



# PROCEEDINGS

## The 4<sup>th</sup> International Conference on Sustainable Innovation (ICoSI) 2020

Cutting Edge Innovations for Sustainable Development Goals

Universitas Muhammadiyah Yogyakarta (Indonesia)

October 13 - 14 2020

<https://icosi.umy.ac.id/>

## Focal Conferences



- ✔ (ICPU) The 2nd International Conference on Pharmaceutical Updates
- ✔ (ICOMS) The 6th International Conference on Management Sciences
- ✔ (ICLAS) The 9th International Conference on Law and Society
- ✔ (ICMHS) The 4th International Conference Medical and Health Sciences
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- ✔ (DREAM) The 5th Dental Research and Exhibition Meeting
- ✔ (ICHA) The 5th International Conference on Hospital Administration
- ✔ (ICOSA) The 3rd International Conference on Sustainable Agriculture





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## Preface by the Chairperson of the 4<sup>th</sup> ICoSI 2020



**Dr. Yeni Rosilawati, S.IP. S.E., MM.**

Assalamu'alaikum Wr. Wb.

All praise is due to Allah, the Almighty, on whom we depend for sustenance and guidance. Prayers and peace be upon our Prophet, Muhammad SAW, his family and all of his companions.

On behalf of the organizing committee, it is my pleasure and privilege to welcome the honourable guests, distinguished keynote & invited speakers, and all the participants.

With the main theme of “Cutting-Edge Innovations on Sustainable Development Goals (SDGs)”, the 4<sup>th</sup> International Conference on Sustainable Innovation (ICoSI) 2020 serves as a forum to facilitate scholars, policy makers, practitioners, and other interested parties at all levels from Indonesia and abroad to present their novel ideas, promote cutting-edge research, and to expand collaboration network. The conference has about 1373 participants participating from more than 8 countries 4 continents all over the world, making this conference a truly international conference in spirit.

This multidisciplinary conference was first held in 2012 and has undertaken various changes and adopted to the current technological trends of our education system. From having this conference with just 175 participants back in 2012 we have come a long way in making the conference a huge success with more than 1373 participants participating in this two-day conference.

Formerly, this conference consisted of only 9 (nine) focal conferences. This year, there are 14 focal conferences from various disciplines, namely: 1) The 2<sup>nd</sup> International Conference on Pharmaceutical Updates (ICPU), 2) The 6<sup>th</sup> International Conference on Management Sciences

(ICoMS), 3) The 9<sup>th</sup> International Conference on Law and Society (ICLAS), 4) The 4<sup>th</sup> International Conference Medical and Health Sciences (ICMHS), 5) The 6<sup>th</sup> International Conference for Accounting and Finance (ICAF), 6) The 2<sup>nd</sup> International Language and Education Conference (ILEC), 7) The 2<sup>nd</sup> International Conference on Nursing (ICONURS), 8) The International Conference on Information Technology, Advanced Mechanical and Electrical Engineering (ICITAMEE), 9) The 2<sup>nd</sup> International Conference of Agribusiness and Rural Development (IConARD), 10) The 10<sup>th</sup> International Conference on Public Organization (ICONPO), 11) The 2<sup>nd</sup> International Symposium on Social Humanities Education and Religious Sciences (ISHERSS), 12) The 5<sup>th</sup> Dental Research and Exhibition Meeting (DREAM), 13) The International Conference on Hospital Administration (ICHA), and 14) The 3<sup>rd</sup> International Conference on Sustainable Agriculture (ICoSA).

Accordingly, We are proud to announce that this year, the 4<sup>th</sup> ICoSI 2020 breaks the Museum Rekor-Dunia Indonesia (MURI) record as the Virtual Multidisciplinary Conference with the Largest Number of Area of Fields in Indonesia

In addition, this year, this conference holds special value since this is the first conference in the history of our university where the entire conference is taking place remotely on a digital platform through the use of advance technologies due to the Covid-19 Pandemic.

I would take this opportunity to express my highest respect to the Rector of Universitas Muhammadiyah Yogyakarta, Dr. Gunawan Budiyanto who gave approval and ensured the maximal support from all the faculty members of Universitas Muhammadiyah Yogyakarta (UMY) that made this event a big success. In addition, my appreciation goes to all the support teams who have provided their valuable support and advice from planning, designing and executing the program.

Let me conclude my speech by encouraging the delegates to participate with an increasing number in all the activities and discussions through the digital platforms for the next two days. I wish everyone a successful, safe, and fruitful conference.

Thank you!

Wassalamu'alaikum Wr. Wb.

Yogyakarta, Indonesia, 14 October 2020





## Welcoming Remarks by the Rector of Universitas Muhammadiyah Yogyakarta



**Assoc. Prof. Dr. Gunawan Budiyanto**

Innovation is the beginning of the development of technology, and technology is a development machine that is expected to provide benefits to humans and provide the smallest possible impact on environmental quality. In the concept of sustainable development, development must improve the quality of human life without causing ecological damage and maintain the carrying capacity of natural resources.

International Conference on Sustainable Innovation (ICoSI) is an international conference which is an annual conference held by the University of Muhammadiyah Yogyakarta (UMY), Indonesia. In 2020 this raises the issue of "Cutting-Edge Innovations on Sustainable Development Goals." Therefore, on behalf of all UMY academics, I would like to congratulate you on joining the conference, hoping that during the Covid-19 Pandemic, we can still provide suggestions and frameworks for achieving sustainable development goals.

# About The 4<sup>th</sup> International Conference on Sustainable Innovation (ICoSI) 2020

## *Cutting Edge Innovations for Sustainable Development Goals*

The 2030 Agenda for Sustainable Development is enacted by the United Nations as a shared blueprint for peace and prosperity for people and the planet, now and into the future. It consists of strategies to improve health and education, reduce inequality, and spur economic growth while also conserving natures by 2030.

This year, however, at the first one-third of its timeline, the SDG Reports shows that the outbreak of COVID-19 did hinder the achievement, or at least decelerate the progress of achieving the 17 goals. In fact, according to the report, “some number of people suffering from food insecurity was on the rise and dramatic levels of inequality persisted in all regions. Change was still not happening at the speed or scale required”, accordingly.

Therefore, in this event of pandemic, the quantity and quality of research, innovation, and more importantly multi-disciplinary collaboration are indispensable. Furthermore, there needs to be clear ends of those works. That is how those research are applicable and benefits directly to the society. That is how those research is incorporated as the drivers of policy making, and used practically in the society. Hence, the stakeholders especially the triple helix of higher education institution, government, and industry must be re-comprehended and supported to reach the common goal of the SGD.

International Conference on Sustainable Innovation (ICoSI) has been essentially attempting to strengthen this regard since its first establishment. One of the goals of ICoSI is to provide primarily a platform where scholars, practitioners, and government could grasp the development and trends of research. Hopefully, meeting these actors altogether would result in stronger collaboration, sophisticated and advantageous research, and brighter ideas for further research. Based on these reasoning, this year, the 4th ICoSI 2020 UMY is themed ‘Cutting-edge Innovations for Sustainable Development Goals’.

Improving from last year conference which brought nine focal conference, this year ICoSI 2020 UMY brings 14 disciplines, from social sciences, natural sciences, and humanities. ICoSI 2020 received as much as 1005 papers. The paper works submitted in ICoSI 2020 UMY will be published in Atlantis Proceedings, IOP Proceedings, National/International Journals, and ICoSI ISBN-indexed Proceedings.

Nevertheless, ICoSI believes that publication is only the beginning of research dissemination. The publications will enhance the chance of the research known by wider audience, and then used, applied, and incorporated at either system, institutional, or personal level of human lives.



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# TRACK ECONOMICS, LAW, EDUCATION, SOCIAL, AND HUMANITIES



# The Effectiveness of Iler Leaf (*Plectranthus Scutellarioides* [L.] R.Br. *Folium*) on the Healing Process (Diameter) Of Burn Injury Grade II A on White Mouse (*Rattus Norvegicus*) Wistar Strain.

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## ABSTRACT

Background : Burns is the occurrence of tissue damage or loss due to contact with heat sources, which often occurs in everyday life, specifically IIA-degree burns. There is a natural ingredient that is fast and easy to get and also grows around us that could be an alternative medicine namely iler plant (*Plectranthus scutellarioides* [L.] R.Br. *folium*). The contents of iler leaf extract (*Plectranthus scutellarioides* [L.] R.Br. *folium*) such as the essential oils, flavonoids, and tannins could be used as wound medicine. Objective : To discover the effects of iler leaf (*Plectranthus scutellarioides* [L.] R.Br. *folium*) ethanol extract ointment application on the healing process (diameter) of burn injury (Vulnus combutio) grade IIA on white mouse (*Rattus norvegicus*) wistar strain. Method : This research is an experimental study with a cohort prospective design. The samples used were 30 white mice (*Rattus norvegicus*) wistar strain which divided into 5 group, the intervention group (2,5%, 5%, and 10% concentration), positive control group, and negative control group. Sibro ointments were given to the positive control group, the negative control group was given a solution of NaCl 0,9%, and the intervention group was given the iler leaf ethanol extract ointment (*Plectranthus scutellarioides* [L.] R.Br. *folium*) with 2,5%, 5%, and 10% concentrations. Measurements were done every two days for 21 days. Results : Data analysis using the Friedman analysis test obtained a p significance value <0.001, this shows that the data is significant. Conclusion : There is an effect of iler leaf extract ointment application (*Plectranthus scutellarioides* [L.] R.Br. *folium*) with concentrations of 2,5%, 5%, and 10% in the healing process of grade IIA burns.

**Keywords:** iler leaf ethanol extract ointment, burn injury grade IIA, wound healing

## 1. INTRODUCTION

Burns is damage or loss of tissue caused by contact with heat sources such as fire, hot water, chemicals, electricity, and radiation. According to Sukasah (2009), based on its depth, burns can be classified as first-degree burns, second-degree burns, second-degree burns, and third-degree burns. Burns are accidents that often occur in daily life, especially second-degree burns, which damage the epidermis tissue and part of the dermis 1,2,3.

According to Basic Health Research of the Health Ministry of the Republic of Indonesia, the prevalence of burns in 2018 was 1.3% in Indonesia, and 1.0% in Central Java province.<sup>4</sup>

Some materials are often found as the first aid for burns in the community, such as toothpaste, used cooking oil, and other ingredients that actually do not heal burns but can even worsen the wound. It is known that there are natural materials that are fast and easy to obtain and grow around us, which can be an alternative, such as iler plant (*Plectranthus scutellarioides* [L.] R.Br.).

Research conducted by Tari (2013) shows that iler

leaf (*Plectranthus scutellarioides* [L.] R.Br. *folium*) with ingredients such as essential oils, flavonoids and tannins can be used as a wound medicine.<sup>5</sup>

Based on the data above, there has been no specific research in Indonesia regarding the iler leaf (*Plectranthus scutellarioides* [L.] R.Br. *Folium*) to treat second-degree burns; therefore this research would be conducted on the effect of iler leaf (*Plectranthus scutellarioides* [L.] R.Br. *folium*) in burns to be done in white rats (*Rattus norvegicus*) Wistar strain.

## 2. METHOD

This study uses a prospective cohort study design with experimental study methods. The experimental animals used were 25 white rats (*Rattus norvegicus*) Wistar strain, which were divided into five groups, with each group consisting of 5 white mice. White rats (*Rattus norvegicus*) Wistar strain is the subject of research with inclusion criteria: male mice, age 4-5 months, body weight 200-300 g, and mice without deforming. There were some criteria of the exclusion in mice, first, the mice with skin disease such as having wounds, scars, and second, the dead rats during



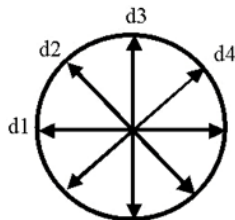
the study.

All rats were acclimatized for 7 days. Furthermore, experimental animals were divided into 5 groups consisting of the control group (K+) which was given Sibro ointment, the control group (K-) was given NaCl 0.9%, the group (K1) was given ointment of iler leaf extract ethanol with a concentration of 2.5%, group (K2) was given ointment of iler leaf extract with a concentration of 5%, and group (K3) was given ointment of iler leaf extract with a concentration of 10%. The entire group was observed for their average diameter of wounds for 21 days every two days.

The creation of IIA-degree burns is done by heating aluminum with a diameter of 2.5 cm in water heated to a temperature of 100 ° C and then applied to the rat's left-back that has been shaved for 30 seconds without any pressure. After wounding, the rats' left-back was applied with an ointment according to their respective groups.

**2.1. Measurement Method of Wound Treatment**

Burns are measured using calipers by dividing the wound into 4 diameters



**Figure 1.** (diameter 1, diameter 2, diameter 3, and diameter 4).

After that, the average diameter of the burn is calculated with the following formula:

$$dx = (d1 + d2 + d3 + d4)/4$$

dx = diameter of wound day-x

d<sub>1</sub> = diameter 1

d<sub>2</sub> = diameter 2

d<sub>3</sub> = diameter 3

d<sub>4</sub> = diameter 4

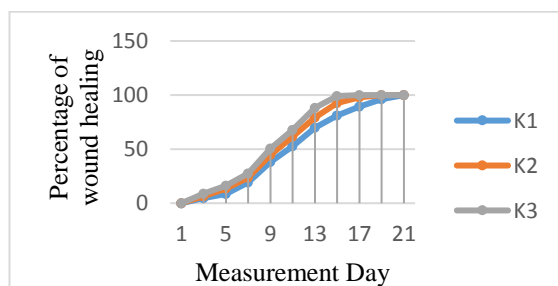
**2.2. Data Analysis**

Data obtained from the study were analyzed using SPSS software. Data normality test uses Shapiro-Wilk. If the data obtained is typically distributed, then it is analyzed using the Repeated Anova test with a significance level of 0.05. If the data obtained are not normally distributed, the hypothesis test is done with Friedman's non-parametric statistical test with the provision that if p < 0.05, then there is a significant difference, and if p > 0.05 there is no significant difference.

**3. RESULT**

Table 1. The Average of Wound Healing (%)

Kelompok	Hari 1		Hari 3		Hari 5		Hari 7		Hari 9		Hari 11		Hari 13		Hari 15		Hari 17		Hari 19		Hari 21		P value		
	Mean	SD	Mean	SD	Mean	SD	Mean	SD	Mean	SD	Mean	SD	Mean	SD	Mean	SD	Mean	SD	Mean	SD	Mean	SD			
K+	0	±0.000	9.80	±1.788	18.05	±3.193	29.04	±6.633	55.37	±4.505	75.39	±5.941	95.16	±3.162	100	±0.000	100	±0.000	100	±0.000	100	±0.000	100	±0.000	
K-	0	±0.000	3.96	±2.449	8.29	±2.607	15.82	±2.774	33.93	±2.645	47.79	±6.107	61.61	±5.215	73.85	±4.207	81.36	±4.277	90.06	±4.086	97.30	±3.346			
K1	0	±0.000	4.73	±2.280	8.65	±2.280	19.31	±4.979	38.23	±5.540	52.79	±7.120	69.75	±8.288	81.14	±5.385	89.41	±5.549	96.08	±3.741	100	±0.000	<0.001		
K2	0	±0.000	6.32	±1.673	13.44	±2.607	23.67	±3.768	44.61	±4.560	61.60	±7.021	79.36	±6.534	92.75	±5.458	98.03	±2.828	100	±0.000	100	±0.000			
K3	0	±0.000	8.28	±1.673	16.18	±2.863	27.65	±3.911	50.54	±4.335	67.88	±6.220	88.03	±5.700	99.21	±1.095	100	±0.000	100	±0.000	100	±0.000			



**Figure 1.** Graphic of the percentage of wound healing of Treatment Group

Based on Figure 1 and Table 1, it can be seen that the K3 group or the use of iler leaf extract ointment (*Plectranthus scutellarioides* [L.] R.Br. folium) with a concentration of 10% is the best treatment group in the healing process of IIA-degree burns compared to other concentration treatment groups.

Then the data analysis was conducted by the normality test using the Shapiro Wilk test. From the normality test, it was obtained that some data had a significance value of less than 0.05; therefore a hypothesis test was performed using the Friedman test. Based on the results of Friedman test analysis, it showed a significance value of less than 0.05. The significance value of fewer than 0.05 means a significant difference between the diameter of the IIA-grade healing burns in each group.

Table 2. Friedman Test Results

Group	Significance
	< 0.001

#### 4. DISCUSSION

This research was conducted to determine the effect of extract ointment of iler leaf (*Plectranthus scutellarioides* [L.] R.Br. folium) on healing diameter of IIA-degree burns in white rats (*Rattus norvegicus*) Wistar strain. The concentration of ethanol extract ointment of iler leaf (*Plectranthus scutellarioides* [L.] R.Br. folium) used in this study was the ethanol extract ointment of iler leaf (*Plectranthus scutellarioides* [L.] R.Br. folium) with a concentration of 2.5%, concentration of 5%, and concentration of 10%.

Ethanol extract of iler leaf (*Plectranthus scutellarioides* [L.] R.Br.) is known to contain one of the flavonoid compounds, quercetin (3,5,7,3', 4'-pentahydroxyflavone). Quercetin on iler leaf (*Plectranthus scutellarioides* [L.] R.Br. folium) can be an antioxidant, preventing free radicals, anti-inflammatory, reducing histamine secretion from mast cells in various tissues and also from basophils. The ability of quercetin as an antioxidant and anti-inflammatory is the basis that quercetin affects the healing process of burns.

The observations shown by the data in table 1 show that the percentage of burn wound healing is the fastest in the positive control group (K +), followed by the treatment group with a concentration of 10% (K3), the treatment group with a concentration of 5% (K2), the concentration treatment group 2.5% (K1), and the negative control group (K-). Burn healing healed faster, starting from the 5th day, until the 15th day, this was due on the 2nd day until the 24th day there was a proliferation phase wound healing. On the 17th-day wound, growth began to slow down. This condition is according to research conducted by Negara et al. (2014), which states that the proliferative wound phase's healing process has reached its peak on the 15th day.

The positive control group (K +) showed 100% wound healing by the 15th day. The negative control group (K-) showed wound healing by 97.30% on the 21st day. In the treatment group, the concentration of 2.5% (K1) showed wound healing by 100% on the 21st day. In the treatment group, the 5% (K2) showed wound healing by 100% on the 19th day. In the treatment group, the concentration of 10% showed wound healing by 100% on the 17th day; this showed that the higher the concentration of ethanol extract ointment of iler leaf (*Plectranthus scutellarioides* [L.] R.Br. folium) that was used accelerated the healing process of the burns.<sup>5,9</sup>

In the negative control group (K-), wound healing was the slowest among the other treatment groups, namely wound healing reaching a percentage of 97.30% on the 21st day. The negative control group (K-) was not given anything, only washed with 0.9% NaCl. This treatment is not in accordance with Setyawati (2014) research, which states that the use of 0.9% NaCl is very well used for wound healing because it can accelerate the formation of the stratum corneum and angiogenesis due to moist conditions.<sup>10</sup>

The positive control group (K +) smeared with Sibro ointment experienced rapid wound healing. On the 15th-day telash burns had a 100% recovery rate. This is because the positive control group (K +) uses the Sibro ointment, which is one of the gold standards for burns medicine, and the composition of the Sibro ointment does not only have one active substance. The active ingredients of Sibro ointment are *Radix scutellariae*, *Phellodendri cortex*, and *Rhizoma coptidis* which have active berberine compounds included in the flavone group, which are derived from a subclass of flavonoids which are efficacious as anti-inflammatory agents and have an antibacterial activity that does not cause skin irritation.<sup>11</sup>

Burn wound healing has several stages, namely inflammation, proliferation, and maturation. In the inflammatory stage, neutralizing toxins and preventing bacteria's spread are done by substances in the body. The body experiences bio cellular and biochemical activity, the body's reaction to repair skin and tissue damage that occurs in the injured area. White blood cells (leukocytes) and macrophages, provide protection and clean the strange matter that sticks, known as the debridement process (cleaning). In this inflammatory phase, hemostasis (cessation of bleeding) occurs, aided by interlocking fibrin threads so that red blood cells and plasma (platelets) will be netted and form clots.<sup>12,13</sup>

In the proliferation stage, granulation (release of new cells/growths, and epithelialization (cell migration/closure) occurs. The granulation process is the formation of a new matrix of connective tissue in the wound area. In the epithelialization process, there is a movement of epithelial cells from the area around the hair follicles to wound area.<sup>14</sup>

The last stage of healing burns is remodeling. Synthesis of extracellular matrix (ECM), cell degradation, and remodeling (cellular activity and vascular activity) occurs in this phase.<sup>12,15</sup>

#### 5. CONCLUSION

- 1) There is an effect of ethanol extract ointment of iler leaf (*Plectranthus scutellarioides* [L.] R.Br. folium) at concentrations of 2.5%, 5%, and 10% in accelerating the healing process of burns diameter grade IIA.
- 2) Extract ointment of Iler leaf (*Plectranthus scutellarioides* [L.] R.Br. folium) with higher concentrations is increasingly useful in accelerating the healing process of IIA-degree burns in this study. The ointment of leaf extract (*Plectranthus scutellarioides* [L.] R.Br. folium) with a 10% concentration is the most influential concentration among other concentration groups on the healing of burn injury grade IIA.

## 6. SUGGESTION

- 1) Future research should reexamine the effect of ethanol extract ointment of iler leaf (*Plectranthus scutellarioides* [L.] R.Br. folium) by adding a higher concentration variation to obtain better results.
- 2) Future research should be expanded with more microscopic observations, such as anatomic histopathology, fibroblasts, and macrophages, in measuring burn healing.
- 3) Future research should be able to conduct an ointment standardization test so that the ointment is more standardized.

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