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Preface

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PREFACE

The 4th International Conference on Agricultural Engineering for Sustainable Agriculture Production (AESAP) 2021 was successfully organized by Mechanical and Biosystem Engineering Department, Faculty of Agriculture Engineering and Technology, IPB University. Organizer was collaborated with (1) Indonesian Society of Agricultural Engineering (ISAE) Bogor Chapter, (2) Indonesian Industrial & Beverages Crops Research Institute (IIBCRI), Ministry of Agriculture, Indonesia, (3) Indonesian Industrial and Beverage Crops Research Institute, Ministry of Agriculture - Republic of Indonesia and (4) Yanmar Agricultural Research Institute (YARI) IPB. Due to COVID-19 related real conference and travel restrictions, AESAP 2021 was held as an online conference on 11-12 Octobers 2021 by Online Video Conference platform.

The conference has provided an opportunity to strengthen network among academicians, researcher, practitioners, and government in collaboration for sustainable agriculture productions. This year, the theme of the conference is “*The Role of Agricultural and Biosystem Engineering to provide and manage Food, Land, Water, and Bioenergy to achieve Sustainable Development Goals (SDGs) toward Industry 4.0*”. The conference was thematically discussed the contribution of biosystem engineering for sustainable agriculture in the industrial revolution 4.0 era, covering topics of agricultural engineering field, such as:

1. Postharvest and Food Engineering
2. Energy and Agricultural Machinery
3. Land and Water Resources Engineering
4. Agricultural Structure and Environment Engineering
5. System Engineering and Informatics for Agriculture

AESAP 2021 main program consisted of three plenary sessions. AESAP 2021 successfully delivered 30 minutes-plenary lectures (20-minute lecture and 10-minute discussion) by five (5) difference countries such as: Dr. Ir. Sam Herodian (Indonesia), Prof. Emiritus Mikio Umeda (Japan), Dr. Dares Kittiyopas (Thailand), Dr. Rossana Marie c. Amongo (Philippine), Dr. Ir. Dadan Kusdiana, M.Sc (Indonesia), Assoc. Prof. Dr. Eng. Muhammad Aziz (Japan), Assoc. Prof. Dr. Ryozo Noguchi (Japan), Prof. Dr. Yukihiko Matsumura (Japan), Prof. Dr. Kudang Boro Seminar (Indonesia), Asif Aunillah, STP., M.Sc (Ministry of Agriculture, Indonesia), Prof. Dr. Ir. Herry Suhardiyanto, (Indonesia), Dr. Arora Amarpreet Singh (Korea) and 80 parallel presenters.

The paper committee received 115 submissions and finally accepted 80 full papers presentations were delivered in the conference and published in this AESAP 2021 proceedings after the peer reviewing process. There were more than 200 participants who attended online AESAP from 7 countries (Japan, Malaysia, Thailand, Brunei Darussalam, South Korea, Philippines, and Indonesia). The differences in time zones and the quality of the participants' internet networks posed a challenge to the implementation of this online conference. However, this was resolved by conducting preparatory Zoom video meetings with session chairs and presenters before the conference was taken place. Therefore, the technical quality and delivery success of the conference were very good.

Acknowledgments and appreciations are given to the Rector and Vice Rector of IPB University for their support to the conference, to the reviewers and editorial board members, committee members, and event partners who worked hard to make the conference and the publication of this proceeding successful.



The paper committee did their best to accomplish manuscript reviewing and editing by following the best scientific standards in the IOP Conference Series: Earth and Environmental Science. However, there might be some shortcomings found in this proceeding. Therefore, suggestions from readers are greatly appreciated, so that the quality of the AESAP conference proceeding will be improved in the future. We hope this AESAP 2021 proceedings will provide knowledge and benefits to academics, scientists, industrial stakeholders, and policy makers, especially in the field of biomass and bioenergy. Thank you for your kind attention.

Bogor, April 2022

The 4th International Conference on Agricultural Engineering for Sustainable
Agriculture Production
Organizing Committee



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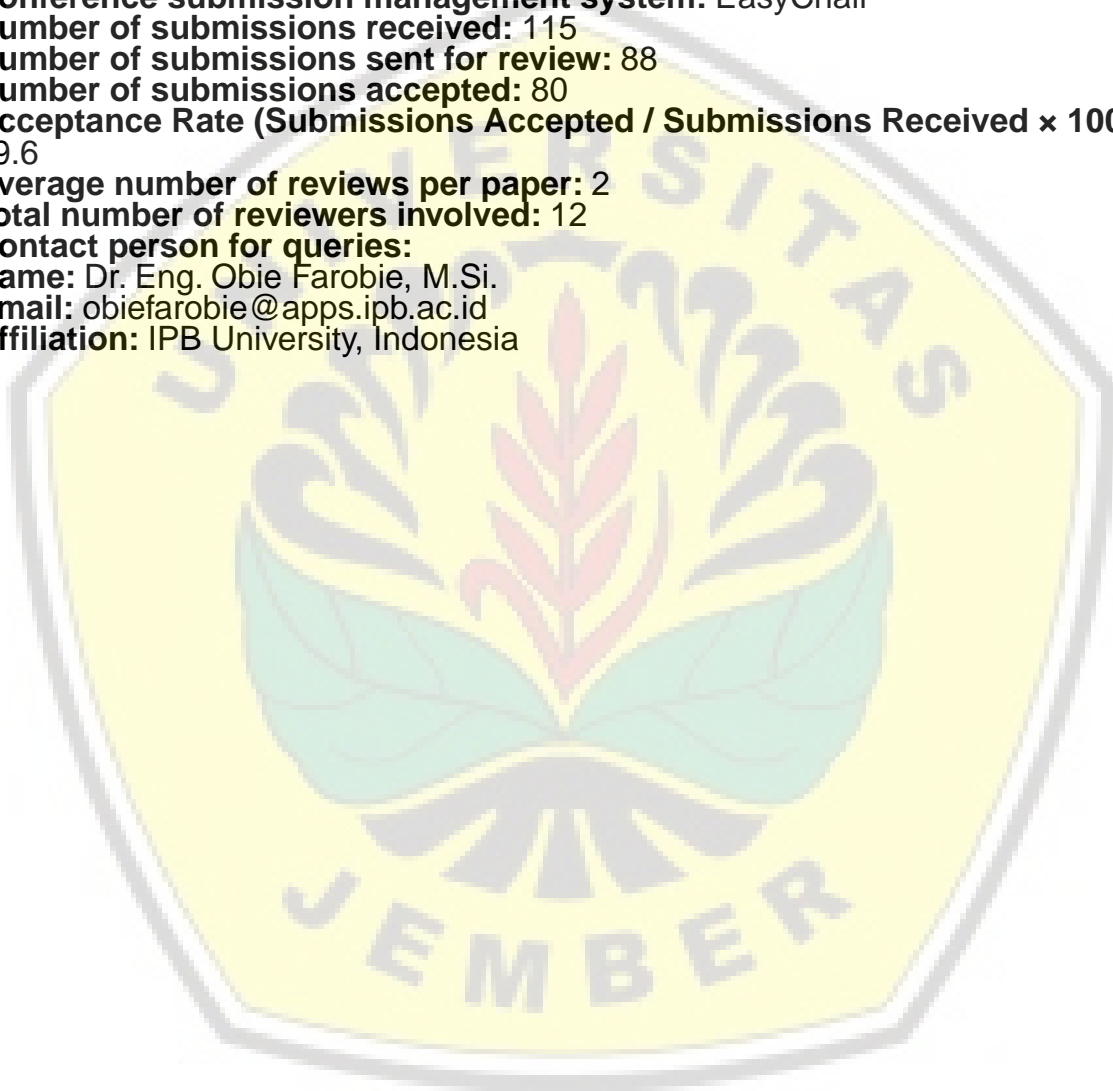
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All papers published in this volume have been reviewed through processes administered by the Editors. Reviews were conducted by expert referees to the professional and scientific standards expected of a proceedings journal published by IOP Publishing.

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- **Number of submissions received:** 115
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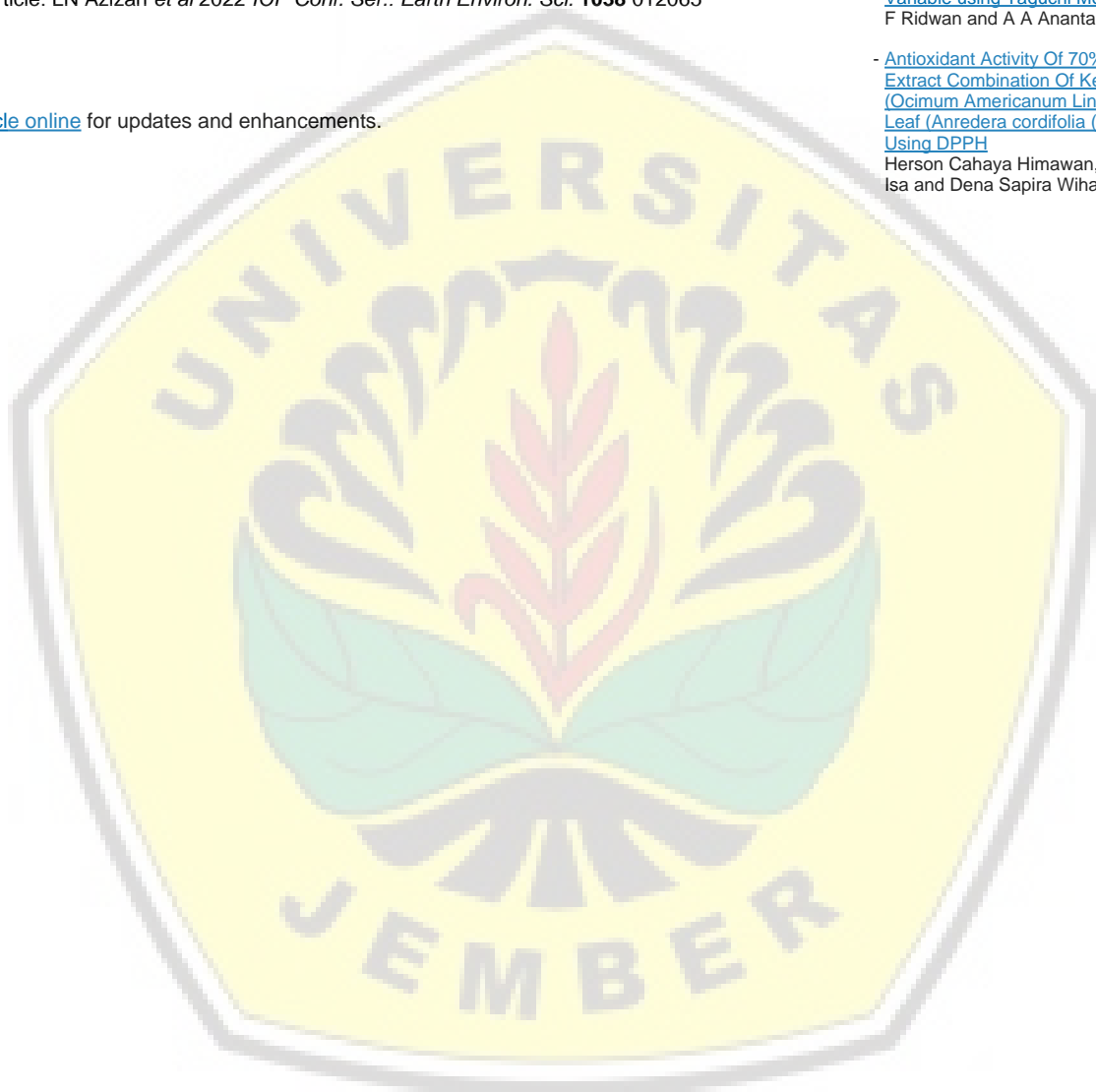
Study of the use of Binahong (*Anredera cordifolia*) herbal as complementary treatment wounds in the Tenger Tribe

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Study of the use of Binahong (*Anredera cordifolia*) herbal as complementary treatment wounds in the Tenger Tribe

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Abstract. The event of injury in Indonesia is an increasing where this is dominated by blucits/brumes. One of their wound healing can be done with complementary therapy. Complementary therapy currently used by the tenger tribe in the treatment of daily wounds. This is because medicine plants are very easy to get in the tenger area. . The purpose of this study was to analyze the implementation of wound treatment carried out by the Tengger Tribe. The design used is a qualitative research with in-depth data collection described in the form of a narrative. The population is the Ngadisari village community by meeting the inclusion criteria. The results showed that most of the respondents were 40-49 years old, more than indicated by the female gender, more of them had a junior high school education background, most of the locations of injuries to the hands, almost all causes of injuries. caused by sharp objects, more than looking at the area and depth of 0.5 – 2 cm, more than dealing with injuries that occurred 1-2 years ago, most of them used complementary therapies at the time of the injury. , and mostly use potions and boiled water from Binahong. It can be said that of all respondents who did complementary therapy, most of them did complementary therapy for wound healing with binahong leaf ingredients. From these results, further research is needed to examine the content and benefits of binahong leaves, especially for wound healing.

1. Introduction

Currently, the incidence of injuries in Indonesia is quite high, as seen from the Basic Health Research (Riskesmas) data from the Ministry of Health of the Republic of Indonesia in 2013 the incidence of injuries/injuries nationally was 8.2% and increased to 9.2%. The proportion of injuries/wounds in Indonesia is dominated by abrasions/bruises at 70.9%, the second most common injury is sprains, and the third most common type of injury is laceration, and other types of injuries with a small proportion, namely fractures 5.8%, severed limbs 0.3%, eye injuries 0.6%, and concussion 0.4%. [7]. Wound healing management can be done with conventional therapy or with complementary therapy. Complementary therapy is also known as traditional medicine or folk medicine, which consists of knowledge developed from generation to generation in various societies before the era of modern medicine [1].

A total of 89,753 out of 294,962 (30.4%) households in Indonesia used traditional health services in the last 1 year [3]. According to Riskesmas 2013, the proportion of traditional health services utilized is 48% ready-made ingredients, 31.8% homemade ingredients, 65.3% manual skills, 1.9% thinking skills and 2.1% energy skills.

People use this therapy for reasons of belief. Clients who use complementary therapy have several reasons. One of the reasons is the holistic philosophy of complementary therapy, namely the existence of inner harmony and health promotion in complementary therapy. Other reasons for financial reasons, chemical drug reactions and cure rates, decision making in treatment, and improved quality of life compared to before. A total of 82% of clients reported side effects from conventional treatment which caused them to choose complementary therapies. Complementary therapies that exist are one of the treatment options in the community. In various health care places, not a few clients ask about complementary therapies to health workers such as doctors or nurses. The role that nurses can give in complementary or alternative therapy can be adjusted to the existing nurse's role, according to the limits of their abilities. The increasing needs of the community and the development of research on



complementary therapies are opportunities for nurses to participate according to community needs. The nurse can act as a consultant to the client in selecting appropriate alternatives ^[11].

WHO also defines traditional medicine as a system of medical knowledge that developed over generations in societies prior to the era of modern medicine, including health practices, approaches, knowledge and beliefs incorporating plant, animal and mineral based medicines, spiritual remedies, techniques manual and exercise, applied singly or in combination to treat, diagnose, and prevent disease or maintain well-being ^[4].

One of the tribes in Indonesia that still maintains its culture and traditions well is the Tengger tribe in East Java. This tribe is located in four districts, namely Probolinggo, Pasuruan, Lumajang and Malang districts. Geographically, the Tengger tribe in Lumajang and Malang Regencies are located far from the center of Tengger cultural rituals, which are generally located around the crater of Mount Bromo. Therefore, the culture of the Tengger tribe in that location tends to be eroded by the entry of foreign cultures. The livelihood of the Tengger people is farming. Their fields are on mountain slopes and hilly peaks. The farming tools used are very simple, consisting of hoes, sickles and the like. This condition can lead to a risk of injury or injury.

The Tengger tribe is one of the tribes in Indonesia that still adheres to its customs and culture, including its local knowledge about treatment using medicinal plants. Traditional medicine is also easy to obtain because it grows around the environment in the Tengger tribal area. The high price of synthetic drugs and the presence of adverse health side effects have prompted people to use traditional medicines again. Traditional medicine is also easy to obtain because it grows around the environment in the Tengger tribe. The use of traditional medicine has been passed down from generation to generation and until now many medicinal plants have scientifically proven efficacy ^[9].

Until now, no research has been conducted on the choice of treatment, especially complementary therapies used by the Tengger Tribe to treat wounds/injuries, so basic research is needed to explore this.

2. Methods

This study uses a descriptive design with a qualitative method approach which aims to determine the use of the Binahong herb drink as a complementary therapy in wound care in the Tengger Tribe with deep interview data collection methods. This research was carried out for 3 weeks in November 2020. The variable of this study was the use of the Binahong herb drink as a complementary therapy for wound care in the Tengger tribe. The research population was the entire community of Ngadisari Village, Sukapura District, Probolinggo Regency, using purposive sampling, with a total sample of 30 people.

3. Results and Discussion

3.1 General data

3.1.1 Age

Table 3.1 Age distribution of respondents

Age range	Frequency	Percentage
20 – 29	6	20
30 – 39	5	16.7
40 - 49	10	33.3
50 – 59	7	23.3
60 – 69	1	3.3
70 - 79	1	3.3
Amount	30	100

The results in table 3 showed that the respondents with the highest number in the age group 40-49 years amounted to 33.3%. The Central Bureau of Statistics categorizes the age group of 15-64 years as productive age. In relation to injury, the young age group is the group at risk for injury. Ages 15-24 years old had a 2.17 higher risk of injury than those aged 55-64 years. The older the age, the lower the incidence of injury ^[6]. Although the respondents aged 40-49 years were the largest at 33.3%, at this age

they tend to be more careful in planning and carrying out technical work. For this reason, young workers need to be educated regarding the prevention of injury.

3.1.2 Sex

Table 3.2 Gender Distribution of respondents

Sex	Frequency	Percentage
Male	12	40
Female	18	60
Amount	30	100

The results showed that the distribution of female respondents was more than male. According to the theory, men have greater demands as workers because men are more active outside the home. However, for Tengger farmers, according to researchers, more respondents are female because in Ngadisari village women have a livelihood as farmers. Meanwhile, men have more livelihoods as tour guides

3.1.3 Education

Table 3.3 Education Distribution of respondents

Education	Frequency	Percentage
Primary/elementary school	3	10
Junior High School	16	53.3
Senior High School	11	36.7
Amount	30	100

In terms of education level, the average respondent has an elementary education. This is influenced by several factors, including age, socio-cultural, and economic. Respondents with productive age in this study were mostly junior high school educated, supported by local socio-cultural factors which considered education not too important and need not be high because they are economically well established and the domicile distance is too far to reach the city to complete higher education. In relation to wound management, limited knowledge will affect the preventive measures taken.

3.1.4 Residence

Table 3.4 Residence Distribution of respondents

Residence	Frequency	Percentage
Cemara Lawang	17	56.7
Ngadisari	11	36.7
Guyangan	2	6.6
Amount	30	100

The results showed that the most residential locations were in the Cemara Lawang hamlet area, followed by Ngadisari hamlet and Guyangan hamlet. This village has a moor area of 456 hectares as a farming area and a tourist area of 279,300 hectares. The area of agricultural fields in the village of Ngadisari is located mostly in the hamlet of fir Lawang. However, land owners and cultivators can be in all hamlets in Ngadisari. In this area, injuries often occur.

3.2 Special Data (use of Binahong herb as a complementary therapy in wound care in the Tengger Tribe)

3.2.1 Characteristic of wound

3.2.1.1 Location of wound

Table 3.5 Characteristic Location of wound of respondents

Location of wound	Frequency	Percentage
Hand	23	76.7
Foot	6	20
Head	1	3.3
Amount	30	100

The results showed that the location of the most dominant wound experienced by respondents was on the hand (on the fingers). For example, like a sickle incision. Working conditions that are dominated by hands are very at risk of injury to the upper extremities. Likewise in the lower extremities or feet, for example, stab wounds with nails, conch shell injuries, due to lack of use of personal protective equipment on the feet such as boots.

3.2.1.2 Etiologi of wound

Table 3.6 Characteristic Etiologi of wound of respondents

Etiologi of wound	Frequency	Percentage
Sharp object	28	93.4
Accident on the way to and from work	2	6.6
Amount	30	100

The results of the study showed that the causes of injuries were almost entirely due to sharp objects (agricultural tools such as sickles, hoes) and the rest were due to work accidents in agricultural areas. According to Maisyaroh, the intensive use of machinery and pesticides and other agrochemicals can cause poisoning and stab wounds, cuts and bruises. Most agricultural accidents are closely related to the pattern of use of agricultural machinery ^[8].

3.2.2 Management wound

Table 3.7 Characteristic of respondents based on the treatment used when wounded

Management used	Frekuensi	Prosentase
Complementary Therapy	24	80.2
Combined Medical Action and Complementary Therapy	6	19.8
Amount	30	100

The results of the study showed that most of the respondents carried out treatment in the traditional way (complementary therapy) when an injury occurred, especially in agricultural areas. This happens because the location of the fields is quite far from clinics or other health facilities, so the community considers that the fastest and most practical way to treat wounds is to use herbs that are available around the managed fields. A small number of respondents used a combination of medical management with complementary therapies for wounds. This happens because the wound experienced is quite extensive and is in a vital area such as the head so that *hechting* is needed to stop the bleeding and close the wound. However, after the action, the respondent combined it with traditional ingredients (*bobok*) to speed up the wound healing process.

3.2.3 Complementary Therapies used by the Tenggerese in wound care

Wound care behavior is divided into wound care on the outside of the body by means of application and wound care from the inside by consuming a potion that is believed by the people of Ngadisari to heal wounds. The type of complementary therapy used is the binahong herb drink.

3.2.3.1 Actions taken at the beginning of the injury

Table 3.8 Complementary Therapy based on taken at the beginning of the injury

Complementary Therapy	Frequency	Percentage
Getah Pohon Pisang	4	13.2
Binahong	8	26.4
Jarak Merah	2	6.6
Warm water	2	6.6
Tunas Pohon Pisang	1	3.3
Sawang Laba-laba	1	3.3
Ganjan	1	3.3
Red onion	1	3.3
Urine	1	3.3
Fuel	1	3.3
Land	1	3.3
Asem Aseman	1	3.3
Combined medicine (<i>Hechting</i> , Betadine, etc)	6	19.8
Amount	30	100

In research that has been carried out on Binahong leaves, it is known that these leaves contain flavonoids, polyphenols, saponins and alkaloids which are active ingredients that can be used as antibiotics, antivirals and anti-inflammatory. Binahong leaves contain antibiotics with a minimum concentration of 1000 ppm. Respondents usually process binahong leaves (usually an odd number of 3 leaves, or 5 leaves, or 7 leaves) then pounded and applied to the wound area, shortly after the injury.

As a wound medicine, Binahong contains several chemical ingredients, namely flavanoids, oleanolic acid, protein, saponins, and ascorbic acid. The content of flavonoid substances is responsible through anti-inflammatory mechanisms, inhibiting free radical activity, and increasing the speed of epithelialization. The ascorbic acid content is very important for activating the prolyl hydroxylase enzyme which supports the hydroxylation stages in the formation of collagen, where immediately after injury, exposure of fibrillar collagen to the blood will cause aggregation and activation of platelets and release chemotactic factors to accelerate the formation of granulation tissue, thus accelerating the process. wound healing. While the content of Saponins functions as a cleanser and antiseptic that can prevent infection in wounds ^[1].

The alkaloids contained in Binahong leaves have the ability as antibacterial by interfering with the peptidoglycan constituent components of bacterial cells, so that the cell wall layer is not fully formed and causes cell death. Likewise, the polyphenol content in Binahong leaves is thought to help fight the formation of free radicals in the body so that it is anti-aging ^[10].

After the initial wound treatment is carried out, the next stage is the wound healing process with the actions taken by the community are: consuming concoctions in the form of drinks originating from Binahong in the form of boiled water from binahong leaves to accelerate wound healing from within. According to the respondent, this action has been inherited from previous parents, with the assumption that it can stop bleeding quickly, practically and is available in nature. This medical tradition is also carried out from generation to generation in this community.

The results of Astuti's research stated that several beneficial substances were found in the leaves, stems and tubers of Binahong. For example, there are glycosides and terpenoids in Binahong leaves, steroids in Binahong leaves and stems. While the alkaloids are found in the leaves, stems and tubers of the Binahong plant. Saponins were also found from the leaves and tubers of the Binahong plant. Astuti's research used dry samples and fresh samples on flowers, leaves, stems and tubers of Binahong and all of them showed the presence of Saponin ^[2]. Meanwhile, according to research Dwiyantri (2015) states that the concentration of boiled water from Binahong leaves has the ability to inhibit bacterial growth

[5]. This shows that the solution (boiled water) of Binahong has succeeded in showing significance in traditional medicine to treat various diseases from within the body, especially wound healing.

4. Conclusions

This research shows that the ingredients from Binahong are proven to be used as complementary therapies in the treatment and care of wounds due to injuries in agricultural areas. In this case, the Tenggerese use Binahong by mashing and smearing it (sleeping) or in the form of boiled water to drink. Several previous studies have conducted that Binahong contains flavonoids, polyphenols, saponins and alkaloids, oleanolic acid, protein, and ascorbic acid which can help wound healing.

5. Acknowledgments

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