**Antioxidant Effects of Cinnamon Supplementation in Rat Strain Wistar with Streptozotocin-Induced Diabetes**

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**ABSTRACT**

Our problem is to evaluate the behavioral effects of infection and combination diabetes - infection in pregnant rats and the protective effect of an antioxidant on neurobehavioral alterations and complications. Diabetes was induced by a single intraperitoneal injection of streptozotocin (STZ) at a dose of 45 mg / kg. Cinnamon has long been used as a herbal medicine in Asia, a natural plant was administered orally (gavages) at a dose of 2g / kg. This administration reduces anxiety and reduces damage due to hyperglycemia. The results indicate the ability of cinnamon to prevent changes induced by experimental diabetes.

**Keywords:** Diabetes, Behavioral, Anxiety, cinnamon, Open Field, ACTH.

**INTRODUCTION**

Diabetes mellitus type 1 is a common disease that affects individuals predisposed to develop at an early age an autoimmune reaction against pancreatic islet B cells [1]. It is one of the inevitable consequences, a disorder in the regulation of carbohydrate metabolism to a possibility of screening for psychiatric disorders such as depression, anxiety and behavioral problems [2]. Streptozotocin induces diabetes mellitus and diabetic causes installation syndrome characterized by polyphagia, polyuria, polydipsia, and glucosuria [3, 4]. STZ is a reference substance for the experimental study of diabetes [5, 6]. This endocrine disorder is characterized by the destruction of β cells Langerhans responsible for insulin deficiency [6]. Diabetologists have obviously deduced that a complementary therapy consisting of plant extracts is required to optimize the treatment of diabetes [7, 8, 9]. Cinnamon has long been used as a herbal medicine in Asia, whereas it is known mainly as a spice in Western countries. Several *in vitro* and animal studies published since 1990 have indicated that cinnamon may mimic insulin effects and thus may improve glucose utilization [10, 11]. In this context, we have developed an experimental approach that aims to study the antioxidant power of cinnamon and its impact on neurobehavioral alterations and complications on the emotional state announced by the (Open Field) behavioral test and reports about Adrenocorticotropic Hormone (ACTH).

**MATERIALS AND METHODS**

**Animals**

The biological material base that we have chosen is the rat Rattus rattus of the Wistar strain from Pasteur Institute in Algiers. The rats are nocturnal mammals of the order of rodents. Upon their arrival, the rats weighed an average of 180 grams, and at the time of the experiment, they weighed on average 250 ± 20 grams. The rats were acclimated under standardized conditions of natural photoperiod, an average temperature of 22 ± 4 ºC and humidity of 50-70%. After an adaptation period of three weeks, we have selected 25 females based on weight which we separated into four experimental groups each include five rats vehicle control CV lot, lot control treated cinnamon CC Lot diabetic DC, treated cinnamon DV lot diabetic. The device is a Plexiglas platform (70cm x 70cm x 40cm) divided into central and peripheral area. Each rat was placed individually in the center of the floor for 5 minutes and allowed exploration [12]. An animal considered anxiety will tend to prefer the peripheral zone Parameters measured...
the time spent in the center, time spent in the periphery and the distance traveled.

**Determination of ACTH levels in plasma**

This test is realized in plasma on immune metrique sequentiel chimiluminescent phase solid [16].

The solid phase is a covered ball of murinemonoclonal antibody anti ACTH. The liquid phase is the alkaline phosphatase (an enzyme which amplifies the chimiluminescence for the antigen detection) combined with an antibody polyclonal of doe anti ACTH in reagent ACTH.

**Statistical analysis of results**

Results are presented as mean ± SEM and shown in histograms. A comparison test was used medium. The test T of Student with the MINITAB program for comparing two averages.

**RESULTS**

**Variation of the open Field Test parameters**

Figure 1 shows that the distance traveled by the control and diabetic rats treated with cinnamon was significant (P<0.05) than that traversed by the vehicle control rats

![Figure 1: Behavior of pregnant rats in the control and treated open Field. (The distance traveled)](image)

**Variation of ACTH levels**

The level of ACTH plasmatic in diabetic rats was significant (P<0.05) contribution to the controls.

The results showed a significant (P<0.05) in level of ACTH plasmatic in diabetic rats treated with cinnamon contribution to the diabetic vehicle. (DC : 265,27±86,91) vs (DV : 110,17±119,81)

![Figure 2: Variation of ACTH levels](image)

**DISCUSSION**

Our experimental study focused on properties that potentiate cinnamon fight against neurobehavioral alterations in rats of Wistar diabetic. Recently, hypoglycemic agents products derived from plants have attracted the attention of researchers since natural plant sources are usually considered less toxic by contribution to synthetic sources [9]. The experimental streptozotocin-induced diabetes is characterized by hyperglycemia [10].

Which is linked by several studies to defects in insulin secretion by reducing the mass of β cells of Langerhans islets [17, 18, 19, 20]. It activates the expression of protein kinase C, protein responsible for the dephosphorylation of the insulin receptor [21]. These complications associated with diabetes status seem to negatively affect the browser behavior and anxious state of diabetic rats at of whose comparison with the control group reported persistent and acute locomotor hypoactivity represented by a decrease in the distance [22]. The results of our work mention a hierarchical efficiency of cinnamon against different levels of disorders caused by the disease, and it will intervene at the molecular and cellular level by correcting the hyperglycemic diabetic rats treated status because it has anti-diabetogenic property, insulin-like [23].

Our results have showed a decrease significant of ACTH plasmatic in diabetic rats vehicle contribution to the controls vehicle. Repetto et al., he demonstrated that the experimental diabetes has been accompanied by a decrease in level of ACTH.

**CONCLUSION**

The crucial problem is summarized in the fact that the induction of experimental diabetes mellitus streptozotocin causes complications and neurobehavioral disruption maternal plasma biochemical metabolism and causes of anxiety. The administration of cinnamon with a protective effect against anxiety and depressive disorders in rats Wistar diabetic. Treatment with cinnamon seem store the levels of ACTH; this suggests that it also has an antioxidant effect.

**REFERENCES**


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