum) is a well-known plant as the primary ingredient in cigarettes. However, recent research has shown that this plant may have potential in rabies treatment. Although the use of tobacco in rabies treatment is still under investigation, several studies suggest that tobacco can be genetically modified to produce antibodies that can combat the rabies virus.

- Benefits of Tobacco in Rabies Treatment

  - Antibody Production: Research from the University of London indicates that genetically modified tobacco can produce monoclonal antibodies that effectively neutralize the rabies virus. These antibodies work by preventing the virus from attaching to nerve endings near the bite site, thus reducing the risk of the virus spreading to the brain.
  - Cost-Effectiveness: One of the advantages of using tobacco as a source of antibodies is the potential to produce medications at a lower cost than conventional methods. This is particularly important for developing countries that often lack access to effective rabies treatments.
  - Effectiveness in Research: Antibodies derived from genetically modified tobacco leaves have proven effective in laboratory trials for neutralizing various strains of the rabies virus. This indicates that tobacco holds promise as a potential source for new rabies therapies.
  - Potential for Drug Development: With continued research and development, tobacco could become a platform for generating safer and more effective medications to treat rabies, as well as other zoonotic diseases.

- Methods of Use

Currently, the use of tobacco in rabies treatment is limited to laboratory research. If further studies prove the effectiveness and safety of antibodies produced from tobacco, the method of administration will be determined based on clinical trial results. The use of this medicinal plant is often accompanied by local

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rituals or beliefs that enhance the perceived effectiveness of the treatment. While traditional treatments cannot replace vaccination and proper medical care, they can be a practical alternative, especially in areas with limited healthcare services.

The use of these plants is often carried out by boiling them or turning them into medicinal drinks. The community believes that a combination of modern medicine and the use of medicinal plants can yield better results in the treatment of rabies. The findings of this study are supported by research from Haselbeck et al., which states that countries with a high burden of rabies need to strengthen the implementation of strategies for rabies control, prevention, and national monitoring. In the One Health concept, the main activities include dog vaccination, access to post-exposure prophylaxis (PEP), and enhancing capacity for rabies monitoring or epidemiological surveillance (Haselbeck et al., 2021). Other research also indicates that the free and illegal movement of animals leads to the introduction of rabies into rabies-free areas (particularly from endemic regions). Animal vaccination strategies are an effective tool; sustained political and financial involvement and increased awareness of the dangers of the disease are crucial (Lojkić et al., 2021). This study represents an approach that integrates One Health and ethnopharmacology, which mutually support each other.

IV. Conclusion

Ethnopharmacology provides valuable insights into the use of medicinal plants in treating rabies in Kualin, East Nusa Tenggara. This study reveals that the local community possesses rich knowledge of the medicinal properties of local plants, which should be preserved and further developed. Documentation of the use of these medicinal plants can serve as a reference for future research and support public health efforts in addressing rabies disease.

References

Aditama, T. Y. (2022). One Health, Kesehatan Satu Bersama. EJournal Kedokteran Indonesia, 10(2), 90–91. https://doi.org/10.23886/ejki.10.207.90-1

Amoako, Y. A., El-Duah, P., Sylverken, A. A., Owusu, M., Yeboah, R., Gorman, R., Adade, T., Bonney, J., Tasiame, W., Nyarko-Jectey, K., Binger, T., Corman, V. M., Drosten, C., & Phillips, R. O. (2021). Rabies is still a fatal but neglected disease: a case report. Journal of Medical Case Reports, 15(1), 1–6. https://doi.org/10.1186/s13256-021-03164-y

Haselbeck, A. H., Rietmann, S., Tadesse, B. T., Kling, K., Kaschubat-dieudonné, M. E., Marks, F., Wetzker, W., & Thöne-reineke, C. (2021). Challenges to the fight against rabies—the landscape of African policy and prevention strategies. International Journal of Environmental Research and Public Health, 18(4), 1–15. https://doi.org/10.3390/ijerph18041736

Kemenkes. (2019). Petunjuk Teknis Penatalaksanaan Kasus Ghpr Ii. Dirjen P2P, 38. https://ayosehat.kemenkes.go.id/media-buku-saku-rabies--petunjuk-teknis-penatalaksanaan-kasus-gigitan-hewan-penular-rabies-di-indonesia

Korassa, Y. B., Lutsina, N. W., Fernandez, S. S. ., & Upa, M. S. M. P. (2023). Ibu Pasca Melahirkan Di Kecamatan Amarasi Timur. Jurnal FarmasiKoe, 6(1), 7–14. https://doi.org/10.31965/jfkoe.v6i1.1142

Lojkić, I., Šimić, I., Bedeković, T., & Krešić, N. (2021). Current status of rabies and its eradication in eastern and southeastern Europe. Pathogens, 10(6). https://doi.org/10.3390/pathogens10060742

Yamada, A., Makita, K., Kadowaki, H., Ito, N., Sugiyama, M., Kwan, N. C. L., & Sugiura, K. (2019). A comparative review of the prevention of rabies incursion between Japan and other rabies-free countries or regions. Japanese Journal of Infectious Diseases, 72(4), 203–210. https://doi.org/10.7883/yoken.JJID.2018.431