3. Improvement of Self-Efficacy-Tukiran-Fitroh (First Author)

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Improvement of Self-Efficacy and Student Learning Outcomes on Acid Base Material Using 9E Learning Cycle Model

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ABSTRACT

The aim of the research was to find the effectiveness of developed teaching materials to increase students' self-efficacy and learning outcomes using 9E learning cycle on acid base matter. The teaching materials was applied in SMAN 7 Surabaya toward 36 students of grade XI-6. This research used 4D model from Thiagarajan. The application steps during learning activity used pre-experimental, pretest–posttest question. The evaluation steps in this research used self-efficacy questionnaire, pretest–posttest questions, and motivation questionnaire. As a results, average self-efficacy and motivation of students increased up to 0.71 and 0.65. The average of learning outcomes increased with 0.75 score and in high category. The conclusion is the developed teaching instrument can improve self-efficacy and learning outcomes of students effectively.

Keywords: *Teaching materials, 9E learning cycle model, Self-efficacy, Learning outcomes*

1. INTRODUCTION

The process of interaction between students and teachers is a learning class activity. The success of the learning process is not only influenced by the teacher's role, but also the students. One of important thing in learning activities is student's self- efficacy. The previous study found higher self-efficacy can improve student learning outcomes and academic achievement [1]. But the result of pre-testing or pilot testing of a survey in Surabaya showed that 80% of students had low self-efficacy.

Based on previous research, learning cycle model application could improve students' self-esteem [2] and high self-esteem will increase self-efficacy [3]. So, the 9E Learning Cycle model can be possible to improve students' self-efficacy. In addition, the previous researcher showed that learning cycle model could significantly improve learning outcomes of student [4], improve science process skills [5], and improve students' scientific attitudes [6].

Learning cycle model is closely related to constructive theory [7]. Constructive theory is based on the fact that students build their own knowledge, not from reproducing other people's knowledge [8]. This learning model emphasizes the importance of exploring, initial knowledge, and transfer of learning [9]. The 9E learning cycle model is a development of the 7E learning cycle model which contains a series of nine planned and interconnected phases where students go through various scientific investigations by exploring teaching material, building concepts after arriving at conclusions and applying concepts or principles that have been held to a new problem. Thus instilling a sense of learning by stimulating students' desire to explore, think and gain experience. The 9E learning cycle model also supports intellectual abilities of students [10].

The 9E learning cycle model is considered suitable to be applied to chemistry learning in senior high school. As we known, chemistry is a complex subject which not only about calculating but also a series of experiment in order giving the students a meaningful learning experience directly for everyday life. This experience can be present in several sub-chemicals belonging to be acid-base matter.

The application of the 9E learning cycle model would require students to observe, classify, analyze, conclude, and communicate the results of the experiments that had been carried out. This process would increase student self-efficacy as students were

directly involved in learning. By experiencing the material, it was hoped the students could understand the concept of acid base and learning outcomes increased.

2. METHOD

The research design used is experimental design using 4D development learning method. This method was established on 3 stages, namely define, design, and develop [11]. The subject of the research was grade XI-6 of SMAN 7 Surabaya with 36 students. The effectiveness of teaching instruments was observed from the motivation questionnaire, self-efficacy questionnaire and pretest-posttest. The collected data was analyzed using descriptive and quantitative methods. The following are the techniques of data analysis for each aspect that has been decided.

2.1. Self Efficacy and Motivation Questionnaire Analysis

The self-efficacy and motivation questionnaire are categorized as follows:

0	10	20	30	40	50	60	70	80	90	100
never				sometimes				always		

Scores of self -efficacy and motivation questionnaire gained was then categorized as presented in Table 1.

Table 1. Category of self -efficacy and motivation [12]

Score	Category
81 -100	Very High
61 – 80	High
41 – 60	Enough
21 – 40	Low
0 – 20	Very Low

The difference between self-efficacy and motivation questionnaire in pretest and posttest after the application of 9E learning cycle model was analyzed by calculating the average used the following formula:

$$< g > = \frac{Spost - Spre}{Smax - Spre} \quad (1)$$

Note:
< g > = gained score
Spre = pretest score
Spost = posttest score
Smax = Maximum score

n-gain will be converted using categories as presented in Table 2.

Table 2. Category of normalized gain [13]

Score *n*-gain	*normalized gain* Category
0,7 < *n*-gain	High
0,3 ≤ *n*-gain	Medium
n-gain < 0,3	Low

2.2. Learning Outcomes Analysis

Analysis on the learning outcomes is a posttest after finishing the project. The accumulation of score is formulated as follows:

$$final\ score = \frac{score\ gained}{max\ score} \times 100\% \quad (2)$$

The converted score was cited based on the decision letter of SMAN 7 Surabaya. The score range was categorized as presented in Table 3.

Table 3. Range value of knowledge competence (Decree of SMAN 7 Surabaya, 2015)

Minimum Criteria of Mastery	Predicate			
	D (poor)	C (average	B (good)	A (excellent
70	< 70	70 - 79	80 - 89	90 - 100

The student learning ability is analyzed using *n*-gain. The result of n-gain will be converted using the category on Table 2.

3. RESULTS AND DISCUSSION

3.1. Self-efficacy Questionnaire

The self-efficacy questionnaire was answered by 36 students of Grade XI-6 in order to know the increase of students' self- efficacy. It seemed that the increase of self-efficacy was present in as presented in Fig 1.

Figure 1. Self-efficacy of student before and after learning process

Figure 1 showed that the average score of self-

efficacy before the learning process is 13.78 and the self-efficacy after the process is 74.66 with raise of score at 0.71.

The results of the research explained that posttest score was higher than pretest score (Figure 1). The result of analysis showed that before the treatment, the average score is 13.78 with very low category. After the treatment done, the average score is 74.66 with high category. The score increase was evaluated using *n*-gain calculation. The average increase was 0.71 with high category. The increase of self-efficacy was gained by the application of 9E learning cycle model, which contains a series of nine planned and interconnected phases. In this learning model, students conducted scientific investigations by exploring teaching material, building concepts, and applying concepts or principles previously known to a new problem. All phases made self-efficacy of students higher than before. This is in line with the previous research, in which self-efficacy have four sources, which are performance experience, vicarious experience, social persuasion, and emotional state [3]. In 9E learning cycle model, four sources of self-efficacy were trained.

3.2. Motivation Questionnaire

The motivation questionnaire was filled by 36 students of grade XI-6. This process was aimed to find the increase of students' motivation. The following was the data of students' motivation in the form of graphic. Based on the graphic above, the students' motivation before the learning process is 30.56 and after the learning process is 75.17. The score reflected the increase of motivation. As shown in Figure 2, the raise is 0.65 in average.

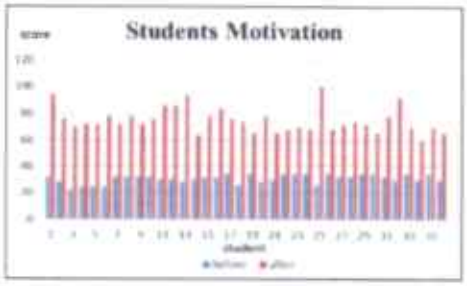

Figure 2. Students motivation before and after learning process

The result of motivation questionnaire analysis was used to support self-efficacy improvement. Based on the score of students' motivation, it can be explained that students' motivation increase during learning activities (Fig 2). Before learning activities using 9E learning cycle model, the average score is 30.56 with low category and after the treatment the score is 75.15 with high category. The score was calculated using *n*-gain and indicated the increase 0.65 with medium category. Self-efficacy had an important role in shaping motivation of someone [3]. Self-efficacy has a huge correlation with motivation, academic choice, changes, and achievement [14]. In addition, motivation is part of activation self-efficacy [3].

3.3. Learning Outcomes Analysis

The increase of the student self-efficacy was expected to increase the result of learning outcomes as well. The knowledge ability test (pretest) was proposed before the treatment and the posttest was given after the learning process. Figure 3 showed the result of analytic test of 36 XI-6 students in the form of graphic.

Students got higher score in post-test than pretest. Raise of score proven the effectiveness of 9E Learning cycle model in increasing the result. The increase was in the aspect of knowledge and accumulated using *n*-gain. The average score of rising is 0.75 with high category. Before the pretest done, there is 97.2% complete. After the post-test done, a very significant raise gained.

Figure 3. Learning outcomes before and after learning process

Cognitive aspect on learning process was aimed to know the students' understanding on subject. For this research, pretest was done in the first meeting and post-test was conducted in the third meeting after the treatment using 9E Learning Cycle model on the material of acid base. Based on learning outcomes analysis, score of pretest and post-test were calculated using *n*-gain. The score is 0.75 with high category [13]. The *n*-gain of learning result showed that 9E learning cycle model could effectively develop self-efficacy in cognitive aspect. Cognitive process was needed in shaping a strong self-efficacy dealing with the situation of analytic thinking of doing right action [3] and can increase students learning outcomes significantly [15]. In addition, 9E learning cycle model required students to observe, classify, analyze, conclude, and communicate the results of the experiments, which is impacts on learning outcomes [10].

4. CONCLUSION

By using 9E learning cycle model, applied to students in SMAN 7 Surabaya showed there is the increase of self-efficacy, motivation, and learning outcomes for them. Therefore, development of teaching materials can increase students' self-efficacy and the learning outcomes. However, be careful with time management and teacher must prepare all of the materials very well.

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Antioxidant Activity from The Combination Ethanol Extract Secang Wood (*Caesalpinia sappan* L.) And Red Ginger Rhizome *(Zingiber officinale Roxb.)*

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ABSTRACT

The antioxidant activity test combination of the ethanol extract secang wood (Caesalpinia sappan L.) and red ginger rhizome (Zingiber officinale Roxb.) was carried out using the DPPH method. Where the principle of the DPPH method is a decrease in the intensity of the absorbance value of the DPPH solution which is directly proportional to the increase in the concentration of antioxidant compounds called IC50 or Concentration Inhibition 50. The results have shown that the value of the IC50 or Inhibition Concentration 50 of the ethanol extract of Secang wood is 54,53 which is a strong antioxidant, the IC50 or Inhibition Concentration 50 value from the ethanol extract of red ginger rhizome (Zingiber officinale Roxb.) is 197,74 which is a weak antioxidant, and the IC50 or Inhibition Concentration 50 value combination of the ethanol extract Secang wood (Caesalpinia sappan L.) and red ginger rhizome (Zingiber officinale Roxb.) for F1 with a ratio of 1:1 is 109,72 which is a moderate antioxidant, F2 with a ratio of 1:2 is 140,96 which is a moderate antioxidant and F3 with a ratio of 2:1 is 90,14 which is a strong antioxidant.

Keywords: *antioxidant, DPPH, ethanol extract of secang wood, ethanol extract of red ginger rhizome*

1. INTRODUCTION

Antioxidants are compounds that have an activity that can delay, prevent and counteract the process of lipid oxidation which can cause damage to cells in the body [1]. The working principle of antioxidant compounds is by donating one electron so that atoms or molecules that have unpaired electrons will get electron pairs. Antioxidants also function as compounds that can bind free radical compounds in the body [2].

Free radicals are molecules that have unpaired electrons, so they are very reactive. Free radicals are also a by-product of the body's normal metabolism that can cause oxidation such as DNA damage, membrane damage and can cause cell death [3].

Based on the source, antioxidants can be divided into two groups, namely synthetic antioxidants, and natural antioxidants. A synthetic antioxidant is an antioxidant compound obtained through the synthesis of a chemical reaction. Examples of synthetic antioxidants that are widely known by the public are Butylated HydroxyAnisole (BHA) and Butylated HydroxyToluene (BHT). Synthetic antioxidants have negative effects on the body when compared to natural antioxidants, including those that can cause liver damage and more severe can cause death because of their carcinogenic nature [4].

While natural antioxidants are antioxidant compounds obtained through the extraction of natural ingredients [5]. Because at this time, antioxidant compounds derived from natural ingredients have received great attention both in the food and medical fields because their use is much safer when compared to synthetic antioxidants. Natural antioxidants, in general, can usually be found in plants such as vegetables, seeds, stems, and fruits.

One of the sources of natural antioxidants can be obtained from the wood plant and on the rhizome of red ginger because these two plants have several bioactive compounds that have potential as antioxidants. Secang wood contains several phytochemical compounds including xanthones, coumarins, chalcones, flavones, and brazilin. The red dye contained in sappan wood is known as a brazilin group compound where brazilin is the main active compound that belongs to the flavonoid group. Brazilin is also an antioxidant compound that has catechol in its chemical structure that can protect the body from poisoning caused by free radicals. While the

red ginger rhizome contains bioactive compounds in the form of gingerols which have antioxidant, antibacterial, anti-inflammatory, anticarcinogenic, antimutagenic, and antitumor activities.

In this study, testing the antioxidant activity of ethanolic extract of secang wood, red ginger rhizome ethanol extract, and the combination of ethanol extract of secang wood and red ginger rhizome (F1, F2, and F3) was carried out using the DPPH method. In the antioxidant activity test, DPPH acts as a free radical compound that will react with antioxidant compounds so that DPPH will turn into *diphenyl-2-picrylhydrazyl* non-radical. The increase in *diphenyl-2-picrylhydrazyl* was characterized by a color change from purple to pink or pale yellow which could be observed using UV-Vis spectrophotometry so that the free radical scavenging activity in the sample could be determined [6]. Based on the description above, the two types of plants must develop their potential and beneficial properties by testing the antioxidant activity of ethanol extract of secang wood, ethanol extract of red ginger rhizome, and a combination ethanol extract of secang wood and red ginger rhizome using the DPPH method.

1. METHODS

This research belongs to the type of experimental research, which is to find the optimal antioxidant activity of the ethanol extract of secang wood (*Caesalpinia sappan L.*) and red ginger rhizome.

1.1. Sample Preparation

5 kg of fresh sappan wood and 4 kg of red ginger rhizome were cleaned and cut into small pieces, then dried at room temperature for 3 days. After that, it is mashed in a blender, until a fine powder of secang wood and red ginger is obtained. The obtained powder will then be extracted by the maceration method.

1.2. Extraction of Secang Wood and Red Ginger Rhizome

The method used was maceration. Secang wood and red ginger rhizome that has been powdered then macerated in 5 L 96% ethanol then allowed to stand for 3 days and placed in a dark place. The obtained macerate was accommodated, then re-macerated 3 times. Then the macerate is evaporated using a rotary evaporator. And the extraction results are then weighed and the % yield is calculated. Furthermore, the process is carried out freeze dry.

1.3. Total Phenolic Content Test

Determination of total phenolic content was carried out by spectrophotometric method using Folin-Ciocalteu reagent. As much as 10 mg of secang wood and red ginger ethanol extract were dissolved to a volume of 10 ml with a mixture of ethanol: aqua dest (1:1). The extract solution was taken 0.3 ml and added with 10% Folin Ciocelteau reagent and allowed to stand for 3 minutes. Each solution was added 1.2 ml of 7.5% Na_2CO_3 then vortexed for 3 seconds and incubated for 30 minutes at room temperature. The absorbance was read by UV-vis spectroscopy at 760 nm. The absorbance of the sample was interpolated into a linear regression equation on the standard curve for gallic acid concentrations of 10, 20, 30, 40, 50 ppm.

1.4. Antioxidant Activity Test

Determination of total phenolic content was carried out by spectrophotometric method using Folin-Ciocalteu reagent. As much as 10 mg of secang wood and red ginger ethanol extract were dissolved to a volume of 10 ml with a mixture of ethanol: aqua dest (1:1). The extract solution was taken 0.3 ml and added with 10% Folin Ciocelteau reagent and allowed to stand for 3 minutes. Each solution was added 1.2 ml of 7.5% Na_2CO_3 then vortexed for 3 seconds and incubated for 30 minutes at room temperature. The absorbance was read by UV-vis spectroscopy at 760 nm. The absorbance of the sample was interpolated into a linear regression equation on the standard curve for gallic acid concentrations of 10, 20, 30, 40, 50 ppm

1.4.1. Preparation of DPPH Solution DPPH

The solution was prepared by dissolving 4 mg of DPPH in 100 mL of methanol pa to obtain a DPPH solution with a concentration of 0.004%.

1.4.2. Optimization of DPPH Wavelength The DPPH

The solution was prepared by dissolving 4 mg of DPPH in 100 mL of methanol pa to obtain a DPPH solution with a concentration of 0.004%.

1.4.3. Control Absorbance Measurement

To measure the absorbance of the blank, it was done by adding 2 mL of methanol pa to 2 mL of 0.004 % DPPH solution. Then shaken until homogeneous and allowed to stand for 30 minutes in a dark room. Then the absorbance was measured at the maximum wavelength using a UV-Vis spectrophotometer to obtain the absorbance value of the blank.

1.4.4. Testing the Antioxidant Activity of the Ethanol Extract of Secang Wood and Red Ginger Rhizome

The testing phase of the antioxidant activity of the ethanol extract of Secang wood and red ginger rhizome was carried out in several stages, namely:

1.4.4.1. Making test solutions with various concentrations of 10,25,50,75 and 100 ppm for ethanol extract of sappanwood and ethanolic extract of red ginger rhizome and F1 (1:1 ratio)

1.4.4.2. Make a test solution with a concentration variation of 9,27,54,81 and 108 ppm for F2 (1:2) and F3 (2:1 ratio)

1.4.4.3. Make a vitamin C test solution as a comparison with variations in concentrations of 5,10,15,20 and 25 ppm.

1.4.4.4. The test solution was pipetted as much as 2 mL and transferred into a vial bottle that had been wrapped in aluminum foil and added 2 mL of DPPH solution, then the solution was shaken and incubated for 30 minutes. Then the absorbance of the solution was measured using a UV-Vis spectrophotometer at a wavelength of 514,5 nm. Then the % inhibition value and IC_{50} value are determined. The % inhibition value can be determined by the following equation:

$$\%\ inhibition = \frac{Absorbance\ blank - sample\ absorbance}{Absorbance\ blank} X\ 100 \quad (1)$$

The % inhibition value is then made a linear equation curve and the obtained equation is used to calculate the IC_{50} value. The $IC_{50\ value}$ is obtained by replacing y in the linear equation with a value of 50 and the x obtained is the IC value$_{50}$.

2. RESULT AND DISCUSSION

2.1. Extraction Results of Secang Wood and Red Ginger Rhizome

The purpose of extracting natural ingredients is to extract the chemical components contained in a sample. The maceration method was chosen because the process is easy and does not use high temperatures in the work process which may damage the chemical compounds contained in the sample which may potentially have antioxidant activity.

The solvent used in the extraction with the maceration method is ethanol 96%. The use of ethanol as a solvent, because ethanol is a universal solvent that can attract most components of chemical compounds in plants so that it can dissolve a polar component. Polar solvents tend to attract polar compounds and vice versa. In addition, ethanol also has the advantage that it is not harmful to the environment.

Then extracted from the wooden cup and red ginger rhizome is filtered and then evaporated by using a rotary evaporator aims to thicken the extract so that an ethanol extract of secang wood and red ginger rhizome is obtained which is then weighed and the % yield is calculated. The % yield of the ethanol extract of secang wood was 10,62116% and the % yield of the red ginger rhizome ethanol extract was 13,48645%.

2.2. Total Phenolic Content Test Result

A total phenolic test on an ethanol extract of secang wood and red ginger rhizome was carried out using the Folin-Ciocalteu method. The principle of this method is based on the reducing power of the phenolic hydroxy group which reacts with Folin-Ciocalteu reagent and gallic acid is used as standard. In determining the levels of phenolic compounds used is gallic acid is a standard solution because gallic acid is a comparison compound and is one of the phenolic acids found in plants and is often used to determine phenol in plants through reagents. Folin – Ciocalteu and is a derivative of hydroxybenzoic acid which is classified as a simple phenolic acid and as a standard with stable and pure substance availability.

Table 1. Standart Absorbance Data For gallic Acid

Concentration (ppm)	Absorbance	Linier Regression
10 22 30 40 50	0.1897 0.3447 0.4810 0.6627 0.7957	y = 0.153x + 0.0757 R = 0.9981

Table 2. Data Of Total Phenolic Content

Sample	Extract Weight (mg)	Dilution factor	Absorbance	Total phenolic content (%)
Sappan wood	10	100	0.3981	10.67
Red Ginger Rhizome	10	10	0.4236	2.53

The presence of an aromatic core in phenolic compounds can reduce the phosphomolybdate phosphorung state to molybdenum tungsten. Phenolic compounds only react with the Folin-Ciocalteu reagent in

an alkaline environment so that proton dissociation occurs in phenolic compounds into phenolic ions [7]. The results of the absorbance measurement of gallic acid standards are presented in table 1.

Based on table 2, it is known that the ethanol extract of Secang wood has a total phenol content of 10.67% while the red ginger rhizome ethanol extract has a total phenol content value of 2.55%.

2.3. Antioxidant Activity Test Results

Activity test of ethanol extract of Secang wood and red ginger rhizome was carried out using the DPPH method and using a UV-Vis Spectrophotometer instrument at a wavelength of 514,5 nm. The DPPH method was chosen because the DPPH method is a fast and simple method. The principle of the DPPH method is that there is a decrease in the intensity of the absorbance value of the DPPH solution which is directly proportional to the increase in the concentration of antioxidant compounds which can be called IC_{50} or *Inhibition Concentration* 50.

Table 3. Data Of Anioxidant Activity Test Result

Sampi e	concentratio n (ppm)	Absorban ce	% inhibitio n (%)	Linier Regressio n
Blank	-	0,9690	-	-
Secang	10 25 50 75 100	0,8414 0,6782 0,5331 0,2934 0,1709	13,2087 30,0133 44,9807 69,7246 82,3583	y = 0,2699x + 8,0156 R² = 0,9878
Ginger	10 25 50 75 100	0,9298 0,8747 0,8187 0,7684 0,7144	4,1281 9,7324 15,5150 20,7056 26,2775	y = 0,2383x + 2,878 R² = 0,9908
F1	10 25 50 75 100	0,9382 0,8754 0,7344 0,6546 0,5272	3,1785 9,6994 24,2305 32,4458 45,5934	y = 0,4675x + 1,2929 R² = 0,9941
F2	9 27 54 81 108	0,9367 0,8787 0,7771 0,6987 0,5991	3,3333 9,3189 19,8039 28,7616 38,1734	y = 0,3537x + 0,1434 R² = 0,9994
F3	9 27 54 81 108	0,9314 0,8388 0,6852 0,5377 0,3829	3,8801 13,4365 29,2879 44,5088 60,4836	y = 0,5731x + 1,6564 R² = 0,9998
Vitamin C	5 10 15 20 25	0,9640 0,7584 0,6667 0,5293 0,3673	0,5172 21,7344 31,2094 45,3913 62,1001	y = 2,9363x + 11,837 R² = 0,9878

In the antioxidant activity test, the ethanol extract of secang wood and red ginger rhizome has used a concentration of 10, 25,50,75, and 100 ppm for ethanol extract of sappan wood and ethanolic extract of red ginger rhizome and F1 (ratio 1:1) and concentrations of 9,27,54,81 and 108 ppm for F2 (comparison 1:2) and F3 (comparison 2:1).

Each concentration was added with 0.004% DPPH solution and incubated for 30 minutes so that the sample could reduce free radicals optimally. Then measurements were made using UV-Vis spectrophotometry to determine the absorbance value of each of these concentrations and calculate the % attenuation or % inhibition and the IC value$_{50}$.

Based on table 3, shows that the concentration of the test solution affects the absorbance value. According to Gordon (1990) which states that the amount of an added concentration of antioxidants can affect the rate of oxidation. The greater the concentration of the sample extract, the absorbance of the sample decreases, and the percentage (%) of inhibition increases. DPPH free radicals will be captured by antioxidant compounds which will release hydrogen radicals, thus forming reduced DPPH-H. The antioxidant capacity is determined by the amounts of hydrogen donors of a substance. The interaction of the sample which acts as an antioxidant compound will neutralize free radicals from DPPH. The neutralization reaction can cause a change in the color of the DPPH solution from purple to yellow because the free electrons from the unpaired DPPH become paired.

Table 4. IC_{50} Value

Sample	IC_{50}	Antioxidant Activity Level (IC Value) With DPPH Method			
		V very strong < 50 ppm	S strong 50-100 ppm	M enough 101-150 ppm	W weak > 150 ppm
Secang Wood	54,5323		√		
Red Ginger Rhizome	197,5425				√
F1	109,7174			√	
F2	140,9573			√	
F3	90,1351		√		
Vitamin C	21,0663	√			

The value of % attenuation or % inhibition is used to determine the value of IC_{50}. The $IC_{50\ value}$ can be obtained from the results of the linear regression equation with the x-axis as the sample concentration and the y-axis as the % attenuation or % inhibition. The linear regression curve generated from the sample can be seen as follows:

From the linear equation above, it is then used to determine the IC_{50} value of each sample where 50% of the sample concentration can reduce the absorbance of the DPPH solution.

Vitamin C is used as a comparison because vitamin C is a natural antioxidant compound that has a very strong antioxidant activity when compared to vitamin E and vitamin A. In addition, vitamin C in its use of safe, practical and can be dissolved in water. The comparison function is to determine whether the test substance can have the same effect as the standard antioxidant source used.

3. CONCLUSION

Based on the results of the research that has been carried out, it shows that the total phenolic ethanol extract of sappan wood is 10.67% while the total phenolic ethanol extract of red ginger is 2.55%. Antioxidant activity test of the ethanol extract of secang wood and red ginger rhizome using the DPPH method, it can be concluded that the ethanol extract of secang wood has an antioxidant activity value or IC50 of 54.5323which is a strong antioxidant. The antioxidant activity value or IC50 of the red ginger rhizome ethanol extract is 197.7423 which is a weak antioxidant. The antioxidant activity values or IC50 of F1, F2, and F3 are 109.7174, 140.9571 which is a medium antioxidant, and 90.1351 which is a strong antioxidant.

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