

# The Effect Of Date Combination Syrup (Phoenix Dactylifera) And Bee Pollen On Erythrocyte Index And Body Weight Of Birth Wistar White Rats (*Rattus Norvegicus*)

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## Abstract

*Anemia is a disease that involves red blood cells characterized by a decrease in erythrocyte mass where red blood cells function as hemoglobin carriers. This study aims to determine the effect of the combination of dates syrup (Phoenix Dactylifera) and bee pollen on Erythrocyte index and birth weight of Wistar white rats (Rattus Norvegicus).*

*The method in this research was experimental lab and research design was randomized post test control group only design on the variable value of erythrocyte index and birth weight of white wistar rats. The research was conducted in August - September 2020 at the Hasanuddin University Biopharmaceutical Laboratory. The samples in this study were 28 pregnant wistar rats divided into 4 groups, namely the CMC (control) group, bee pollen syrup, date syrup and the group with the combination of syrup each consisting of 7 samples. The intervention was carried out for 21 days with a dose ratio of 20 g of dates (equivalent to 5 dates) and 1 g of bee pollen given orally using a sonde with a dose of 20 ml / 150-200g / body weight / day. Data analysis on erythrocyte index used paired sample T-test and repeated anova test while weight data analysis used the Kruskal Wallis test with repeated man whitney.*

*Results The erythrocyte index level and body weight of the puppies after the intervention had the highest increase, namely in the combination syrup group with parameters of MCHC erythrocyte levels with a significant value of  $p = 0.013$  which means  $<0.05$  compared to the CMC (Control) group, bee pollen syrup and date syrup increased evenly.*

**Keywords:** Syrup combination of dates and bee pollen, Erythrocyte index, Weight birth.

## 1. INTRODUCTION

Anemia is defined functionally as a disease involving red blood cells characterized by a decrease in erythrocyte mass where red blood cells function as hemoglobin carriers and then transport and circulate oxygen from the lungs to all body tissues. Satrio & et al, (2016). Anemia can occur due to iron deficiency. Bone marrow requires iron to produce blood hemoglobin (Briawan, 2014). Anemia is a problem that is widely found throughout the world as a major public health disorder, especially in developing countries which has a major impact on physical health, social welfare and economy (Susilo et al., 2015). Factors causing

AKI (2017) others 30.2%, bleeding 27.1% and hypertension 22.1%. (Indonesian Ministry of Health, 2018).

Anemia occupies the highest percentage of causes of maternal death in Indonesia, namely 28% (Indonesian Ministry of Health nd). Meanwhile, according to data from the South Sulawesi Provincial Health Office in 2018, the maternal mortality rate has increased from 115 cases to 139 cases. The causes of the Maternal Mortality Rate (MMR) consisted of bleeding (41.61%), hypertension in pregnancy (21.48%), infection (4.03%), circulatory system disorders (8.72%), metabolic disorders (2.01%), and other causes (22.15%).

Anemia in pregnant women is a condition in which red blood cells and blood protein decrease, causing the oxygen carrying capacity for the needs of the mother and the fetus to decrease. The low supply of oxygen can spur an increase in cardiac output where the heart which is continuously stimulated to work hard can lead to heart failure and other complications such as preeclampsia. (Tarwoto, 2015). In pregnancy there is an increase in blood plasma which causes hypervolemia. Compared to blood plasma, there are fewer red blood cells resulting in blood thinning (hemodilution). Pregnant women who have anemia will affect the growth and development of the fetus or baby either during pregnancy or during childbirth, such as increasing the risk of preterm birth, giving birth to babies with low body weight (<2.5 kg), infection and anemia can cause death both in mother and baby.

The data for low birth weight babies (LBW), the health profile of South Sulawesi province in 2017 was 3.25%. Low birth weight (LBW) is one of the causes of neonatal mortality in Indonesia with the incidence of low birth weight (LBW) of 38.85%. (South, 2018).

Based on (Riskesdas, 2018) states that in order to avoid these things, pregnant women are required to need additional iron 90 iron tablets during the pregnancy period with the aim of reducing the anemia rate of pregnant women so that in this case it can increase and maintain the number of red blood cells as well as cell formation. red blood for the fetus and placenta, thus ensuring oxygen circulation and metabolism of nutrients needed by the mother during pregnancy (Roosleyn, 2016). The need for blood added tablets (TTD) in pregnant women increases by 200-300%. The estimated amount of iron that needs to be stored during pregnancy is 1040 mg. Of this amount, 200 mg of Fe is retained by the body during delivery and the remaining 840 mg is lost. A total of 300 mg of Fe is transferred to the fetus, with 50-75 mg for the formation of the placenta, 450 mg for increasing the number of red blood cells, and 200 mg lost during delivery. (Ertiana & Reni, 2016). In this case, in addition to the intake of Fe tablets, one of the alternatives as functional food is the use of foods that may be able to increase hemoglobin levels directly or indirectly, among others : dates and bee pollen.

Dates are the fruit of the Phoenix dactylifera plant and one of the foods that are rich in nutrients, the fruit contains a lot of energy from carbohydrates (glucose, fructose), a little protein and fat, and is complete with vitamins and minerals (Hidayah & Nurlinda, 2018). While Bee pollen is a food supplement that can repair damaged cells / tissues through the process of cell reproduction to replace dead cells (replication), repair damaged cells (rehabilitation), and optimize cell function. Dates and bee pollen each have advantages and content that can act as additional food, especially for pregnant women, where one of the important minerals in dates is iron which plays an important role in treating anemia (Mariyan and Mary, 2015). able to provide an influence in the repair of red blood cells and energy metabolism for malnourished sufferers. (Pantopoulos et al, 2012).

Based on several studies, it was suggested that the iron content contained in dates, namely 1.02 mg, showed a significant result in the increase in serum Fe after giving dates. (Pravitasari, et al. 2014). Similarly, according to (Ristyning et al., 2017) consuming 100 grams of dates for 14 days or approximately 5 - 7 fruits regularly will help increase hemoglobin levels in the blood. The same research was conducted by Diyah Ayu Susilowati

(2017) It was found that giving dates can increase hemoglobin levels by 1.1 g% in anemic pregnant women. In addition to utilization in the repair of red blood cells, dates also play a role in increasing body weight.

Based on this background, the researchers were interested in conducting research on the effect of giving a combination of date syrup (*Phoenix Dactilyfera*) and bee pollen on erythrocyte index and birth weight of white rats of Wistar strain (*Rattus Norvegicus*).

## 2. RESEARCH METHODS

### *Research Location and Design*

This research was conducted at the Hasanuddin University Biopharmaceutical Laboratory and the Clinical Pathology Laboratory of Hasanuddin University Teaching Hospital, which took place from August to September 2020. In this study, quantitative research was used with the type of experimental laboratory research and the Randomized Post Test Control Group Only Design research design.

### *Population and Sample*

The population and sample in this study were female wistar rats (*Rattus Norvegicus*) that met the inclusion criteria whose pregnancy could be identified by looking at the rats' vaginal smears after mating. If the vaginal intake of rats has yellowish colored sperm spots, it can be defined as 0 days of pregnancy (Smith, 1988). The rats' weights ranged from  $\pm 200$  g and were around 10-12 weeks old, because at the age of 10-12 weeks the rats' weight had reached the mature phase, namely  $\pm 200$  g (Kaempe, et al., 2019). The total sample in this study were 28 pregnant wistar rats with 10% tolerance of the sample divided into 4 groups.

### *Research Tools and Materials*

The tools used in this study were a set of rat rearing tools (cage size 30 cm x 20 cm x 13 cm), sonde, syringe, capillary pipette, stirring rod, measuring cup, 100 ml glass bottle, spatula, blender, gloves (latex), Hematology analyzer, EDTA vacutainer tube, 1 mL syringe, camera, tissue, and stationery as well as the materials used in this study: CMC (Carboxymethyl cellulose), sodium benzoate, aquades, khallas dates, and bee pollen.

### *Research Implementation*

#### *a. Determination of the Dosage Administration*

Based on the calculation of the body surface area dose conversion formula, the maximum dose conversion for humans weighing 60 kg to rats is 6.2. So that the dose for each intervention was given 413.2 mg (20.6 g) / 150-200 g rat weight for date syrup, bee pollen syrup at a dose of 1.035 g / 150-200 g rat weight and in combination syrup of dates and bee pollen with each single dose 413.2 mg + 20.7 mg = 433.9 mg / 2ml / day.

#### *b. Process of Making and Checking Syrup Chemical Content*

##### 1. CMC solution

10 g of CMC powder dissolved with warm water then mix using a mixer to form mucilago, enough up to 100 ml.

##### 2. Dates Syrup

The khallas dates are separated from the seeds as much as 20 g, mashed with aquadest using a blender until completely smooth then add 0.25 g sodium benzoate, enough to 100 ml.

##### 3. Bee Pollen Syrup

1 g of bee pollen which has been mashed is then mixed with a CMC solution, then 0.25 g of sodium benzoate are added, stirring vigorously until homogeneous, sufficient to 100 ml.

##### 4. Dates Combination Syrup with Bee Pollen

Dates and bee pollen that have been crushed are mixed and added with 0.25 g of sodium benzoate, stirring vigorously until homogeneous and then add 100 ml of distilled water.

#### *c. Reproduction and Intervention Process in Mice*

Wistar white rats were divided into 4 intervention groups, namely the control group, the intervention group 1, the intervention 2 and the intervention group 3, where the control group only received enough food and distilled water up to 21 days of pregnancy and the first intervention group was given feed + bee pollen syrup at a dose of 20 , 7 mg / kg of rats and distilled water sufficiently for 21 days of gestation, the second group was given feed + date syrup at a dose of 413.2 mg / kg of rats and enough distilled water for 21 days of pregnancy, and the third group was given feed + combination syrup and dates. bee pollen with a dose of 433.9 mg / 2ml / kg / day and sufficient distilled water for 21 days of pregnancy.

All mice were adapted for 7 days and the female rats were reproduced by determining the estrus phase of female rats (the fertile period of the mice where the rats were ready to reproduce) for 1 week, then combining female and male rats, then determining 0 days of pregnancy using the vaginal intake method. in the research of Rakhman et al (2019).

*d. The process of examining the Erythrocyte Index and the birth weight of white wistar rats.*

Measurement of erythrocytes of pregnant female rats was carried out on day 0 of pregnancy and day 20 of pregnancy and divided into 4 groups consisting of 7 pregnant rats for each group, blood was drawn through the orbitalis sinuses of the mice, then put into a vacutainer tube filled with EDTA powder. (Ethylene Diamine Tetracetic Acid) (1mg / 1ml of blood), the solution was shaken with the aim of preventing coagulation / clotting, then blood samples were examined using a hematology analyzer.

Measurement of the weight of the pups was carried out immediately when the pups were born using a digital scale to find out how the weight of the children was born in Wistar rats.

### **3. DATA ANALYSIS**

Processing and data analysis in this study using SPSS version 20. The data were analyzed descriptively to get the mean, median, maximum value, minimum value and standard deviation. Then the distribution / normality of the data is tested with the Saphiro-Wilk test because the number of samples used is less than 50. If the normality test is normally distributed, the paired test is carried out using the paired T test and tested with the One Way ANOVA parametric test to analyze the differences between groups and If significant data is obtained, it will be continued with the Post Hoc Bonferroni test. If the data remains abnormally distributed, it is tested with the Kruskal Wallis nonparametric test to analyze the differences between groups and then the Mann Whitney U Post Hoc test is carried out. 05, it was concluded that there was no significant difference.

### **4. RESULT**

*a. Analysis of the content of the combination of dates syrup with bee pollen*

Based on the results of the nutritional content test of a combination of dates syrup and bee pollen in 100 ml with a concentration of 20 g of dates and 1 g of bee pollen which was carried out in the biopharmaceutical laboratory of the Faculty of Mathematics and Natural Sciences, Hasanuddin University. Where the content of the combination syrup contains water content of 83, 98 g, Crude Protein 1.63 g, Crude Fat 0.13 g, crude fiber 0.48 g, ash content 0.44 g, iron (Fe) 24 g, carbohydrates 13 , 82 g, magnesium 105 g, manganese 40 g, zinc 13 g, flavonoids 0.033 g, polyphenols 0.236 g.

Combination syrup is a mixture of functional food ingredients, namely dates and bee pollen, Dates are one of the foods that are rich in nutrients including carbohydrates, glucose, fructose, sucrose, magnesium, calcium, phosphorus, folate, protein, iron, and several vitamins, among others. others Vitamin A, Thiamine (B1), Riboflavin (B6), Niacin, and

Vitamin E. Iron and protein contained in dates act as the main ingredients for forming hemoglobin. (Wiullin Setiowati, 2018).

Bee Pollen is a collection of flower pollen from various plant sources, which is collected and mixed with nectar and honey bee saliva, carried out by bee workers at the entrance to the hive (Guine, 2015). Bee Pollen contains several important nutrients and bioactive compounds such as proteins, enzymes and essential and non-essential amino acids, lipids, carbohydrates, phenolic compounds, minerals, several antioxidant vitamins, such as C, E,  $\beta$ -carotene, as well as vitamins from the B-complex. . (Utomo, Saidah, Utami, & Sartini, 2017), (Demir & Kaya, 2020) Report that bee pollen is a rich source of potassium, phosphorus, magnesium, calcium, sodium , sulfur, iron, copper, manganese, zinc , chromium and nickel. Bee pollen mixture is formed by 13-55% carbohydrates, 10-40% protein, 1-20% lipids, 3-8% water, 0.5-3% minerals, 0.02-0.1% vitamins, 0 flavonoids, 04-3% and other compounds such as resins and antibiotic substances (Abdelnour, Abd El-Hack, Alagawany, Farag, & Elnesr, 2019).

b. Analysis of the Effect of Giving CMC (Control), Bee pollen Syrup, Date Syrup, Combination Syrup on Erythrocyte Index Levels (MCV, MCH, and MCHC).

Table 1. The distribution of differences in MCV levels before and after treatment in the CMC (Control) group, bee pollen syrup, date syrup, and combination syrup (intervention).  
aPaired t – test; bOne Way ANOVA

MCV Erythrocyte Index	N	Mean $\pm$ SD (fL)		P-Value	Difference in mean $\pm$ SD	95% CI	P-Value
		Pre	Post				
<b>CMC (Control)</b>	7	53.22 $\pm$ 1.61	54.42 $\pm$ 2.48	0.199 <sup>a</sup>	1.20 $\pm$ 2.20	-3.23 – 0.83	0.177 <sup>b</sup>
<b>Bepollen Syrup</b>	7	52.37 $\pm$ 2.37	55.65 $\pm$ 1.77	0.013 <sup>a</sup>	3.27 $\pm$ 2.47	-5.57 – 0.98	
<b>Dates Syrup</b>	7	53.55 $\pm$ 2.45	58.83 $\pm$ 4.70	0.019 <sup>a</sup>	5.27 $\pm$ 4.38	-9.32 – 1.21	
<b>Combination Syrup</b>	7	52.40 $\pm$ 2.73	55.42 $\pm$ 4.56	0.072 <sup>a</sup>	3.01 $\pm$ 3.65	-6.39 – 0.36	

Based on the table above, there were significant changes in the intervention group treated with Bee pollen syrup, and date syrup, using the paired t test, the p value was <0.05 in the intervention group with the conclusion that there were significant changes before and after treatment, while in the group Control (CMC) and Combination Syrup were not statistically significant changes. In the analysis of MCV erythrocyte levels in the control and intervention groups using the one way ANOVA test, p value> 0.05 was found, with the conclusion that there was no significant change in MCV erythrocyte levels for the control and intervention groups.

Table 2. Distribution of differences in MCH levels before and after treatment in the CMC (Control) group, Bee pollen syrup, date syrup, and combination syrup (intervention)

MCH Erythrocyte Index	N	Mean ± SD (PG)		P-Value	Difference in mean ± SD	95% CI	P-Value
		Pre	Post				
CMC (Control)	7	23.78 ± 14.69	24.05 ± 14.57	0.054 <sup>a</sup>	0.27 ± 0.30	-0.55 – 0.06	0.383 <sup>b</sup>
Bepollen Syrup	7	23.40 ± 14.88	23.98 ± 14.63	0.002 <sup>a</sup>	0.57 ± 0.29	-0.84 – 0.29	
Dates Syrup	7	23.54 ± 14.85	23.90 ± 14.70	0.036 <sup>a</sup>	0.35 ± 0.35	-0.68 – 0.03	
Combination Syrup	7	23.59 ± 14.86	24.31 ± 14.54	0.074 <sup>a</sup>	0.71 ± 0.87	-1.52 – 0.09	

<sup>a</sup>Paired t – test; <sup>b</sup>One Way ANOVA

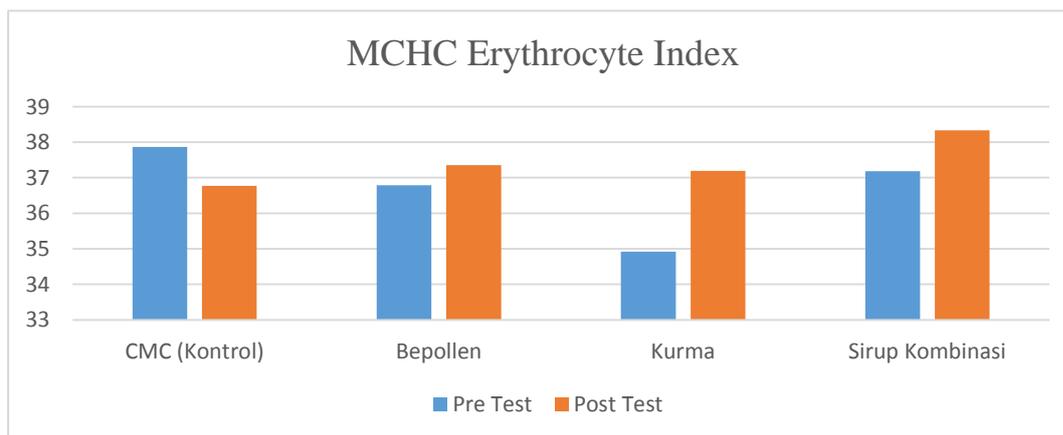
Based on the table above, there are significant changes in the two groups, namely the intervention group for those who were given Bepollen syrup and date syrup, using the paired t test obtained p value <0.05 with the conclusion that there were significant changes before and after treatment, while in The control group (CMC) and the intervention group that were given the combination syrup did not statistically significant change. In the analysis of MCH erythrocyte levels in the control and intervention groups using the one way ANOVA test, p value > 0.05 was found, with the conclusion that there was no significant change in MCH erythrocyte levels for the control and intervention groups.

MCHC Erythrocyte Index	N	Mean ± SD (G/dL)		P-Value	Difference in mean ± SD	95% CI	P-Value
		Pre	Post				
CMC (Control)	7	37.87 ± 8.51	36.77 ± 9.05	0.151 <sup>a</sup>	-1.09 ± 1.76	-0.53 – 2.73	0.037 <sup>b</sup>
Bepollen Syrup	7	36.79 ± 9.05	37.35 ± 8.78	0.382 <sup>a</sup>	0.55 ± 1.56	-2.00 – 0.88	
Dates Syrup	7	34.92 ± 10.20	37.19 ± 8.85	0.111 <sup>a</sup>	2.27 ± 3.22	-5.25 – 0.70	
Combination Syrup	7	37.18 ± 8.92	38.33 ± 8.39	0.013 <sup>a</sup>	1.14 ± 0.86	-1.94 – 0.34	

Table 3. Distribution of differences in MCHC levels before and after treatment in the CMC (Control) group, Bee pollen syrup, date syrup, and combination syrup (intervention).

<sup>a</sup>Paired t – test; <sup>b</sup>One Way ANOVA

Based on the table above, there are no significant changes in the two groups, namely the control group (CMC) and the intervention group given Bepollen, and dates, using the paired t test, the p value is > 0.05, with the conclusion that there are no significant changes before and after treatment, while in the intervention group given the combination syrup, statistically significant changes occurred. In the analysis of MCHC erythrocyte levels in the control and intervention groups using the one way ANOVA test, the p value was <0.05, with the conclusion that there was a significant change in MCHC erythrocyte levels for the control and intervention groups.



MCHC Erythrocyte Index Diagram Before and After treatment in the control group (CMC), and the intervention group with Bepollen, Dates and Combination Syrup.

Table 4. Post-Hoc Analysis of Difference in MCHC Levels between CMC (Control) Groups for Bepollen, CMC (Control) on Dates, CMC (Control) on Combination Syrup, Bepollen for Dates, Bepollen for Combination Syrup, and Dates for Combination Syrup.

Different Treatment Groups	Mean Difference	95% CI	P
CMC (Control) vs S.Bee pollen	1.65	-3.91 – 0.59	0.143
CMC (Control) vs S.Dates	3.37	-5.62 - -1.11	0.005
CMC (Control) vs S.Combination	2.24	-4.49 – 0.01	0.051
S. Bepollen vs S. Dates	1.71	-3.97- 0.54	0.130
S. Bepollen vs S. Combination	0.58	-2.84 – 1.67	0.597
S. Dates vs S. Combinations	1.12	-1.12 – 3.38	0.312

**Post Hoc LSD**

Based on the table above, the one way ANOVA test followed by the Post Hoc LSD test showed that, statistically, there was no significant difference in the levels of the MCHC erythrocyte index to the administration of the CMC (Control) group to Bepollen Syrup, CMC (Control) to the Combination syrup, Bepollen syrup against Dates syrup, Bepollen syrup against Combination Syrup, and Dates syrup against Combination Syrup. Whereas in the treatment of giving CMC (Control) to Dates Syrup there was a significant difference in the levels of MCHC index erythrocytes.

Table 5. Birth weight distribution of Wistar strain white rats in the CMC (Control) group, Bee pollen syrup, date syrup, and combination syrup (intervention).

Treatment	N	Mean Rank	Chi Square	Mean (g) ± SD	Score p
CMC (Control)	7	7.57	12.749	5.43 ± 0.53	0.005 <sup>b</sup>
Bee pollen Syrup	7	11.86		5.86 ± 0.69	
Dates Syrup	7	17.71		6.43 ± 0.53	
Combination Syrup	7	20.86		6.71 ± 0.48	

<sup>b</sup>Kruskal Wallis

Based on the table, it is found that in both groups in the control group (CMC) and in the intervention group treated with Bee Pollen Syrup, Dates Syrup and Combination Syrup, there is a significant effect using the Kruskal Wallis test, the p value <0.05 is obtained. the effect of differences in birth weight of the two groups, namely the control group with a result of 5.43 g, and the intervention group for those given bee pollen syrup of 5.86 g, date syrup of 6.43 g, and the highest was with the intervention of combination syrup. amounting to 6.71 g.

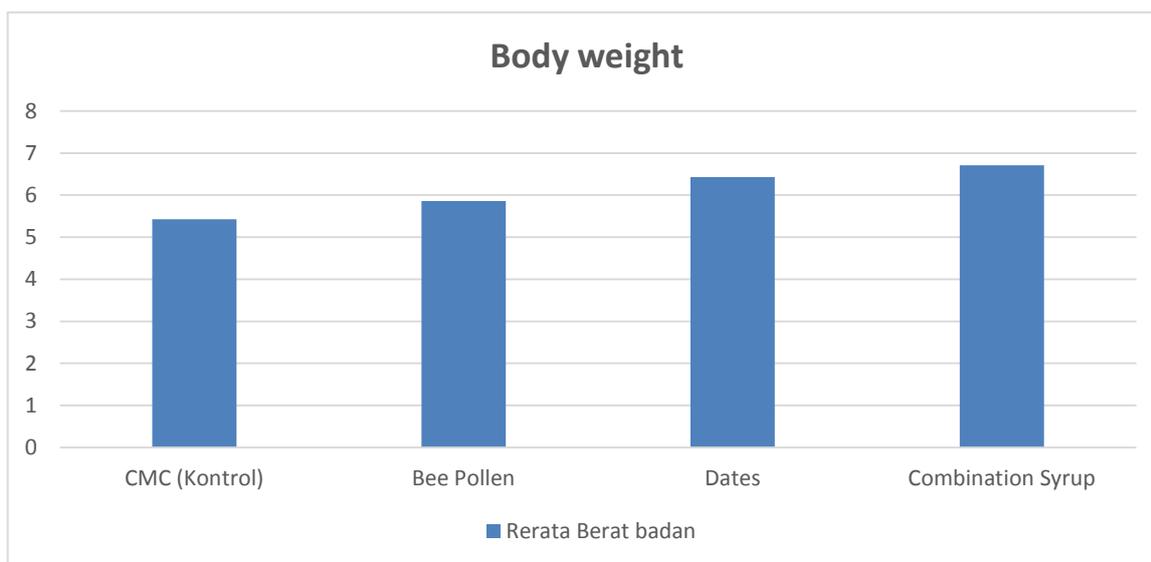


Diagram of the Mean Birth Weight of the Wistar Rats

Table 6. Distribution of Wistar strain white rat tillers in the CMC (Control) group, bee pollen syrup, date syrup, and combination syrup (intervention).

Treatment	N	Mean (ekor) ± SD	Score <i>p</i>
CMC (Control)	7	8 ± 2.16	0.669 <sup>c</sup>
Bee pollen Syrup	7	7 ± 1.29	
Dates Syrup	7	7.14 ± 1.57	
Combination Syrup	7	7.43 ± 1.27	

<sup>c</sup>OneWay ANOVA

Based on the table, it was found that in both groups in the CMC syrup control group and in the intervention group treated with Bee pollen syrup, date syrup and Combination Syrup, there was no significant effect using the one way ANOVA test obtained p value > 0.05 with the conclusion, no There is an effect of differences in the number of children from the two groups, namely the control group with an average result of 8, and the intervention group for those given bee pollen syrup of 7, date syrup of 7.14 and given the intervention of combination syrup of 7.43.

## 5. DISCUSSION

Based on the results of research on the differences in the pre and post erythrocyte index of 28 pregnant Wistar rats and body weight of the pups, which was carried out in August - September 2020 at the Hasanuddin University Biopharmaceutical Laboratory with the treatment given to the CMC (Control) group, Bee pollen syrup, syrup Dates and Syrup Combination into groups (Intervention) with a dose ratio of 20 g of dates and 1 g of bee pollen with a dose of 2 ml / 150-200 g BW / day each.

### 1. *Erythrocyte Index Analysis Results in each group*

Erythrocyte index is an examination to measure the average red blood cell rate. The MCV (Mean Corpuscular Volume) or VER (Average Erythrocyte Volume) examination, describes the size of the erythrocytes in units of fL (femtoliter), where a decrease in MCV indicates that erythrocytes / red blood cells have a small size (microcytic) This anemia is caused by iron deficiency and thalassemia, whereas the increase in MCV shows that erythrocytes / red blood cells have a large size (macrocytic), this is caused by anemia with a deficiency of folic acid or vitamin B12. (Wirahartari, Herawati, & Wande, 2019).

Based on the results of the MCV and MCH Erythrocyte Index analysis in Table 2.2 and Table 2.3, respectively, there were significant changes in the intervention group treated with Bee pollen syrup and date syrup, using the paired t test obtained p value  $<0.05$  while in control group (CMC) and Combination Syrup statistically there was no significant change. Likewise, in the analysis of MCV and MCH erythrocyte levels in the control and intervention groups using the one way ANOVA test, it was found that  $p = 0.177$  on MCV and  $p = 0.383$  at MCH levels which means  $> 0.05$ , with the conclusion that there is no significant change in MCV erythrocyte levels. and MCH in both the control and intervention groups.

Erythrocyte level MCHC (Mean Corpuscular Hemoglobin Concentration) or KHER (Mean Erythrocyte Hemoglobin Level) describes the average amount of hemoglobin concentration in erythrocytes so that this can be used as an indicator in observing therapy in anemia. In table 2.4 with examination of MCHC levels, there is a significant change in the intervention group treated with syrup combination with  $p = 0.013$  which means  $<0.05$ . Likewise, in the analysis of MCHC erythrocyte levels in the control and intervention groups using the one way ANOVA test, it was obtained  $p = 0.037$ , which means  $<0.05$ , with the conclusion that there were significant changes in MCHC erythrocyte levels in both the control and intervention groups. After the LSD post hoc test was carried out, the treatment with a significant value was the treatment in the control group (CMC) of date syrup with a result of  $p = 0.005$ .

Wirahartari et al., (2019) suggest that changes in erythrocyte size can affect the viscosity of blood fluids, so that it can affect the function, activity and smoothness of blood circulation. In pregnancy the need for oxygen is higher, which triggers an increase in erythropoetin production. As a result, the plasma volume increases and red blood cells increase. In pregnancy there is a process of hemodilution or blood thinning due to an increase in plasma volume which increases in a larger proportion compared to the increase in erythrocytes, resulting in a decrease in hemoglobin concentration due to hemodilution (Manuaba, 2012). Hemodilution functions so that the blood supply for the enlarged uterus is fulfilled, protecting the mother and fetus from the negative effects of blood loss during childbirth (Manuaba, 2010). Giving iron tablets during pregnancy is one way to overcome the reduction in HB in pregnant women. Giving calories 300 calories / day and iron supplements as much as 60 mg / day should be enough to prevent anemia. Where 60-65 mg of Fe is equivalent to 200 mg of ferrous sulfate (Psiari Kusuma et al., 2019). Good sources of iron are found in animal foods,

such as meat, chicken and fish. Other good sources are eggs, mashed serials, nuts, green vegetables, and several types of fruit, one of which is dates (Almatsier, 2010).

In the results of the intervention that was given to white rats of the Wistar strain, statistically both date syrup, bee pollen syrup and combination syrup showed that each had a positive impact on the performance of erythrocyte index levels both on MCV, MCH levels and especially on the intervention given. the combination syrup resulted in a significant increase in the levels of MCHC erythrocytes.

Some of the same studies were carried out by Onuh, SN et al, (2012) on 50 Wistar rats during the 112 days treatment period with a dose of 100 g of crude palm fruit extract and methanol and given orally in stratified doses showed that it had properties to support increased erythropoietin synthesis. by the liver to stimulate the bone marrow to produce more red blood cells / hemopoiesis.

Research conducted (Ristyning et al., 2017) On toddlers suffering from iron deficiency anemia (ADB) suggests that by consuming 100 mg of dates, the body's need for magnesium and manganese, copper and sulfur, half part iron, and one quarter part calcium and Potassium can be fulfilled, with the management of giving date palm juice it can be done as additional food for babies over the age of 6 months, while at the age below 6 months it is done through breastfeeding mothers so that they can produce breast milk that contains sufficient iron.

In addition, Nurul Utami & Risti Grahart (2017) conducted a study of 30 people aged 16-18 years at the Ali Maksum Krapyak Islamic boarding school, Yogyakarta, with respondents who were given seven dates every morning and one tablespoon of honey, indicating an increase in hemoglobin levels before and after giving dates and honey, which were statistically significant.

Research by Ady Try Himawan Zen, et al. (2013) at the Islamic University of Sultan Agung Semarang on the Wistar male white rat. With a sample of 24 male Wistar rats which were divided into four groups. Each group consisted of 6 individuals taken by simple random sampling method. Group 1 was given standard diet and distilled water ad libitum for 21 days, group 2 was given low Fe and distilled water ad libitum for 21 days, group 3 was given low Fe and aquadest feed ad libitum for 21 days with date palm juice. 50% by sonde on days 8 to 21, and group 4 were given low Fe and aquadest feed ad libitum for 21 days by giving 100% date palm extract by sonde on days 8 to 21. The dose of date palm juice in rats is the result of conversion. from the dose of date palm juice for adults  $90 \text{ ml} \times 0.018 = 1.62 \text{ ml}$  which is simplified to  $1.6 \text{ ml} / 200 \text{ g BW}$  rats. The results of the study were that the hemoglobin levels of mice with iron deficiency and were given date juice at a dose of 50% and 100% were higher than those that were not given date juice but lower than the control. This shows that the administration of date palm juice has a significant effect on the blood hemoglobin levels of iron deficient rats.

Tyas, Woelansari, & Istanto, 2018. In their research on giving Ajwa Date Juice to Mice with a concentration of 20% showed a result of  $13.82 \text{ g} / \text{dL}$ , 40% showed a result of  $14.38 \text{ g} / \text{dL}$ , and 60% showed a result of  $15,05 \text{ g} / \text{dL}$ , this can have a significant effect on hemoglobin levels by giving the highest treatment, namely the treatment given a concentration of 60%.

Morgano, et al. (2011) suggest that regular bee pollen intake has a very good impact, such as anemia, depression, memory loss, prostate, impotence, aging, stress-related diseases and impaired immune function, in addition to antibiotics, antineoplastics, anti-diarrhea and antioxidant properties. .

Utami & Graharti, 2017. Suggest that the iron content contained in dates, namely  $1.02 \text{ mg}$ , shows a significant increase in serum Fe after giving dates. The same research was conducted by Diyah Ayu Susilowati (2017). It was found that giving dates can increase Hemoglobin levels in pregnant women with anemia who were given treatment increased by  $1.10 \text{ g}\%$ .

Giving dates can increase hemoglobin levels in pregnant women with anemia an average increase of 1.1 g%.

Research by Nur Setianingsih, et al. (2017) at the University of Muhammadiyah Malang on Mice Embryos. By giving date palm pulp extract to 4 treatment groups, namely the control group (given distilled water), the treatment was given a dose of date palm extract as much as three grains or as much as 0.135 g (K2), the treatment was given a dose of date palm extract as much as five grains or 0.234 g (K3), the treatment was given a dose of date palm extract as much as seven grains or 0.372 g (K4). Mice that were given date palm pulp extract had body weight ranging from 30-45 g. The extract was given orally on days 14-18 of pregnancy using a needle sonde. Each treatment group was given 0.2 ml. And on the 19th day of pregnancy, surgery was performed. The results showed that there was an increase in the number of leucocytes after giving the date palm pulp extract for 5 days. The higher the dose given to mice, the more leukocytes produced.

## 2. *The results of analysis of the birth weight of the puppies in each group*

Based on the results of this study, it was shown that the combination syrup had a significant effect on the birth weight of Wistar white rats with p value = <0.05. The increase in body weight in the group given the date syrup treatment with a yield of 6.43 g was not much different from the group given the combination syrup treatment with a yield of 6.71 g. This shows that iron intake does affect the energy metabolism of mice which can increase body weight. As in the research of Panto Paul (2012), which states that iron functions as a cofactor in multiplying proteins and enzymes needed for oxygen and energy metabolism and several other important processes. (Sukarni and Wahyu, 2013) suggest that iron plays a very important role not only in delivering oxygen to body tissues but also as a cofactor with several enzymes involved in the process of energy metabolism.

In a study by Abeer El Sakka, et al., Said that giving dates as much as 100 g which is equivalent to 314 calories in nursing mothers can act as galactogogues thereby increasing the baby's weight in the first two weeks postpartum. Likewise research (Agustina & Barokah, 2018) has an increase in body weight, one of which can be influenced by factors such as food intake. By adding dates to the daily intake of food, it is hoped that it can help improve malnutrition in children. In addition to iron content, dates are rich in other nutrients, high in carbohydrates, low in protein and fat, which are thought to play an active role in increasing body weight.

## 6. CONCLUSION

Based on this study, it shows that date syrup, bee pollen syrup either separately or in combination has a positive impact on the performance of the erythrocyte index, especially at the MCHC (Mean Corpuscular Hemoglobin Concentration) level, there is a significant change in the intervention group treated with the syrup combination with p = 0.013, which means <0.05, there was also an increase in the birth weight of the white Wistar strain puppies. However, several existing studies suggest that success significantly depends on the number of doses given, and when compared to the number of doses given by researchers, it is still relatively small and needs to be done with more varied doses so that a more effective dose can be determined. Erythrocyte levels and birth weight can provide a more meaningful success rate, especially in human pregnancy.

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