

ANTIDIABETIC ACTIVITY OF POWDER AND ETHANOLIC EXTRACT OF ANTLION (*Myrmeleon sp.*) ON WISTAR STRAIN WHITE MALE RATS WITH GLUCOSE PRELOAD

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INTRODUCTION

Diabetes mellitus (DM) is a group of metabolic diseases characterized by hyperglycemia. It occurs because abnormalities in insulin secretion, insulin action, or both (Gustaviani, 2006). Diabetes treatment is generally done through regular insulin injections and delivery of oral antidiabetic drug such as sulfonylurea class, biguanide, thiazolidinedion and meglitinida which have some side effects like headache, dizziness, nausea, anorexia and permanent organ damage. More over, they are also expensive. People start taking treatment in traditional way natural materials, such as antlion (*Myrmeleon sp.*) to lower blood glucose level (Lee et al., 2007).

Previous research showed that the young antlion methanolic extract of had the highest inhibitory activity toward α -glucosidase enzyme, was 22.81% (Faiz, 2008). Giving combination of Antlion and bananas for 14 days could decrease blood glucose levels at a dose of 0,01ml / 200g (Tyas 2006).

This study has examined the antidiabetic effects of the powder and ethanolic extract of antlion (*Myrmeleon sp.*) on blood glucose level of Wistar male rats were burdened by glucose.

MATERIAL AND METHOD

Antlion (*Myrmeleon sp.*) obtained from Gebanganom, Genuksari, Semarang, Central Java. The chemicals used were GOD-PAP, glucose monohydrate, Na CMC, aquabidest, aquadest, and ethanol 96%. Test animals employed were 2-3 months old male albino wistar rats with the weight range of 150-200 grams. They were obtained from the Laboratory of Pharmacology and Toxicology, Faculty of Pharmacy, University of Muhammadiyah Purwokerto. Tools used were a set of Pyrex®, mortars and stamper, oral injection syringe, micropipette, centrifuge, yellow tip, eppendorf, electric scales, vortex, and UV-vis spectrometer.

Extraction procedure

The Antlions that had been dried with freeze drying method and divided into two groups. The first group was for powder preparation, while the second one the powdered Antlion was extracted with 96%

ethanol. The extract was filtered and evaporated to dryness in water bath at 50°C.

Experimental animals

Twenty seven rats were divided at random into nine groups of 3 animals each. Animal was adapted to the same condition and avoided from stress. Before getting the treatment, every group was fasted for 18-24 hours and allowed free access to standard pellet diet and water ad libtum.

Group I as the normal control group, Group II as the positive control group was given glibenclamide. Group III as the negative control group was given glucose. Group IV, V, and VI was given antlion powder with the dose of 5.42 mg/KgBW, 10.84 mg/KgBW, and 21.68 mg/KgBW respectively. While group VII, VIII, and IX were got ethanol extract of antlion with the dose of 0.1626 mg/KgBW, 0.3252 mg/kgBW, and 0.6054 mg/KgBW respectively. All treatments were held orally and then glucose tolerance test was conducted by adding glucose monohydrate with the dose of 1,35 g/200Gbw solution 30 minutes after the treatment.

Blood sampling was done shortly before glucose tolerance test as minute 30 and right after giving glucose as minute 0. Blood sampling was re-done in minute 30, 60, 90, and 120 after the test. Blood glucose level was measured by using GOD-PAP method.

The blood glucose level of each group was analysed statistically. From the value of $AUC_{(-30)-90}$ the blood glucose was analysed by using *Two Way ANOVA* and *Post Hoc* LSD with the significance level of 95% to determine the significance of each group. The results were considered to be significant when the P-value was less than 0.05. For data processing SPSS data analysis soft ware Version 16 was used.

RESULTS AND DISCUSION

The hypoglycemic effect of Powder and Ethanolic Extract of Antlion (*Myrmeleon Sp.*) shown in Table 1 below. The normal control shows that the data of the glucose of the rats blood are within the scale of 109-151mg/dl. This scale does not show normal content of rats blood glucose which is between 70-110mg/dl (Harkness, 1983).

Table 1. Effect of Powder and Ethanolic Extract of Antlion (*Myrmeleon Sp.*) on White Rats Male Strain Wistar Blood Glucose (Mg/Dl) Levels.

	T(-60)	T(-30)	T ₀	T ₃₀	T ₆₀	T ₉₀	T ₁₂₀
Group I	151.21 ±5,75	143.22 ±39,80	133.02 ±20,00	126.34 ±13,07	124.49 ±2,64	114.21 ±6,24	109.90 ±15,50
Group II	102.58 ±20,87	89.14 ±18,19	131.40 ±20,98	138.68 ±7,93	123.03 ±43,00	95.13 ±31,56	94.35 ±32,62
Group II	114.32 ±8,45	118.98 ±16,0	142.98 ±9,07	165.41 ±24,00	132.56 ±26,55	125.64 ±12,85	113.14 ±14,00
Group IV	117.94 ±4,35	76.69 ±11,71	132.16 ±14,50	139.21 ±10,14	136.97 ±16,44	129.02 ±13,05	106.49 ±7,27
Group V	117.94 ±24,78	82.15 ±14,48	130.11 ±17,01	138.40 ±24,69	129.02 ±20,07	120.23 ±29,97	101.22 ±20,86
Group VI	113.19 ±8,51	95.27 ±16,45	130.92 ±12,76	139.33 ±9,05	130.40 ±20,06	111.70 ±33,97	99.61 ±18,97
Group VII	104.44 ±30,11	104.72 ±26,27	132.80 ±39,55	135.11 ±18,17	129.13 ±9,23	123.71 ±4,93	101.64 ±25,43
Group VIII	105.81 ±30,11	92.40 ±26,27	129.54 ±39,55	135.67 ±18,17	118.53 ±9,23	112.86 ±4,93	108.75 ±25,43
Group IX	105.77 ±22,12	92.04 ±24,58	116.76 ±6,62	136.45 ±8,73	127.91 ±8,62	118.40 ±8,88	97.93 ±14,79

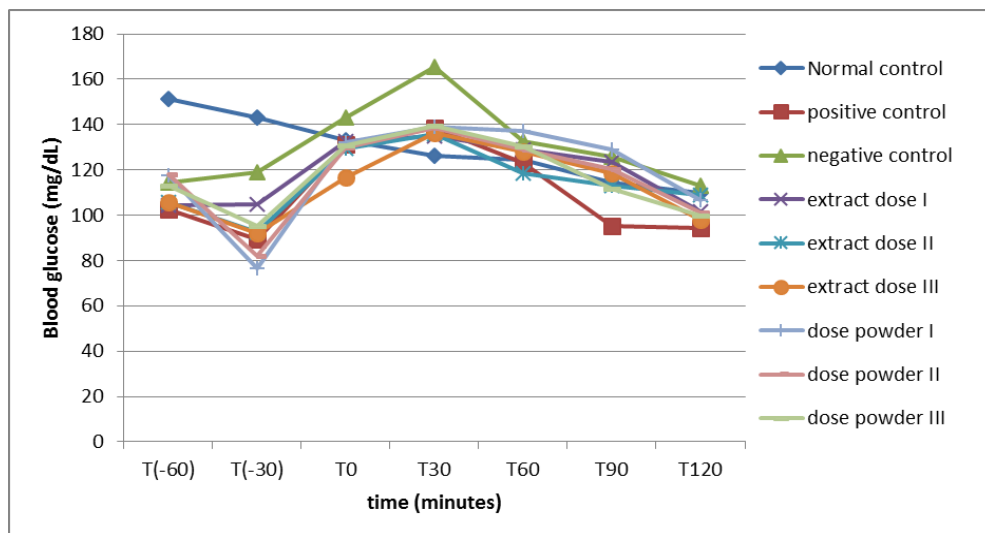


Figure 1. Relationship Curve Blood Glucose level vs. Time

The figure of relationship between the blood glucose level v.s time shows that blood glucose level reach its peak in after 30 minutes of glucose addition (T30) and within the next minutes the blood glucose level is decreases, which in minute 60 to minute 120. This is in line with the theory that the scale of blood glucose normally will increase within 30 minutes to an hour after oral glucose addition (Myes, 2000).

The figure 1 shows that negative control has higher percentage of blood glucose compared to any other treatment. This occurs because negative control is only given glucose orally that the scale of rat blood glucose stays high. On the other hand, in positive control, etanolic extract dose I, II, III and dose powder I, II, III are still below the curve of negative control.

According to the result of LSD test, the negative control group gives significant difference ($p > 0,05$) over glibenclamide positive control group, dose II and III both of powder and etanolic extract of antlion. This means that towards the glibenclamide positive control group, dose II and III, the treatment of both etanol extract and powder of antlion have hypoglichemic effect. However, it is different in the case of dose I of either etanolic extract or powder of antlion which has less significant hypoglichemic effect shown in $AUC_{(-30)-90}$ compared to negative control, though this difference is not significant ($p > 0,05$).

Treatment group of antlion powder at dose I, II, and III as well as the treatment of ethanolic extract at dose I, II, and III shows meaningless difference ($p > 0,05$) with the giving of glibenclamide suspension (positive control). The result of this research shows that the giving of either antlion powder or extract can decrease the scale of blood glucose as glibenclamide suspension does at 0,6mg/KgBB dose, though it is not as effective as glibenclamide treatment.

The chemical compound of Antlion extract such as alkaloids isoindoline which has unique pharmacological activity, such as 4-hydroxy isoindoline-1-one, 2-(2-hydroxietile)-4hydroxy isoindoline-1-one (Nakatani *et al*, 2006). Several isoindoline derivates are used to cure diseases mediated by TNF α (Muller, 2002). The alkaloids compose can resist *alfa-glukosidase* enzym in mucose *duodenum* so that the decomposing reaction of polisacaride to become monosacaride can be resisted. In such way, glucose is released more slowly and absorbed into blood less rapidly, in fewer and moderate scale. In this way, the peak of glucose scale can be prevented (Tyas and Rajardja, 2007). However, it is worth noticing in the future research to determine the active compose which is responsible in decreasing of the blood glucose level of antlion.

CONCLUSION

According to the result of this research, it can be concluded that both powder and ethanolic extract of antlion can give effect to the decrease of blood glucose level. The capability of antlion extract is better than antlion powder in decreasing the blood glucose level.

REFERENCES

1. Abbas, A., Milles, J., Ramachandran, S. (2012). Rosuvastatin and atorvastatin: comparative effects on glucose metabolism in non-diabetic patients with dyslipidaemia. *Clinical medicine insights Endocrinology and diabetes*, (5), p. 13–30.
2. Adnyana, I.K., Elin, Y., Adreanus, A.S., Endang, K., Maria, I.J., Joseph, I. (2004). Antidiabetic Activity of Noni Fruit (*Morinda citrifolia* L.). Ethanolic Extract. *Acta Pharmaceutica Indonesia xxxix*. (02):43-49.
3. Ashcroft, F.M., Gribble, F.M. (1999). ATP-sensitive K⁺ Channels and Insulin Secretion : Their Role in Health and Disease. *Diabetologia*. 42 (08). p. 903-919
4. Fischbach, F.T. (1992). *A Manual of Laboratory and Diagnostic Tests*. 4th Ed. Pennsylvania: J.B. Lippincott.
5. Goldstein, B.J., Wieland editor, D.M., (2008). *Type 2 Diabetes Principles and Practice*. 2nd Ed. USA: Inc.
6. Harkness, I.E., Warger, I.E. (1983). *The Biology and The Medicine of Rats, Rabbits and Rodents*. 2nd Ed. Philadelphia: Lea and Febiger
7. Lee, S.K., *et al*. (2007). Inhibitory Activity of *Euonymus alatus* Against α -glucosidase in Vitro and in Vivo. *J Nurt re Pract*. 1(3). Hal 184-188.
8. Mayes, P.A., Muray, R.K., Granner, D.K. (2000). *Harper's Biochemistry*. 25th Ed. New York: Mc Graw-Hill.
9. Muller, G., Hon-Wah, M., David, I.S., 2000. *Pharmaceutically Active Isoindoline Derivatives*. TW 2001-90128385.
10. Muhammad, M.Z., *et al*. (2013). A Combination of Bitter Gourd Ethanolic Extract with Ant Lion Larvae Aqueous Extract for a Blood Glucose-Lowering Agent. *International Food Research Journal*. 20(2). Hal. 851-855.
11. Nakatani, T., Eiji Nishimura., Naoki Noda., 2006. Two Isoindoline Alkaloids from The Crude Drug, The Ant Lion (The Larva of Myrmeleontidae Species) [abstrak]. *J Nat Med*. 60. Hal. 261-263.
12. Sutanto, Faiz., *et al*. 2008. Inhibitory Activity of Ant Lion Methanolic Extracts Against α -glucosidase enzyme as Antidiabetic, [Thesis], Bogor, Faculty of Math and Natural Science, Institut Pertanian Bogor