



EFFECTS OF ALLIGATOR PEPPER (*ELETTARIA CARDAMOMUM*) ON PROLACTIN SECRETION IN LACTATING SPRAGUE DAWLEY RATS

Uloneme GC^{1*}, Ihemelandu EC², Anibeze CIP², Ezejindu DN³

¹Department of Anatomy, College of Health Sciences, Imo State University Owerri, Nigeria.

²Department of Anatomy, College of Health Sciences, Abia State University Uturu, Abia State, Nigeria.

³Departments of Anatomy, College of Health Sciences, Nnamdi Azikiwe University, Nnewi Campus, Anambra State, Nigeria.

ABSTRACT

The effect of alligator pepper (*Elettaria Cardamomum*) on prolactin secretion in lactating sprague dawley rats was investigated. A total of 80 lactating Sprague dawley rats were used for the study. They were divided into four groups labeled A,B,C, and O respectively, with a sample size of twenty lactating rats per group. The groups (A,B,C) received 0.7mg /kg/bw, 1.4mg/kg/bw, and 2.8mg/kg/bw of aqueous solution of alligator pepper respectively. Group O, the control group, received only distilled water. The rats whose mean weight was 200g received the treatments by oral intubations between the hours of 9 and 10 am daily. At the end of the 10- day treatment (beginning from day of delivery), ten lactating rats were sacrificed from each group. Prolactin hormone assay was carried out on the blood sample of the forty sacrificed animals. The remaining ten animals per group (A,B,C) were then allowed a 7-day non-treatment period to suckle their litters during which only distilled water was administered to them and the control group. The rats were sacrificed at the end of the 7th day and their blood samples collected and investigated accordingly. The results showed that alligator pepper (*Elettaria Cardamomum*) has a dose-dependent suppressive effect on prolactin secretion. The analysis showed that prolactin concentration was significantly higher ($P<0.05$) in the control group than in the other groups while prolactin level of group A was significantly higher ($P<0.05$) groups B and C.

Keywords: Alligator pepper, Prolactin, Wistar rats, Herbaceous Perennials, Lactating Mothers.

INTRODUCTION

The plants which produce alligator pepper are herbaceous perennials of the ginger family of flowering plants grown in so many countries of the world. Alligator pepper is used widely in Nigeria by many cultures for various medicinal, cultural, herbal, dietetic and brewing purposes [1]. In South-Eastern Nigeria, alligator pepper is served along with kola nuts, bitter kola, garden egg, palm wine, local gin or even water alone to guests for entertainment. For the fact that the pepper performs the dual role of flavour amelioration and excitement of the taste buds which in turn induces an appetite stimulation of the gastro-intestinal function by increased salivation and gastric flow, both pregnant and lactating mothers

consume the product wholesomely.

The experience of pleasurable and euphorant effects attained by lactating mothers who superstitiously consume alligator pepper to facilitate or enhance uterine endometrial healing and uterine involution post natally or as a masticatory is usually turned to that of anxiety and worry as their breast milk secretion becomes scanty. The presence of ergot alkaloids in alligator pepper has been demonstrated by Doherty et al 2010 [2]. These alkaloids include bromocriptin, ergocriptin etc. It has been observed in our earlier study that alligator pepper reduced milk secretion in lactating wister rats (unpublished). This study was therefore designed to evaluate whether or not alligator pepper affects prolactin

secretion in lactating Sprague dawley rats.

MATERIALS AND METHODS

Eighty confirmed pregnant Sprague dawley rats were housed and fed liberally in their maternity cages with clean water and normal rat chaw. The pregnant rats were grouped into four, identified as groups O,A,B and C. Each group comprised of twenty rats. The 80 seven-month old female rats exposed to the mature males same time delivered their litters in their individual separate cages between the 21st and 24th days of confirmation of pregnancy. The litter size of the rats ranged between three and eight; and to ensure that each of the mother rats suckled approximately the same number of litters, the litter size per mother rat was adjusted to between four and five as soon as they delivered. The animals and their litters were fed ad libitum with rat chaw and clean water through out the duration of the experiment.

Preparation of stock solution of granulated alligator pepper of 1mg/ml concentration

Stock solution of the granulated alligator pepper was prepared by dissolving 100mg of powdered alligator pepper in 100mls of distilled water and the concentration used was 1mg/ml. The choice of the various doses of the aqueous solution of alligator pepper was informed by a work done on alligator pepper by Igwe et al 1999^[3], in which it was observed that bolus consumption of 350mg of alligator pepper by a 50kg weight individual caused a physiological imbalance. Using the above values as bench mark, 0.7ml of alligator pepper solution was administered to group A lactating rats, 1.4ml of alligator pepper to group B and 2.8ml of alligator pepper to group C through

oral intubation, while the (control) group O received only distilled water.

For a period of ten days from day of delivery, the respective doses of the alligator pepper stock solution were administered to the corresponding animals between 9am and 10am daily before the routine feeding of the animals. The litters of the respective groups were weighed daily for the purpose of accessing growth rate.

At the end of the treatment period of ten days, ten animals per group randomly selected were sacrificed by anaesthetizing them beyond consciousness in a chamber containing chloroform soaked in a mass of cotton wool. A labeled 5ml spring and needle were used to draw blood from the heart to run the required tests on prolactin for the various lactating animal groups that received different doses of aqueous solution of alligator pepper, or only water for group O.

The remaining unsacrificed ten lactating rats per group were allowed to live a normal life free of alligator pepper treatment for seven days before sacrificing them and their blood collected as described above. This is aimed at checking the blood prolactin levels of the different groups to ascertain whether there is a return to normal prolactin levels occasioned by withdrawal of treatment.

RESULTS

The results of the prolactin hormone assay (run with optical density readings at 450 nanometer against prolactin concentrations) carried out on the experimental and control group lactating rats administered with varying doses of aqueous solution of alligator pepper and water are as shown in the tables below.

Table 1. Prolactin concentration/level (ng/ml) for lactating rats sacrificed after 10 days of treatment

Group (n=10)	Dose (mg/kg)	Prolactin concentration (ng/ml)	P - value
Control (o)	0.00	6.44 ± 0.29	< 0.05
A	0.70	4.38 ± 0.2.1	< 0.05
B	1.40	3.12 ± 0.39	< 0.05
C	2.80	1.13 ± 0.18	< 0.05

Table 2. Comparing the mean prolactin concentration of the different animal groups scarified after 10 days of treatment

Group (n=10)	Difference in mean prolactin concentration (ng/ml)	P - value
O – A	2.06 ± 0.41	< 0.05
O – B	3.32 ± 0.53	< 0.05
O – C	5.31 ± 0.27	< 0.05
A – B	1.26 ± 0.48	< 0.05
A - C	3.25 ± 0.25	< 0.05
B – C	1.99 ± 0.52	< 0.05

Table 3. Prolactin concentration (ng/ml) for the lactating rats sacrificed 7 days after withdrawal of treatment

Group (n=10)	Product Administered	Mean prolactin Concentration (ng/ml)	P - value
Control (o)	Water	5.92 ± 0.34	< 0.05
A	Water	4.89 ± 0.24	< 0.05
B	Water	4.67 ± 0.21	< 0.05
C	Water	3.04 ± 0.16	< 0.05

Table 4. Comparing prolactin concentration for the lactating rats sacrificed 7 days following withdrawal of treatment

Group (n=10)	Difference in mean prolactin concentration (ng/ml)	P - value
O – A	1.03 ± 0.32	< 0.05
O – B	1.25 ± 0.43	< 0.05
O – C	2.88 ± 0.32	< 0.05
A – B	0.22 ± 0.33	< 0.05
A - C	1.85 ± 0.20	< 0.05
B – C	1.66 ± 0.30	< 0.05

DISCUSSION AND CONCLUSION

The observation and findings from this study have shown that alligator pepper (*Elettaria cardamomum*) has a pronounced suppressive effect on the prolactin levels of lactating Sprague dawley rats fed with aqueous solution of the product. It was observed that prolactin concentration was significantly higher ($P < 0.05$) in the (control) group O animals, than in groups A, B and C. The prolactin level was also significantly higher ($P < 0.05$) in group A animals treated with 0.7mg/kg body weight aqueous solution of alligator pepper over groups B and C animals treated respectively with 1.4mg/kg and 2.8 mg/kg body weight of the product. The group B animals, correspondingly had a significantly higher ($P < 0.05$) level of prolactin than animals in group C. It is therefore, certainly appropriate to state that from the results obtained, the blood level of prolactin of the experimental animals was inversely proportional to the quantity of alligator pepper solution administered to the animals.

The finding is in consonance with the result of the works done by Essien 1994 [4,5], in which he demonstrated that the level of prolactin in the serum of lactating experimental rats decreased with a corresponding increase in dosage level of the active

ingredient extracts of alligator pepper. The blood prolactin levels of the lactating animals treated with varying doses of alligator pepper shoot up following withdrawal of treatment with aqueous solution of alligator pepper (Table 3). The rats that earlier received 0.7ml of alligator pepper group A had their prolactin level elevated from mean level of 4.38 ± 0.21 ng/ml to 4.89 ± 0.24 ng/ml. The mean prolactin concentration of group B rats treated with 1.40ml of alligator pepper rose from 3.12 ± 0.39 (ng/ml) to 4.67 ± 0.21 (ng/ml). Similarly, that of group C animals treated with 1.80mg/kg of product moved from 1.13 ± 0.18 to 3.04 ± 0.16 (ng/ml).

A common fact raised by the above results is that seven days after cessation of treatment with varying doses of alligator pepper product, the blood prolactin concentrations of the experimental groups (A,B,C) were comparatively and relatively at different higher levels in relation to control group, indicative of gradual return to normal values similar to control group. The relative increase in blood prolactin levels occasioned by treatment withdrawal for seven days corresponded with the relative quantity of aqueous solution of alligator pepper earlier administered.

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