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Effects of Hydro-Ethanol Leaf Extract of Cissus Aralioides on Prolactin and Thyroid Stimulating Hormone in Female Wistar Rats

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Abstract*—Infertility is an important issue among married couples across the globe and several options have been employed to tackle the situation. One option that have been employed to tackle the situation is the use of herbs. Cissus aralioides leaves are well known and used among women who are expecting fruitfulness. The aim of this study is to ascertain the effects of hydro-ethanol leaf extract of cissus aralioides on prolactin and thyroid stimulating hormone in female wistar rats. A total of 20 rats weighing between 150mg to 170mg were used for the study. The animals were divided into four groups with five animals per group. Group 1 (control) were administered 5mls of distil water for 30days, group to received 150mg/kg of C. arlioides, group 2 received 300mg/kg of extract and 3 received 600mg/kg of extract.For prolactin: control: mean ± std 0.49 ±0.03, extract 150mg/kg: 0.67 ± 0.04*, extract 300mg/kg: 0.43 ± 0.05, extract 600mg/kg: 0.35 ± 0.02 and for thyroid stimulating hormone (TSH), control: 0.47 ± 0.04, extract 150mg/kg: 0.29 ± 0.02, extract 300mg/kg: 0.70 ± 0.04*, extract 600mg/kg: 0.76 ± 0.06. The study revealed that there is significant increase in prolactin when 150mg/kg of extract was given and significant decreased when extract of 600mg/kg was administered when compared with control. Also, for TSH, there is significant decreased in TSH when 150mg/kg of extract was administered and significant increase in TSH when extract of 300mg/kg and 600mg/kg when administered compare to the control. The weight of the right fallopian tube significantly decrease slightly when extract of 300mg/kg was given (0.22 ± 0.03*). Statistical analysis was done using SPSS version 24 with ANOVA. P < 0.05 was said to be significant

***Index Terms*— Hydroethanol, Thyroid Stimulating Hormone, Effect, Cissus aralioides, Prolactin.**

I. INTRODUCTION

Infertility is an important issue among married couples across the globe and several options have been employed to tackle the situation. One option that have been employed to tackle the situation is the use of herbs. *Cissus aralioides* leaves are well known and used among women who are expecting fruitfulness. *C. aralioides* is commonly know as monkey plum (Adelenwa and Haruna, 2013).

The World Health Organization said that about 80% African's population depends

on traditional medicines for their primary health care needs (WHO, 2005). The female reproductive system has several risk factors like toxicants radiation, drugs and life style. (Fucic et al., 2012).

The use of herbs as fertility regulator may have adverse effects (Mclay et al, 2017).

Anosike et al (2018) reported that C. aralioides has membrene stabilizing property.

II. MATERIAL AND METHODS

A. EXPERIMENTAL ANIMALS

The animals were obtained from the animal house, Faculty of Basic Medical Sciences, University of Port Harcourt. Twenty (20) of the female wistar rats were used. The animals were caged and placed under natural environmental condition. The animals were provided with clean drinking water and standard feed (rat chow). The research was carried out in accordance with the principles for laboratory animal use and care as found in the European Community guidelines (European Community Guidelines, 1986).

Plant Collection and Preparation

Plants were collected from a forest in Etche Local Government of Rivers State and sent to the Herbarium for proper identification.An approval for this study was obtained from the Centre for Research Ethics And Management of the University of Port Harcourt with the approval number UPH/CEREMAD/REC/MM72/006

The *Cissus aralioides* leaves were washed dried under normal room temperature. The dried leaves were grounded into powder. 4kg of the grounded powder was placed in a maceration jar and 5.00mils of 70% ethanol (hydro ethanol) was added. The content was then emptied through the filter paper. The filtrate containing the extract was dried into a past. Extract doses of 150, 300 and 600mg/kg body weight was administered to the sub-groups.

The LD_{50} of the plant is said to be above 5000mg/kg of body weight as determined by Nwogueze B. C. et al, (2018) was used.

B. STUDY DESIGN

A total of 20 female wistar rats weighing between 150g and 19kg were used for the research. The animals were weighed before the commencement of extract administration and at that of extract administration. The animals were randomly selected into four groups of five rats per group.

C. Blood Collection

The animals were placed a desiccator containing

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chloroform soaked in cotton wool and used to anaesthetized the female wistar rats.thereafter, 5ml of blood samples were collected through cardiac puncture with syringe and shared into the plane bottles and for hormonal analysis.

Determination of serum levels of prolactin and thyroid stimulating hormone

Estimation of the concentrations of prolactin and thyroid stimulating hormone were done using the SM-300A Microplate Reader Surgiffeld Medical England.

Statistical analysis

Data were presented as mean ± SEM and were analysed using a one-way ANOVA and $P < 0.05$ was significant.

III. RESULTS

The study revealed the following prolactin: control: mean ± std 0.49 ±0.03, extract 150mg/kg: 0.67 ± 0.04*, extract 300mg/kg: 0.43 ± 0.05, extract 600mg/kg: 0.35 ± 0.02 and for thyroid stimulating hormone (TSH), control: 0.47 ± 0.04, extract 150mg/kg: 0.29 ± 0.02, extract 300mg/kg: 0.70 ± 0.04*, extract 600mg/kg: 0.76 ± 0.06. The study revealed that there is significant increase in prolactin when 150mg/kg of extract was given and significant decreased when extract of 600mg/kg was administered when compared with control. Also, for TSH, there is significant decreased in TSH when 150mg/kg of extract was administered and significant increase in TSH when extract of 300mg/kg and 600mg/kg when administered compare to the control (Table 1). The weight of the right fallopian tube significantly decreases slightly when extract of 300mg/kg was given (0.22 ± 0.03*) and the thyroid gland significantly increased when extract of 600mg/kg was administered 1.25 ± 0.18* (Table 2a).

Table 1 Effect *Cissus aralioides* leaves on prolactin and TSH

Groups	Prolactin(ng/ml) Mean ± Std	TSH (u/u/ml) Mean ± Std
Control	0.49 ± 0.03	0.47 ± 0.04
Extract 150mg/kg	0.67 ± 0.04*	0.29 ± 0.02*
Extract 300mg/kg	0.43 ± 0.05	0.70 ± 0.04*
Extract 600mg/kg	0.35 ± 0.02*	0.76 ± 0.06*

Table 2a: Effect of extract on Thyroid gland

GROUP	Thyroid gland(g) Mean ± Std
Control	0.83 ± 0.01
Extract 150mg/kg	0.08 ± 0.07
Extract 300mg/kg	0.80 ± 0.04
Extract 600mg/kg	1.25 ± 0.18*

Table 2b: Effect of extract on weight of Fallopian tube

GROUPS	Left fallopian tube(g) Mean ± Std	Right fallopian tube(g) Mean ± Std
Control	0.24 ± 0.01	0.23 ± 0.01
Extract 150mg/kg	0.20 ± 0.03	0.22 ± 0.03
Extract 300mg/kg		
Extract 600mg/kg	0.20 ± 0.03	0.22 ± 0.03*
		0.23 ± 0.02
	0.23 ± 0.02	

Table 2c: Effect of extract on weight of Kidney

GROUPS	Left Kidney(g) Mean ± Std	Right Kidney(g) Mean ± Std
Control	0.62 ± 0.02	0.69 ± 0.03
Extract 150mg/kg	0.63 ± 0.03	0.65 ± 0.03
Extract 300mg/kg		
Extract 600mg/kg	0.69 ± 0.012	0.67 ± 0.03
	0.69 ± 0.04*	0.75 ± 0.03

IV. DISCUSSION

Hormones are determinants of fertility and when they are not in appropriate concentration, that is when they are underproduction or overproduction, it becomes a problem. These have led several women to seek for herbal medicine as a solution to their infertility problem.

The study revealed that *C. aralioides* significantly increased serum concentration of prolactin when extract at a low dose (150mg/kg) was administered and significantly decrease serum concentration prolactin at high dose (600mg/kg) was administered and when compared to control group (Table 1). This rise in serum concentration of prolactin at a low dose of 150mg/kg when administered to the animals may suggests interference with the hypothalamic-hypophysial portal system or may be due to obstruction of dopamine by a potent substance in the extract. Prolactin is a hormone produced by the anterior pituitary gland and regulated by the hypothalamus. When prolactin is found in excess, it may delay fertility by suppressing gonadotropic hormones. Therefore, it may not be good for couples expecting children but may be good for nursing mothers who are unable to breastfeed their children due to inability of their breasts to produce milk despite presence of suckling reflex. However, when high dose of extract of *C. aralioides* (600mg/kg) was given to the animals, the serum prolactin level reduces compared to the rise in serum prolactin when 150mg/kg was given. This extract at high dose could be beneficial to single or married women who has high prolactin in their system and this may reduce infertility due to hyperprolactinaemia.

The study also revealed significantly increased in the serum level of thyroid stimulating hormone (TSH) when both moderate and high dose of the extract (300mg/kg and 600mg/kg) when administered respectively (Table 1). This increased in TSH may be due to a powerful stimulant called thyrotropin releasing hormone (TRH) produced by the hypothalamus. It could also be that the thyroid gland that produces T_3 and T_4 may be defective in that, the negative feedback mechanism which is a process that inhibits thyrotropin releasing hormone is not functional, thereby more TRH and subsequent more TSH is secreted. If people continue to use this plant in moderate and high dose, leading to increase TSH, this may cause goitre which is due to hypertrophy of the thyroid gland.

However, when low dose (150mg/kg) extract of *C. aralioides* was administered, there was significant decreased in serum level of thyroid stimulating hormone when compare to control (Table). This decrease in TSH may be due to pituitary disease and this could affect secretion of thyroid hormones.

On the organs, the extract significantly increased the weight of the thyroid glands and the weight of the left kidney at high dose when compare with control group (Table 2). Again, at moderate dose, the weight of the right fallopian tube was significantly decreased slightly when compare to control group (Table 2).

V. CONCLUSIONS

Herbal medicine has contributed immensely to the development of the health sector owing to the phytochemical constituents of various plants across the globe.

The study shows that at low dose, the extract significantly increases serum level of prolactin concentration and significantly decrease serum level of prolactin when extract was administered at high dose.

At both moderate and high dose of the extract, serum level of thyroid stimulating hormone was significantly increased and significantly decreased at low dose.

The extract also exerts its effect on the organs by significantly increase the weight of the thyroid gland and the left kidney at high dose and at moderate dose the weight right fallopian tube was significantly

decreased.

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1. Hydroethanol leaf Extract of *Cissus aralioides* alters oestrous cycle and reproductive hormones in female experimental wistar rats.
2.Phytochemical Analysis of leaf Extract of *Englerina drummomdii balle ex polhill & wiens.*