

ARTICLE

TEST OF HYPOGLYCAEMIC FUNCTION IN WHITE RAT (*RATTUS NORVEGIUS* W) UPON ADMINISTRATION OF FRACTIONS OF EXTRATS OF AFRICAN LEAF (*VERNONIA AMYGDALINA* DEL)

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ABSTRACT

Vernonia amygdalina Del is plant with various functions. It multipurpose attributes and rapidly regenerating soft wooded shrub characteristics makes it very special. Beyond been used in disease treatment, it also is a good source of good nutrients for the body. *V. amygdalina* was the most popular for it antidiabetic characteristics and it was noted that where oral intake of hot water *V. amygdalina* leaves extract (500 mg/kg) was administered, it reduced blood glucose concentration. The present research is an experimental study and it commenced by weighing the rats. The weights of the rats used range from 150-200 g. these rats were made diabetic by continuous administration of glucose. After the diabetic state was achieved, the trial commenced to assess the impact of fractionated concentrate of African leaf on reduction on blood glucose in these rats. From the result of the experiment on the white rats, effect of EEAL on blood glucose wasn't statistically significance ($p > 0.005$) but that of HEAL was significance ($p < 0.005$). This further authenticates the benefit of African leaf in management of diabetes. It therefore can be concluded that it has a hypoglycemic attribute and if used by humans it can help individual easily reduce hyperglycemia.

INTRODUCTION

KEY WORDS

African leaf, hypoglycemia, diabetes mellitus, blood glucose.

Vernonia amygdalina Del is plant with various functions. It multipurpose attributes and rapidly regenerating soft wooded shrub characteristics makes it very special. It is about 2 to 10 m tall with petiolate leaves of around 6 mm in diameter. It is widely spread geographically accounting for the various names it is known as. It is a species under the genus *Vernonia* Shrub (Family: Compositae; Order: Asterales; S/C: Asteridae; Classes: Dicotyledons) which contains about 1000 species. More than 500 of these *Vernonia* plants are distributed in Africa and Asia, approximately 300 in Mexico, Central and South America. When using African as a case study, the African widely grown in the western part of the continent of Africa especially in Nigeria. It has various medicinal attributes and used from ages past. Also it is characteristically a tropical plant making it thrive well irrespective of adverse weather condition or change in climate. In traditional medicine, African leave can be used as an herbal treatment for various kinds of the disease. [1]

Beyond been used in disease treatment, it also is a good source of good nutrients for the body such as phenolic acids, fatty acids, vitamins, essential acids, specially oils, antioxidants, mineral sources and anti-inflammatory agents [2]. The leaf is beneficial because it is involve in making people healthier and this is attributed to its various constituents. Diabetes mellitus is a metabolic disorder resulting from a defect in insulin secretion, insulin action, or both. Insulin deficiency in turn leads to chronic hyperglycemia with disturbances of carbohydrate, fat and protein metabolism [3]. Quite difficult to believe but through that every 17 seconds, someone in the world dies of diabetes related causes. In the same 17 seconds, another two people are diagnosed with the disease for the rest of their life and may suffer increased morbidity and reduced quality of life, premature death, and large adverse economic effects due to higher healthcare and non-healthcare costs [4]. Globally, type 2 diabetes disproportionately affects the working age population; 46% of those affected are aged 40–59 years, and half of all diabetes-related deaths occur in individuals under age 70 [5]. Type 1 diabetes mellitus may present at any age but most typically presents in early life with a peak around time of puberty [6]. Diabetes mellitus is a chronic disease which affects millions of people worldwide and the prevalence of this disease was projected to reach 300 million before year 2025 [7]. *V. amygdalina* was the most popular for it anti-diabetic characteristics in Nigeria [8, 9]. Studies have shown that anti-diabetic potential of *V. amygdalina*. It was noted that where oral intake of hot water *V. amygdalin* leaves extract (500 mg/kg) was administered, it reduced blood glucose concentration of both normoglycaemic and hyperglycemic rats induced by alloxan (10). The aim of this research is to test of hypoglycemic function in white rat (*Rattus norvegicus* W) upon administration of fractions of extracts of African leaf (*V. amygdalina* DEL).

MATERIALS AND METHODS

Prior to start of this study an ethical clearance letter has been obtained from the Animal Research Ethics Committee (AREC) of Universitas Sumatera Utara, Medan, Indonesia. The present research is an experimental study and it commenced by weighing the rats. The weights of the rats used range from 150-200 g. these rats were made diabetic by continuous administration of glucose. After the diabetic state was achieved, the trial commenced to assess the impact of fractionated concentrate of African leaf on reduction on blood glucose in these rats. For this study a total of forty-five white male rats (*R. norvegicus*) were used and divided into groups

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of 15 with each group consisting of 3 rats each. The effect of the African leaf was studied by giving the extracts to these rats orally. After this is done, a period of 15 minutes is waiting for before the rodent glucose levels were checked each. Out of the total 15 groups, three groups of the rats served as control. One of the controls was given distilled water; another given CMC suspension with both serving as negative controls and the third group was given suspension of glibenclamide to serve as a positive control. The remaining 12 groups were given the African leaf extracts. A section of the African Leaf extracts was made into suspension using ethanol focus of African leaf (EEAL) and administered at 100, 200 and 300 mg/kg body weight of rats and this had effect on the hyperglycemic state of the rats, another was made into suspension using fractionated n-hexane think of African leaf (HEAL) does not hyperglycemic affect and the last suspension was made using fractionated ethyl acidic corrosive deduction focus of African leaf (EAEAL) at 200 and 300 mg/kg body weight of rat and this also have effect on the hyperglycemic state of the rats. When the test was completed, test of decrease in blood glucose level was done. With help of ANOVA blood glucose level of mice has analyzed and test have identified at 95% confidence level. From the result in this ANOVA test and method it has been identified that there were significant difference and then continued used with Duncan test to determine which group were having important different using SPSS (Version22).

RESULTS AND DISCUSSION

From the result of the experiment on the white rats it has been found that Africa leaf is one of the best plants that can be used as herbal treatment for various diseases and it is useful in control of blood glucose and therefore will be beneficial in the management of diabetes. After the experiment on the 45 rats it has been identified that the rats administered African leaf extracts had a decrease in body weight that is approximately average to their initial weigh before induction of the diabetic state and also their blood glucose level decrease as well by 5%. [Table 1] shows the frequency distribution of body weights of the rats used in this study as well as the minimum and maximum weight respectively. Also the Mean Weight and Standard Deviation is shown in [Table 1]. The effect of EEAL on blood glucose wasn't statistically significance ($p > 0.005$) but that of HEAL was significance ($p < 0.005$) and this are shown in [Table 2] and graphically represented in [Fig. 1] below.

Table 1: Frequency Distribution characteristics of Body Weight of Rats Used

Body Weight of Rats (Grams)	No	Percentage (%)
150 -159	25	55.56
160 -169	17	37.78
170 -179	2	4.44
180 -190	1	2.22
Total	45	100

Maximum weight = 180 Minimum weight = 150 Mean = 158.91 SD = 6.56

Table 2: Results for ANOVA Test of Gilbenclamide, EEAL and HEAL

	N	Mean	Standard Deviation
Gilbenclamide	3	113.33	5.51
EEAL 100 mg/kg	3	117.67	2.08
EEAL 200 mg/kg	3	118.67	3.22
EEAL 300 mg/kg	3	113.00	5.29
Gilbenclamide	3	113.33	5.51
HEAL 100 mg/kg	3	131.33	2.52
HEAL 200 mg/kg	3	127.67	1.53
HEAL 300 mg/kg	3	122.00	2.00

EEAL Value for $p = 0.312$ (Not Statistically Significant)

HEAL Value for $p = 0.001$ (Statistically Significant)

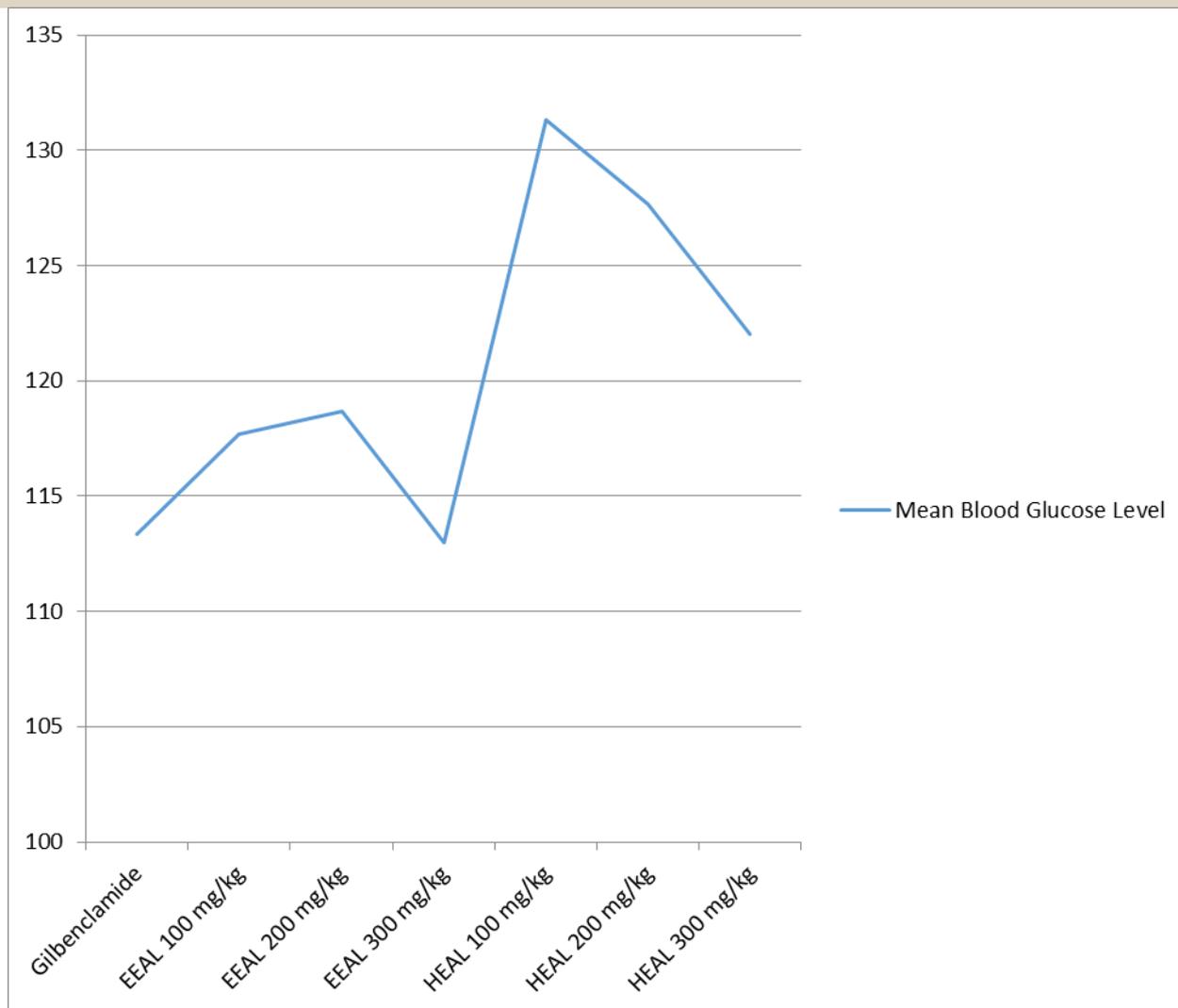


Fig. 1: Graphical Representation showing Changes in Blood Glucose of Rats Given Gilbenclamide, EEAL and HEAL Respectively.

CONCLUSION

The relationship between African leaves and health is indispensable, furthermore it is rich has nutritional value as it constitute of phenolic acids, fatty acids, vitamins, essential acids, oils, antioxidants, mineral sources and anti-inflammatory agents. A significant hypoglycemic activity with weight loss was noticed in the rats when African leave was used in diabetic management in diabetic rats. Hence it could be concluded that African leave has hypoglycemic function in patients suffering from hyperglycemia.

CONFLICT OF INTEREST

Nil

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