EVALUATION OF TRANSAMINASE ACTIVITY OF ETHANOLIC EXTRACT OF FRESH OCIMUM BASILICUM IN RATS

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ABSTRACT

The objective of this study was to evaluate the effects of ethanolic extracts of fresh leaves of Ocimum basilicum on transaminase activities in albino rats. Thirty two male albino rats were randomly assigned to three experimental groups of 12 marked as groups A, B, and C respectively. Groups A and B were treated with oral administration of organic extract of Ocimum basilicum at 400mg and 200mg /kg body weight daily respectively. Group C received no treatment. The body weight of rats of group A and B were significantly (P < 0.05) reduced up to 31.85% and 23.46% respectively compared to the control. The activities of AST were significantly elevated 23.46% respectively compared to the control. Results also exhibited that the specific activities of transaminase (AST/ALT) in the serum was significantly (P < 0.05) higher in the treated rats than the control. The result of the this study suggests that ingestion of ethanolic extract of Ocimum basilicum could upset the body metabolic system and may also elicit a toxic effect especially when taken at high concentration.

Key words : Albino rats, Ethanolic extracts, Ocimum basilicum, Transaminase activity.

INTRODUCTION

Ocimum basilicum (sweet basil) belong to the family lamiaceae. It is a popular culinary herb and its essential oil has been used for many years in food and flavouring (Vieira and Simon (2000), as an ingredient of dental and oral health care products and in fragrances (Guenther, 1952). It is among the plants that contain high concentration of the defence compounds of the phenylproene class (eugenol, chavicol and their derivation (Pascual-Villalobos and Ballesta-Acosta, 2003). In addition, basil essential oils have been reported to have anti–HIV–1 activity (Yamakasi et al., 1998), anti-inflammatory activity (Singh and Majundar, 1997); anti microbial activity (Suppakul et al., 2003), anti – oxidant activity (Dasgupta et al., 2004), analgesic properties (Aziba et al., 1999) and wound healing properties (Salmah et al., 2005). The anti – microbial activities of O. basilicum essential oils are associated with the main constituent of linalool and methyl chaviecol (estragole (Singh and Majundar, 1997).

Aminotransferases also called transferases are enzymes that catalyze the transfer of amino group from α-amino to α - keto acids (Nelson and Cox, 2000). The two transaminases in used in diagnostic enzymology and aspartate aminotransferase (ALT) also known as glutamate-oxaloacetate transaminase (GOT) and alanine transferase (ALT) also known as glutamate pyruvate transaminase (GPT) (Nsririm, 1999). Aspartate aminotransferase concentration especially when taken at high concentration.

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is lower in tissue that contain both transaminases except in the liver where they exist in equal amounts. In severe tissue injury such as acute hepatitis and liver necrosis, AST may rise up to 100 times (Nsirim, 1999). This rise may occur before any clinical sign or symptoms such as jaundice manifests. In addition, AST is found both in the cytoplasm as well as in the mitochondria. Greater release of it suggests gross damage which has penetrated beyond the cytoplasm as occurs in severe and chronic damage (Nsirim, 1999). Many toxic agents elicit their effects on enzyme system. The aim of this study was to determine the effect of ethanolic extract of fresh leaves of *O. basilicum* on transaminase (AST/ALT) activity of rats.

**MATERIALS AND METHODS**

The study was carried out at the Department of Biochemistry and Biotechnology of Ebonyi State University, Nigeria to determine the effect of ethanolic extract of fresh leaves of *Ocimum basilicum* on transaminase activity in rat.

**Extraction :**

Fresh leaves of *Ocimum basilicum* (sweet basil) were harvested from Ntezi-aba in Abakaliki Local Government Area of Ebonyi State. Fresh leaves (100g) were sliced into small pieces and soaked in 750ml of ethanol for 24 hours. Dark-blue solution (670ml) was obtained after decantation. The ethanolic extract was then evaporated to get a jelly-like residue. The extraction method adopted was according to Okotoro and Ogundele (1998).

**Experimental animal :**

Thirty two adult male albino rats each weighing between 100.50-120.50g were obtained from the Experimental Animal House of the Veterinary Department, University of Nigeria, Nsukka and used for the experiment. The rats were kept under close observation in order to ensure good health for conducting experiments properly and to acclimatize to the animal room conditions for a period of five days. They were maintained on standard feed and water provided *ad libitum*. On 6th day, the rats were randomly assigned to three experimental groups of 12 and were marked as group A, B, and C. The weights of the animals were measured on daily basis to determine the actual volume of the extract to be given to the albino rats.

**Administration of extracts to animals :**

Group A received normal diet, water and an oral administration of organic extract of *Ocimum basilicum* at a dose of 400mg/kg body weight daily and group B received 200mg/kg. Group 3 (control) was given feed and water without treatment. The extract was filtered and the solvent removed with rotary evaporation to obtain crude active ingredient. The organic extracts were administered with the help of a measuring dropper once daily. The administration of the extract lasted for seven days.

**Biochemical analysis :**

Alanine amino transaminase (ALT) and aspartate amino transaminase (AST) where studied for biochemical parameters. The rats were starved of food for 24 hours. Subsequently, blood samples were collected after decapitation into sterile vacuum container tube without an anticoagulant. Serum protein was determined according to the method of Lowry (1951). The enzyme activities were determined adopting the methods described by Amstrong and King (1954). The enzyme activities were express as iu/l

**Statistical analysis :**

Data obtained were subjected to a one way analysis of variance ANOVA using the General Liner Model procedure of SAS (version 6.04) (SAS Institute, 1994). Comparison of significant treatment means was by least significance differences (LSD) as outlined by Obi (2002).

**RESULTS AND DISCUSSION**

Ethanolic extraction of fresh *O. basilicum* leaves yielded 18% extract. The mean body weight of rats of group A was significantly (p<0.05) reduced up to 31.85% and in group B, it was decreased to the extent of 23.46%. In the course of the administration of the organic extract to the rats,
a decrease in the feed and water intake of the treated rats was observed. This observation is in line with the findings of Cornish (1992) that ethanolic extract of O. basilicum reduced the body weight of albino rats. It could be that the levels of organic extract administered were beyond the tolerable limits of the rats thereby resulting in the interruption in absorption and metabolism of feed nutrients essential for growth.

The AST and ALT activities of albino rats treated with ethanolic extract of O. basilicum is as shown in Table 1. The activities of AST were significantly elevated in group A and B rats (400mg or 200mg/kg) body weight to the extent of 68.22% and 63.54% respectively compared to the control. Similarly the activity of ALT was significantly increased in groups A and B, to the extent of 72.00% and 68.28% respectively compared to the control. According to Khan et al. (2008) AST is found both in cytoplasm and mitochondria while ALT is a cytoplasmic enzyme. Raised levels of transaminases observed in the study have serious implications for the animals administered with the ethanolic extract. AST are widely used to assess liver function. The elevation of AST alongside the ALT makes the liver a target of suspicion as this is the usual pattern in case of hepato-toxicity caused by toxic agents (Ezeonu and Ezejiofor, 1998 ). However, the activities of transaminases were higher in the albino rats treated with 400mg / kg body weight than those treated with 200mg / kg body weight. This is an indication that the extract appear to elicit higher effect at a higher dose.

In general, the activities of AST were significantly (P < 0.05) higher than the activities of ALT in the three groups examined. Nelson and Cox (2000) had earlier reported that aspartate transaminases (AST) was the first to appear after cellular and hepatic damage followed by alanine transaminase (ALT). This could also explain why AST activity was greater (P < 0.05) than ALT activity in all the rats examined. The chemical compounds like quercetin, P-coumaric acid, rutin etc. present in the organic extract (Van and Nguyen, 1993) might be responsible for both cellular and hepatic damage. These compounds according to the authors cause tissue and cellular damage leading to raise in transaminases activities. However, the precise mechanism of these chemicals is not yet well understood.

The specific activities of transaminase (AST/ALT) in the serum was significantly (P < 0.05) higher in the treated albino rats than the control. This increase in specific activity of AST and ALT in group A and B might be due to metabolic response in association with the ingestion of the ethanolic extract. The importance of AST and ALT in the diagnosis of cellular and liver damages caused by drug toxicity or infection have been reported by Nelson and Cox, (2000). They reported that the measurement of the serum concentration of the two amino transaminase provides information about the severity of the damages. Necrosis of cells as a result of tissue damage facilitates the leakage of transaminases into the blood stream thereby leading to rise in serum transaminases (Ramzi et al., 1999 )

The result of the this study suggests that ingestion of ethanolic extract of Ocimum basilicum could upset the body metabolic system. The results also indicated that the administration of ethanolic extract might elicit a toxic effect especially when taken at high concentration .

**Table 1** : AST and ALT activities of albino rats treated with ethanolic extract of *O. basilicum*.

<table>
<thead>
<tr>
<th>Animal group</th>
<th>AST activity (iu/l)</th>
<th>ALT activity (iu/l)</th>
<th>Specific enzyme activity (iu/l)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Enzyme activity</td>
<td>Specific enzyme</td>
<td></td>
</tr>
<tr>
<td></td>
<td>AST (i.u/l)</td>
<td>ALT (i.u/l)</td>
<td>AST (i.u/l)</td>
</tr>
<tr>
<td>A</td>
<td>27.53+1.81</td>
<td>25.36+1.11</td>
<td>0.1766+0.01</td>
</tr>
<tr>
<td>B</td>
<td>24.00+2.80</td>
<td>22.38+2.29</td>
<td>0.1416+0.03</td>
</tr>
<tr>
<td>C</td>
<td>8.75+1.44</td>
<td>8.10+1.441</td>
<td>0.0377+0.004</td>
</tr>
</tbody>
</table>
REFERENCES


