ISSN 2515-8260 Volume 07, Issue 08, 2020

The Effect Of Giving Dates Syrup Combination (Phoenix Dactylifera) And Bee Pollen On Hemoglobin Levels In Pregnant Wistar Rats (Rattus Novergicus)

Fahriani[1],Sartini[2], Veni Hadju[3]

[1]*Departeman of Midwifery, Postgraduate School, Hasanuddin University, Indonesia*
[2]*Department of Farmachy, Faculty of Medical, Hasanuddin University, Indonesia*
[3]*Departmentof Nutrition, Faculty of Medical, Hasanuddin University, Indonesia*

Email Address: fahriani72@gmail.com, fahrianisulbung@gmail.com

Abstract: ***Background: Anemia often results from iron deficiency in a pregnant woman as a result of a double iron needs resulting from a rise in blood volume, to meet a mother's (prevent blood loss at birth) and fetal growth. Dates and bee pollen have the potential to increase hemoglobin because of its complex properties and compositions.***
Objective of the study :This study aims to identify the effect of combination of dates and bee pollen syrup towards the hemoglobin level on the pregnant white wistar strain
Reseach method:This research used an experimental research design with randomized post test control group. It used simple random sampling technique by paying attention to inclusion and exclusion criteria, and obtain 28 pregnant white wistar strain rats. The samples were divided into 4 groups. The control group was given cmc solution intervention group was given dates syrup,bee pollen, and the combination of dates syrup and bee pollen,at a dose of 2ml/day for 20 days. Measurement of hemoglobin levels using a hematology analyzer.
Result: The results of this study analyzed using paired T test, Anova test with two factorial design and post Hoc LSD. This study shows that from the statistical test of hemoglobin levels, it obtained an average value in control group before 13.700±0.883 and after treatment 13.314±0.979 with a value (p=0,096,p>0.05), which means there is no difference after treatment while in the intervention group date syrup before treatment 12,500 ± 0.416 and after treatment 13,014 ± 0.644 with value (p = 0.179, p> 0.05) which means there is no difference after treatment. The bee pollen syrup group before treatment was 13.814 ± 0.823 and after treatment 14.014 ± 0.795 with value (p = 0.099, p> 0.05) which means there is no difference after treatment. whereas in the combination of date syrup and bee pollen groups before treatment was 12.971 ± 0.616 and after treatment 15.557± 0.378 with value (p=0.000, p<0.05) which means there is a difference after treatment.
Conclusion: The conclusion of this study is that there is an effect of giving a combination of dates syrup and bee pollen. It is hoped that the next researcher can make a combination of dates syrup and bee pollen which is given to pregnant woman

Keywords: Hemoglobin, dates, bee pollen, pregnant wister rats.

1. INTRODUCTION

Anemia in pregnancy can make harmful effect on the health of pregnant women and the fetus, pregnancy usually occurs with increased energy and oxidation requirements due to increased use of oxygen from the mother's body, placenta and fetal development, and when the number of red blood cells or oxygen-carrying hemoglobin in the blood is not sufficient for physiological needs, a pregnant woman's body will experience anemia (Cunningham, 2018, Giel, nd 2019).

ISSN 2515-8260 Volume 07, Issue 08, 2020

According to WHO, there are 34 % pregnant women with anemia in the world, which 75 % are in developing countries. Pregnant women with iron deficiency anemia are around 62.3% (UNIC, 2014). The prevalence of anemia in pregnant women in Indonesia increased compared to 2013, pregnant women with anemia in 2013 were 37.1% while in 2018 it increased to 48.9% (Riskesdas, 2018).

Iron maintains the function of hemoglobin cells which have elements that deliver oxygen to the blood circulation network and the benefits of other minerals to prevent anemia (Novitasari, 2014). Iron deficiency can cause anemia, so that formation of red blood cells is needed, red blood cells deficiency can cause low hemoglobin (cahyani,2009)

A research conducted by Rizkiawati found that in preventing anemia, in addition to consuming iron, folic acid can also increase hemoglobin levels and vitamin C which play a role in increasing the absorption of non-heme iron to four times. vitamin c and iron form complex iron ascorbate compounds that are easy to dissolve and are easily absorbed.

The content of dates that increase hemoglobin in addition to iron, namely flavonoid compounds that help increase hemoglobin and platelets (Marzuki, 2012). In a study conducted by SofiahMawaddah (2019) Other content of dates are protein, fat, minerals, sources of potassium, folic acid.

Iron is a medication that has an important role in regulating hemostasis of iron. Research conducted by Maryam Masher, giving iron to female rats with 50 mg and polyphenols. each polyphenol shows different results and regulates iron differently which may be due to the structure that the combination of flavonoids and iron can increase hemoglobin.

Dates contain high iron so that they help to increase hemoglobin levels and prevent anemia, consuming as much as 25 g / day / person for 30 days can increase hemoglobin levels in pregnant women, in 25 grams of dates contain 0.225 iron (Ike AY, 2019). In YanI's research, the composition of dates consisted of carbohydrates (44% - 88% total), fat (0.2% - 0.4%), protein (2.3% - 5.6%), fiber (6.4%). % - 11.5%).

In addition to dates which are rich in iron, bee pollen can also increase hemoglobin levels in the human body which contains iron 2.60 - 1180.00 mg depending on bee food and flavonoids, natural chemicals with a complex composition. bee pollen has many benefits, including as an antioxidant (ShaheenFaizi, 2017). To increase the strength and resistance of the body against various diseases can add 20% bee pollen to food.(Syafrizal, Hariani, & Budiman, 2016).

2. MATERIALS AND METHODS

Research design

This study used quantitative research with the type of laboratory experimental research and Randomized Post Test Control Group Only Design. In the experimental design there were two groups selected randomly. One group act as a control group and the other group acts as an experimental group.

Population and Sample

The population was all white wistar rats that were pregnant and in good health, the number of samples was 28 white wistar rats selectedrandomly which were divided into 4 groups consisting of 7 samples for each group that met the inclusion criteria. the pregnancy seen from vaginal smears of mated rats, if the The rats vaginal smear had yellowish colored sperm spots, it could be defined as 0 days of gestation (Smith, 1988). The rats'weights ranged from ± 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, which was ± 200 g (Kaempe, et al, 2019).

ISSN 2515-8260 Volume 07, Issue 08, 2020

The instruments of data collection

Tools and Materials: EDTA tubes, capillary pipes, handscoons, alcohol cotton, tube racks, labels, markers, tissues, dry rags carried out with the work procedure. The rats were held and clamped at the nape with middle fingers. Then the rats are conditioned as comfortable as possible, then the capillary tubes are scratched in the medial canthus of the eye under the eyeball towards the optic foramen, then the capillary tube is rotated to injure the plexus. if it is rotated 5 times it must be returned 5 times. the blood is collected into the EDTA tube then close it, then shake the tube so that the blood in the tube is not damaged and save it in the tube then do a hematology analyzer examination

Syrup making

The preparation for making date syrup is done by separating the dates from the seeds and weighing 20 g, then mix with 150 ml of distilled water at a concentration of 0.1% w / v then grind using a blender until completely smooth. Making bee pollen syrup with 1 g of bee pollen granules powder were suspended in 100 ml distilled water at a concentration of 2% w / v and mixed vigorously from date syrup and bee pollen were combined to form a syrup combination. The process of making a combination of dates syrup with bee pollen, pour water in the container provided then boil it, stir well for 10 -15 minutes, wait until it cools then strain then make processed syrup and mix it with the date palm suspension with bee pollen then add sodium benzoate preservative 0, 25% in 100 ml.

Method of collecting data

Data collection was carried out by researchers. Experimental animals of wistar strain female rats were adapted for 7 days in a new environment, combining female and male rats by determining the estrus phase of female rats (the fertile period of the rat where it were ready to produce) for 1 week with a ratio of 1: 1 (One male and one female), a total of 60 males and 60 females, determined 0 days of pregnancy using the vaginal smear method in the study of Rakhman et al (2019) and obtained 28 pregnant wistar rats using the vaginal smear method.

3. RESEARCH FLOW

Intervening by measuring blood hemoglobin levels of pregnant female rats on day 0 of pregnancy and divided into four groups of seven pregnant female rats for each group. The control group only received enough feed, cmc solution and distilled water up to 20 days of pregnancy. the intervention group in the first group was given feed + date syrup at a dose of 413.2 mg / kg of rats and enough distilled water for 20 days of pregnancy. the second group was given feed + syrup bee pollen with a dose of 20.7 mg / kg BW of rats and sufficient distilled water for 20 days of pregnancy. the third group was given feed + combination of dates syrup with bee pollen at a dose of 433.9 mg / kg BW of rats and sufficient distilled water for 20 days of pregnancy.

Data analysis

Before conducting data analysis, it is necessary to conduct an analysis requirement test in the form of a normality test to analyze the distribution of data whether or not the sample size is normally <50, so the test used is Shapiro Wilk. The data is said to be normally distributed if $p > 0.05$ and if the data is not normally distributed, $p < 0.05$. After that, the homogeneity test was carried outto see variations in the data for the control and intervention groups. ThenHypothesis testing is done by testing the Paired test to see the differences in the pre-test and post-test of each group and is carried out by one-way ANOVA test to determine the effect of the comparison between groups. then if the data is influential, then continue the post hoc test. Data processing was done using the computer data version of the Package for the Social Science (SPSS) program. 25. Data analysis using univariate analysis to determine the frequency distribution and bivariate analysis to determine the effect of intervention on

ISSN 2515-8260 Volume 07, Issue 08, 2020

groups, then the results of the analysis are described in table form, narrated with a bar chart (Dahlan S, 2016)

4. RESULTS

Chemical analysis of the composition of date syrup and bee pollen. Based on the test results of the composition of the combination of dates syrup with bee pollen, the results obtained from the carbohydrate content of 13.82%, crude protein as much as 1.63%, crude fat 0.13%, crude fiber 0.48%, iron 24 ppm, magnesium 105 bpj, zinc 13 ppm, manganese 40 ppm, flavonoids 33.03 ppm / polyphenols 236.12 ppm.

Table 1. The results of the analysis of hemoglobin levels (g / dl) given before and after treatment are as follows:

Hewan uji	Kelompok							
	Larutan cmc		Sirup kurma		Sirup bee pollen		Sirup kombinasi	
	Pre	Post	Pre	Post	Pre	Post	Pre	Post
1	14,8	13,5	12,7	12,5	14,0	14,2	12,1	15,6
2	12,7	12,0	12,5	13,7	13,5	13,4	12,9	16.0
3	14,5	14,2	12,2	12,5	14,0	14,1	12,8	15,4
4	14,2	14,5	13,0	13,4	14,6	14,5	13,1	15,1
5	14,0	14,0	12,0	13,7	13,2	13,4	13,4	15,5
6	12,7	12,5	13,0	12,1	14,9	15,4	14,0	15,2
7	13,0	12,5	12,1	13,2	12,5	13,1	12,5	16,1
SD	0,88	0,97	0,41	0,64	0,82	0,79	0,61	0,37
Rata-Rata	13,7	13,3	12,5	13,0	13,8	14,0	12,9	15,5

Table 2.The results of the statistical analysis of the measurement of hemoglobin levels (g / dl) are given before and after treatment, namely as follows:

** Paired T Test ** Anova Two Factorial Randomized Design*

Kelompok Perlakuan	n	Kadar Hemoglobin (g/dl)		P-value	X̄	95 % CI		P-Value
		Pre Mean±SD	Post Mean±SD		Mean ±SD	Lower	Upper	
Larutan CMC	7	13.700±0,883^{bc}	13.314±0,979^{bc}	0.096*	-0,385±0,517	-,864	,093	
Sirup Kurma	7	12.500±0,416^{bc}	13.014±0,644^{bc}	0.179*	,514±0,893	-,311	1,34	
Sirup Bee Pollen	7	13.814±0,823^{b}	14.014±0,795^{b}	0,099*	,200±0,270	-,050	,450	0,000**
Sirup Kombinasi	7	12.971±0,616^{c}	15.557±0,378^{a}	0.000*	2,585±0,878	1,773	3,398	

ISSN 2515-8260 Volume 07, Issue 08, 2020

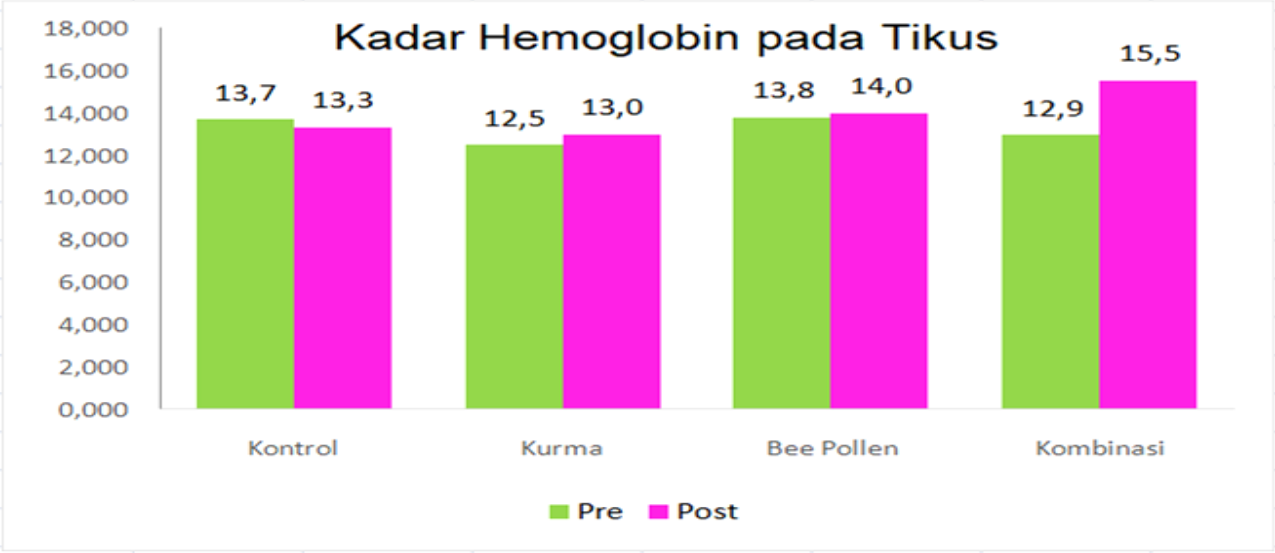

Figure 1. Bar diagram of the average increase in hemoglobin levels in pregnant Wistar rats.

Table 3. Results of Post Hoc Statistical Analysis Comparison of Effects Provision of CMC Solution, Date Syrup, Bee Pollen Syrup and Syrup Combination between groups

** LSD post hoc test*

Kelompok Perlakuan	Perbedaan Rerata	95 % CI		Nilai P
		Lower	Upper	
Kontrol – Kombinasi	-7571	-1,305	-0,209	0,008
Kurma – Kombinasi	-1.5071	-2,055	-0,959	0,000
Bee pollen - Kombinasi	-0,350	-0,898	0,198	0,205

Based on the data above, it shows that in the cmc solution group there was a decrease as seen in Table 2 and Figure 1 diagram with an average HB value of 13.7 pre-test to 13.3 post-test, while the results of statistical tests are shown in Table 3, the differences before and after the solution treatment in CMC, it can be concluded that the CMC solution is not significantly different. It can be seen that the significance value of the p-value is 0.96, which means there is no effect of intervention to increase hemoglobin levels. Meanwhile, in table 4, the results of the post hoc statistical analysis show that the combined control has a p-value> 0.05, it means that there is a significant change in the increase in hemoglobin levels in pregnant wistar rats.

The date syrup group has an increase seen in table 2 and Figure 1 diagram with an average HB value of 12.5 pre-test to 13.0 in the post-test. while the results of statistical tests are shown in table 3, the differences and between before and after treatment of date syrup. It was concluded that date syrup was not significantly different. It could be seen the significance value of p-value 0.179, where there was no effect of intervention to increase hemoglobin levels. whereas in table 4, the results of the post hoc statistical analysis show the date-combination obtained p-value <0.05, meaning that there is a significant change in the increase in hemoglobin levels in pregnant wistar rats.

The bee pollen syrup group shows an increase, seen in table 2 and diagram 1 with an average HB value of 13.8 pre-test to 14.0 in the post-test. while the results of statistical tests

ISSN 2515-8260 Volume 07, Issue 08, 2020

are shown in Table 3, the differences before and after the bee pollen syrup treatment. It can be concluded that the bee pollen syrup is not significantly different, it can be seen from the significance value of p-value 0.099, where there is no effect of intervention to increase hemoglobin levels. whereas in table 4 the results of the post hoc statistical analysis shows bee pollen - combination obtained p - value> 0.05, meaning that there is no significant change in the increase in hemoglobin levels in pregnant wistar rats.

In the combination syrup group there was an increase seen in table 2 and diagram figure 1 with an average HB value of 12.9 pre-test to 15.5 in the post-test, while the statistical test results are shown in table 3 before and after the combination syrup treatment, it can be concluded that The combination syrup was stated to be significantly different, it could be seen from the significance value of p-value 0.000, where there was an effect of intervention on increasing hemoglobin levels in pregnant Wistar rats.

5. DISCUSSION

This study showed that the combination of date syrup and bee pollen had a higher hemoglobin increase compared to the date syrup and bee pollen syrup groups. Where in this study the composition of the combination of dates syrup and bee pollen contains 24 ppm of iron with 20 g of dates, equivalent to 5 dates and 1 g of bee pollen. Previous research conducted by Ike AY (2019) showed that dates contain a lot of iron which can increase hemoglobin with 5 date seeds equivalent to 25 g with an iron content of 0.225 mg, iron needed by pregnant women is 25 g / day. There are differences that could affect the possibility due to the type of dates and how they are processed. Meanwhile, the results ofSusiloningtyas Research (2018) Provision of Fe preparations of 60 mg for 30 days can increase hemoglobin levels by 1gr / dl.

Iron is essential for making hemoglobin which is needed by the body which functions as a hemoglobin system for the fetus. According to the Dietary iron intake requirement increases from 18 mg / day in adult women to 27 mg / day in pregnant women. WHO recommends that pregnant women take iron supplements 60 mg / day for 6 months. Dates contain 75 g of carbohydrates, 2.2 mg of niconic acid, 6.1 mg of vitamin C, 144 mg of vitamin B2, 93 mg of Vitamin B, 90 mg of Vitamin A, 0.43 g of fat, 2.35 g of protein, 2 fiber , 4 g, and the mineral content is phosphorus 63 mg, zinc 1.2 mg, iron 1.2 mg, sulfur 14.7 mg, copper 2.4 mg, magnesium 50 mg, calcium 52 mg, folic acid 54 mg, in addition to contains minerals, dates also contain elements, namely carbohydrates 75 g, fiber / fiber 2.4 g, protein 2.35 g, fat 0.43 g, vitamin A 90 mg, vitamin B1 93 mg, vitamin B2 144 mg, vitamin C 6.1 mg, niconic acid 2.2 mg. (Sodiqah, Y, 2015). While the components of bee pollen consist of nutrients (protein, carbohydrates, and lipids), amino acids, fatty acids, vitamins, mineral flavonoid compounds, phenolic acids, and their derivatives of inorganic macroelements (sodium, potassium, calcium, and magnesium), micro elements (iron, zinc, manganese and copper) and several other metals (chromium, aluminum, strontium, tin, nickel and vanadium), especially for gluconic acid, potassium, calcium, iron, manganese and zinc (Kalayc, Z. 2017).

Combined syrup shows the effect of increasing hemoglobin levels significantly, seen from table 1, table 2 and diagram, from the results of statistical tests, there is a significant difference of 2.6 mg / dl compared to date syrup alone or bee pollen syrup itself. In this study, researchers made a combination syrup to help problems that occur in pregnant women who are anemic. This combination syrup has been combined with date syrup and bee pollen syrup so that the chemical content in it is sufficient to increase hemoglobin levels.

The results of this research have just been carried out by referring to previous research, so that it was carried out by combining the therapy of giving date syrup and bee pollen syrup which is processed into one product.so it can be consumed to increase

ISSN 2515-8260 Volume 07, Issue 08, 2020

hemoglobin levels in pregnant wistar white rats. Researchers developed existing research and made products from dates and bee pollen to be processed into syrup. Dates extract is one of the processed products from dates made by pressing which is currently available in the market. Date juice is in liquid form such as syrup, so it is easy to consume and easier to store. Date palm juice is believed to have properties in curing disease, increasing stamina. or immune system and overcoming anemia (Hermawan et al, 2019).

6. CONCLUSION

Based on the results of the research and data analysis that conducted on the effect of giving a combination of dates syrup and bee pollen on the increase in hemoglobin levels in pregnant wistar rats, it was found that there was an increase in hemoglobin levels.

Ethical Approval

Before conducting the research, the researcher first submits a research permit which has previously obtained an ethical approval recommendation number 6524 / UN4.14.10 / TP.02.02 / 2020 and the ethical approval protocol number 982009226.

7. REFERENCE

[1] Cahyani, AD, 2009. The Relationship Between Hemoglobin Levels and Learning Achievement in Students of SD N Kartasura 1, 4 and 6 in Kartasura District, Sukoharjo Regency. Study Program III Nutrition, Faculty of Health Sciences, Muhammadiyah University of Surakarta. Available from: http://etd.eprints.ums.ac.id/6187/1/J300050014.pdf [Accesed 20 october 2020]
Cunningham, et al. (2018). Williams Obstetrics Edition 23 Volume 1. Jakarta: EGC.

[2] Dahlan, M.S. (2016). Langkah-Langkah Membuat Proposal Penelitian Bidang Kedokteran dan Kesehatan. Jakarta: CV Sagung Seto.

[3] Dahlan, M.S. (2016).Besar Sampel Dalam Penelitian Kedokteran DanKesehatan.Jakarta : EpidemiologiIndonesia.

[4] Giel, KE (2019). The Impact of Maternal Eating Disorders on Dietary Intake and Eating Patterns during Pregnancy: A Systematic Review. 1–17.

[5] Hernawan, B., Sofro, ZM, & Sulistyorini, SL (2019). The Effect of Dates Syrup Consumption on Lipid Peroxide Concentration during Acute Aerobic Exercise for Beginners. Biomedics, 11 (1), 30.https://doi.org/10.23917/biomedika.v11i1.7129.

[6] Ike AY (2019). The Effect of Dates Extract on Increasing Hemoglobin Levels of Pregnant Women. Indonesian journal science and technology series, 5 (2), 60.https://doi.org/10.36722/sst.v5i2.351

[7] Kaempe, H., Suryanto, E.& Kawengian, S., 2013, Potensi Ekstrak Fenolik Buah kurma (Musa Spp.) Terhadap Tikus Putih (Rattus norvegicus), Chem. Prog.,6 (1), 6-10

[8] Marzuki, A., Nurhainun I., and Uslam, 2012, The Effect of Dates (Phoenix dactylifera L) on Changes in the Number of Platelets in Rats (Rattus norvegicus), Vol. 16, Faculty of Pharmacy, Hasanuddin University Makassar.

[9] Mawaddah, S. (2020). The effect of giving dates juice on the increase in hemoglobin levels in adolescent girls with anemia. Media Information, 15 (2), 160–164.https://doi.org/10.37160/bmi.v15i2.385

[10] Faizi, S., Mazhar, M., Gul, A., Kabir, N., & Simjee, S. U. (2017). Effects of naturally occurring flavonoids on ferroportin expression in the spleen in iron deficiency anemia: In vivo. *RSC Advances*, *7*(38), 23238–23245. https://doi.org/10.1039/c7ra02138k

ISSN 2515-8260 Volume 07, Issue 08, 2020

[11] Novitasari, S. (2014). Relationship of Protein, Iron, Vitamin C and Zinc Intake Levels with Hemoglobin Levels in Teenage Girls at Batik 1 High School Surakarta (Doctoral dissertation, Muhammadiyah University of Surakarta).

[12] Profile of South Sulawesi. 2018. Health Profile of South Sulawesi 2013. Makassar: Profile of South Sulawesi

[13] Riskesdas, 2018. Research and Development Agency for Health Ministry of the Republic of Indonesia 2018. http://www.depkes.go.id/resources/download.infoterkini/materi_2018/Hasil%20RISKESDAS% 202018.Pdf - Accessed March 2020.

[14] Smith, John B, Soesanto Mangkoewidjojo, dan International Development Program of Australian Universities and Colleges. 1988. *Pemeliharaan, pembiakan dan penggunaan hewan percobaan di daerah tropis* oleh. Jakarta; Canberra: International Development Program of Australian Universities and Colleges.

[15] Susiloningtyas, I. (2017). PROVISION OF IRON (Fe) IN PREGNANCY By: Is Susiloningtyas. Sultan Agung Scientific Magazine.

[16] Syafrizal, Hariani, N., & Budiman. (2016). Phytochemical Analysis, Toxicity, and Antioxidant Extract of Bee Pollen (Bee Pollen) Trigona spp.*Proceedings of the 50th National Seminar on Indonesian Medicinal Plants*, (4), 408–414.

[17] *THE EFFECT OF DATE (PHOENIX DACTYLIFERA) JUICE TO INCREASE HAEMOGLOBIN LEVEL OF WHITE RAT (RATTUS NOVERGICUS). Sodiqah, Yani 1, Abdi, Dian Amelia 2, GunawanSahid 3, Hafsah, Andi Najmiah 4*. (nd). (April 2015).

[18] United Nation Information Center (UNIC), 2014. Maternal Deathrates Fall But Chronic Diseasesincrease Pregnancy Risk-Un Agency. Jakarta

[19] WHO, WHO (2019) Hemoglobin concentration for the diagnosis of anemia and assessment of saverity. Vitamin and Mineral Nutrition System Geneva.

[20] Z. Kalayc ı o ğ lu, H. Kaygusuz, S. Döker, S. Kolayl ı, and FB Erim, “Characterization of Turkish honeybee pollens by principal component analysis based on their individual organic acids, sugars, minerals, and antioxidant activities, "LWT - Food Science and Technology, vol. 84, pp. 402 - 408, 2017.