

# Utilization of Babadotan (*Ageratum conyzoides*, L) Leaf Extract to Accelerate Blood Clotting

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Injury is damaged or loss of body tissue. If there is a wound around a damaged blood vessel, there will be a process of stopping the bleeding and tissue repair in response to the body through the process of hemostasis. Babadotan (*Ageratum conyzoides*, L) is a plant that contains active compounds to accelerate the process of hemostasis. This study aims to determine the effect of babadotan leaf extract on blood clotting time. The research method used is quasy experiment. This design seeks to reveal the causal relationship by involving the control group and the experimental group. The data obtained are primary data that is data obtained from the results of the examination of blood coagulation with administration and without administration of babadotan leaf extract with the Lee and White examination method. The results of the research that have been carried out show the average freezing time of blood samples without juice of babadotan leaves is 9.89 minutes, while the blood samples given of babadotan leaf extracts show a freezing time of 9.19 minutes. So the freezing time difference in the two samples is 0.7 minutes or 7% faster. Based on these data it can be concluded that the juice of babadotan leaves (*Ageratum lonyzoides*, L) can be used to speed up blood clotting time.

**Key words:** *Ageratum Conyzoides*, L, Babadotan leaf, Lee and White method, Blood clotting time.

## Introduction

The development of the times also demands progress in the health sector, one of which is the development of medicines. The diversity of health problems that occur in the body requires the development of medicines continuously. The diversity of health problems can be caused by daily activities, such as diet, work patterns, and so on. One of the most common bodily health problems is injury. Injury is damaged or loss of body tissue that occurs due to factors that interfere with the body's protection system, both closed and open (Pusponegoro, 2003). Open

wounds or external wounds allow for breakage of skin tissue or mucous membranes so that tissue damage is accompanied, bleeding, and increased risk of infection.

When the body experiences external injuries, the body will respond through the hemostatic process (Nugraha, 2015). In the process of stopping the blood (blood clots) and tissue repair. The process of blood clotting involves a process in which blood fluid components are transformed into semisolid material (blood clots) (Zaetun, 2014). Vascular vasoconstriction will occur when the body has an injury to the blood vessels so that blood flow to the injured blood vessels decreases. This process continues with the gathering of platelets and attach to the blood vessels to form platelet blockage. Blood clotting factors will be activated and form fibrin threads which cause platelet plugs to become non permeable through the stages of platelet adhesion, platelet aggregation, and release reactions so that bleeding can be stopped (Setiabudy, 2012). Fibrin is a protein that is insoluble and shaped like a web of threads so that it can hold blood cells when the clotting process takes place (Zaetun, 2014).

The use of drugs made from synthetic substances often have side effects on the body (Butsanusalam, 2016). In addition, the necessary costs also become another obstacle. Therefore, the development of natural or herbal based medicines needs to be developed. Herbal medicine is an ingredient or ingredients in the form of plant material, animal material, mineral material, sarian (galenic) preparations or mixtures of these materials which have been used for generations for treatment, and can be applied in accordance with the norms prevailing in society (Regulation of the Minister of Health of the Republic Indonesia, 2012). These drugs can minimize side effects, even relatively easy to obtain and cheaper. Even the World Health Organization (WHO) recommends the use of herbal medicines in the maintenance of public health, prevention and treatment of diseases, especially for chronic diseases, degenerative diseases and cancer.

One of the herbs that can accelerate the process of stopping blood is babadotan (*Ageratum conyzoides*, L). This plant contains various active substances, such as amino acids, tannins, stigmasterol, friedelin, sulfur, potassium, chloride, pectic substance, agaretochromane,  $\beta$ -cytoserol, flavonoids and polyphenols (Dalimarta, 2000). Of the various active substances, flavonoids are active substances that can play a role in the process of stopping bleeding due to rupture of blood vessels (Soegijanto, 2006; Zaetun, 2014). While other active substances, namely tannins, are able to precipitate blood proteins as well as shrinking tissue in narrow bleeding so that it is useful as hemostatics and blood clots (Apriyani, Sunarni, and Ningsih, 2011).

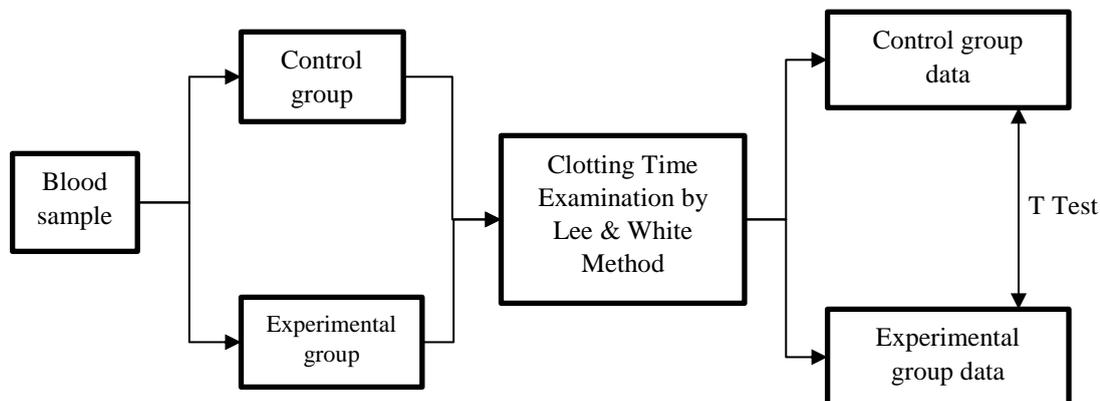
An examination that can be used to measure blood clotting time is Cloting Time. Cloting time is an examination to determine the time needed for blood to clot in vitro, the unit used in the freezing time check is minutes (Nugraha, 2015). One method that can be used in the Cloting Time examination is the Lee and White Method (the tube method). Complete blood without anticoagulants in the tube will experience blood clots due to direct contact with the surface of the tube. The tube method uses 3 tubes each filled with 1 ml of blood placed at a water temperature of 37oC, then the tube is slowly tilted at an angle of 40 degrees, every 30 seconds so that blood comes in contact with the tube wall while seeing clots have occurred (Nugraha, 2015).

Research on the effect of adding juice / extraction on the leaves of babadotan (*Ageratum Conyzoides*, L) has been widely carried out. Apriani, Sunarni and Ningsih (2011) conducted a study on the effects of ethanol extract of bandotan (*angeratum conyzoides*, l) on bleeding time and blood clotting in male white rats (hundred norvegicus). The study showed a decrease in bleeding time and blood clotting in white mice (*Rattus Norvegicus*) by 85.45% and 70% on T3 (sixth day). In addition, Bamidele et.al., (2010) conducted a study on the hemostatic effects of bandotan methanol leaf extract in albino rats and found the mean freezing time decreased significantly in the experimental group compared with the control group.

## Research Method

### *Design and Procedure*

The method used in this study is quasy experiment, where this method aims to reveal the causal relationship by involving the control group and the experimental group (Nursalam, 2015). The steps of the research carried out can be seen in Figure 1.



**Figure 1.** Research Steps

Variables are the size or characteristics possessed by a group. This characteristic will be different from that of other groups. Some common variables are independent variables and dependent variables. The independent variable or the independent variable is the variable that influences or is considered to determine the dependent variable. This variable can be a risk factor, predictor, cause / cause (Saryono, 2013). The independent variable or independent variable in this study was the treatment of babadotan leaf extract in the sample. While the dependent variable or dependent variable is a variable that is influenced by the independent variable. The dependent variable is also called event, outcome, benefit, effect or impact (Saryono, 2013). The dependent variable in this study is blood clotting time.

### *Research Site and Participants*

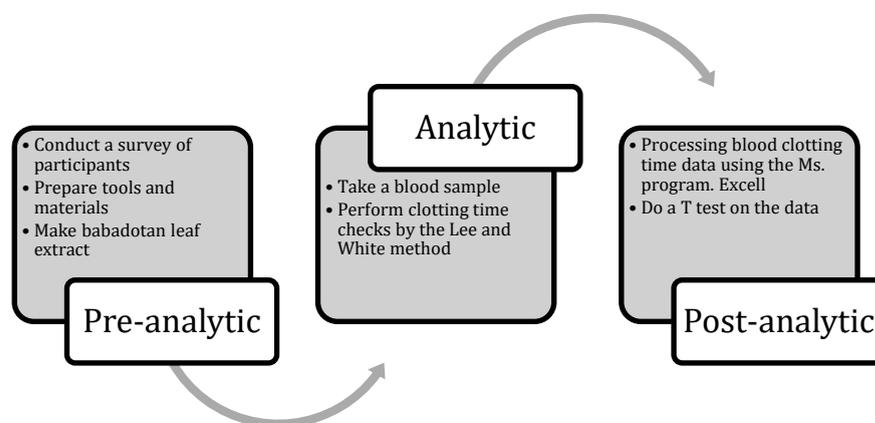
The study was conducted at the Hematology Laboratory, Rajawali College of Health Sciences. While the research samples were obtained from 30 Rajawali Health College students. Samples are selected based on certain criteria that must be met, namely students who are not taking drugs

and have a disease that affects blood clots. This is done in order to obtain blood conditions and normal blood clotting processes.

### *Data collection and analysis*

The samples obtained were tested by examining the Clotting Time method using the Lee and White Method. Figure 1 shows that the sample is divided into two groups, namely the control group and the experimental group. In the control group, blood clotting time measurements were carried out without the administration of babadotan leaf extract. Whereas in the experimental group, the administration of babadotan leaf extract was carried out before the freezing time measurement process was carried out. To determine the effect of giving babadotan leaf extract on blood clotting time, a statistical test was carried out using the T test.

The research procedure was carried out through three stages, namely the pre-analytic, analytic, and post-analytic stages. Figure 2 shows the complete activities at each stage of the study. The pre-analytic stage is the initial step to obtain information from participants about their own conditions. This is done to avoid factors that can affect the measurement results. In addition, at this stage a babadotan leaf extract was made. Making this solution is done by smoothing as much as 500 grams of babadotan leaves using mortil. Then the smoothed babadotan leaves are squeezed using sterile gauze and filtered using filter paper. The filtrate obtained is collected in an Erlenmeyer tube.



**Figure 2.** Examination Research Procedure for Blood Clotting

The analytic stage is the clotting time inspection stage. At this stage a blood sample is taken. The blood drawn is then collected into six serological tubes that have been labeled with numbers 1 through 6. Tubes 1 to 3 are samples that are not given babadotan leaf extracts, while tubes 4 to 6 are tubes that are given babadotan leaf extracts. The amount of babadotan leaf extract added to tubes 4 to 6 is 100  $\mu\text{L}$ . Time measurement is done with a stopwatch, turned on when blood enters the syringe indicator.

In the post-analytic stage, the data obtained are presented in tabular form in the Ms. program. Excell. This data was processed to see differences in the mean blood clotting time in the control

group and the experimental group. To see the effect of giving babadotan leaf extract to the blood clotting time, a statistical test was performed using the T test in the SPSS program.

## Results and Discussion

Clotting time examination by Lee and White method was carried out for 30 participants who met the criteria. That is, all samples have been identified as normal blood conditions. Table 1 shows that the blood clotting time in the control sample (without the administration of babadotan leaf extract) was on average 9.89 minutes. Whereas the blood clotting time in the experimental sample (given babadotan leaf extract) showed an average faster time, which was 9.19 minutes. When viewed from the time range, freezing time for control samples occurs in the range of 8 minutes to 12 minutes. Whereas the experimental samples occurred in the range of 7 minutes to 11 minutes 30 seconds. The time span in one sample group can be caused by technical and clinical factors. In this case, the technical factor that can influence the diversity of the results of the clotting time measurement is the blood sampling process (Zaetun, 2014). Expulsion of blood into the syringe that is too fast can result in lysis. In addition, venous blood sampling is not appropriate and too long can also result in the formation of blood foam in the syringe which can cause shortening of clotting time. While clinical factors include abnormalities in blood, platelet count, hemophilia, and so on.

**Table 1.** Data from Clotting Time Examination Results Using the Lee and White Method

Sampel	N	Average	SB	Minimum	Maximum
		Freezing Time		Freezing Time (minute)	Freezing Time (minute)
Control (without babadotan leaf extract)	30	09.89	1,71	08.00	12.00
Experiments (plus babadotan leaf extract)	30	09.14	1,21	07.00	11.30

Based on the difference in average blood clotting time, the experimental sample was 0.7 minutes faster (7%) than the control sample. To emphasize the difference in blood clotting time is influenced by the addition of babadotan leaf extract, a statistical test was performed using the T test. Table 2 shows the results of the analysis of the T test where P value is <0.01. This value indicates that the two sample mean values are significantly different. Based on these data, it can be said that the administration of babadotan leaf extract can significantly speed up blood clotting time. This decrease in freezing time is due to the content of active compounds in the babadotan plant, some of which are tannins and flavonoids (Rosmiati and Vincent, 1995; Dalimarta, 2000). The presence of tannins is able to precipitate blood proteins and constrict narrow blood vessel tissue. In addition, flavonoids also play a role in the process of blood clotting by accelerating the release of platelets. While the presence of platelets is a blood clotting factor. The collected platelets will immediately form nonpermeable platelet plugs in the

presence of fibrin threads formed by blood clotting factors (Setiabudy, 2012; Zaetun, 2014; Apriyani, Sunarni, and Ningsih, 2011; and Soegijanto, 2006).

**Table 2.** Data Analysis of the Difference in Mean Blood Clotting Time

	N	Average+SB	Difference +SB	IK 95%	P
No giving	30	9,89±1,71			
By giving	30	9,19±1,21	0,70±0,41	0,86±0,54	<0,001

Judging from its benefits as an external wound medicinal plant, babadotan leaf extract must also have the ability as an anti-bacterial. It is not impossible if microorganisms can enter the body through wounds. When a wound occurs, the risk of infection due to the entry of microorganisms becomes very high. The presence of flavonoid compounds can damage the cell membrane of microorganisms through the process of inhibiting energy metabolism and the formation of complex compounds with extracellular and dissolved proteins (Cowan, 1999; Nuria et al., 2009; Bobbarala, 2012; and Cushnie and Lamb, 2005). In addition, the presence of polyphenol compounds as an alcohol compound in general can also function to inhibit bacterial activity.

## Conclusion

Babadotan leaves are medicinal plants that can be used to treat wounds. The presence of tannins and flavonoids contained in these plants can accelerate the process of blood clotting. In addition, flavonoid compounds and polyphenols can also act as an anti-bacterial so as to reduce the risk of infection. With proper processing, this plant can be used as a basic ingredient in the manufacture of external wound medicine.

## Acknowledgements

The researcher would like to thank Lembaga Pengelola Dana Pendidikan (LPDP) Indonesian endowment fund for education, Finance ministry of Indonesia for supporting this research.

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