Alkaloids of *Cucumis Metuliferus* fruit pulp reduces hepatitis B virus (HBV) in laboratory animals

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**Abstract**

Objective: Studies on the effects of the alkaloids of *Cucumis metuliferus* fruit pulp on hepatitis B virus was investigated in albino rats.

Materials and Methods: The alkaloids from *C. metuliferus* fruit pulp were isolated according to the method described by Agrawal and Paridhavi [1] and the effect of the isolated alkaloids was assayed in albino rats infected with hepatitis B serum.

Results: Results obtained showed that 50 – 200mg/kg of the alkaloids produced dosed - dependent statistically significant (p<0.05) decrease in the levels of serum alkaline phosphatase (ALP), alanine aminotransferase (ALT) and aspartate aminotransferase (AST) in albino rats infected with hepatitis B serum.

Conclusions: This result showed that alkaloid isolated from the fruit of *C. metuliferus* plant may have some protective activity against hepatitis B virus (HBV).

Keywords: Hepatitis B virus, alkaloids, *C. metuliferus* fruits, biochemical parameters.

**Introduction**

Hepatitis can be described as a diffuse inflammatory disease of the liver which may be associated with hepatocellular necrosis affecting the acini, and are caused by different types of viruses including hepatitis B virus [2]. This virus has surface antigens that are labeled HBsAg, HBeAg, and HBcAg [3]. Replication of HBV has been shown to be sorely in the liver, perhaps other extra-hepatic replication sites also exist [4].

Studies have shown that treatment of liver disease using orthodox approach has been so difficult, and herbal preparations have been useful for the treatment of liver disorders [5]. The need for the development of an efficient hepatoprotective drug from the natural resource is therefore a necessity [6]. The use of herbs as antiviral agents have been documented scientifically [7]. These authors further stated that alkaloids isolated from these plants have been proven to have antiviral properties. Though, the antiviral properties of the ethanolic crude extract of *C. metuliferus* fruit have been reported [8], not much have been documented on the activities of the alkaloidal content of the plant on hepatitis B virus. The purpose of this study was therefore to investigate the antiviral properties of the alkaloids on hepatitis B virus-induced liver damage of albino rats.

**Materials and Methods**

**Plant Collection and Authentication**

The ripe fruit of *C. metuliferus* were harvested from Chong’openg of Jos South Local Government Area of Plateau State, Nigeria. The plant was identified and authenticated by Professor C. O. Akueshi of the department of plant science of the University of Jos, Nigeria.

**Preparation of C. metuliferus**

The mesocarp of the fruits and seeds were carefully scooped out of the pericarp using a spatula and was well stirred after which the yellowish fibrous portion was sun-dried. Sieves of different sizes were used to separate the seeds from the greenish fluid portion, after which the fluid portion was spread on trays and placed in an oven set at 55 °C until it was dried. The yellowish and the greenish dried portions were then mixed and reduced to fine particle size using mortar and pestle.

**Isolation of Alkaloids of the *C. metuliferus* Fruit Pulp**

The alkaloids from *C. metuliferus* fruit pulp were isolated according to the method described by Agrawal and Paridhavi [1]. The pure alkaloid was stored in an air-tight container at room temperature prior to use.
Ethical Clearance
Ethical clearance on the proper handling and use of animals and their products was obtained from the ethical Committee on Animal use of the Department of Pharmacology and Toxicology, University of Jos, Nigeria.

Effect of Alkaloids Isolated from C. metuliferus Fruit Pulp on Hepatitis B Virus-Induced Liver Damage
Twenty five adult albino rats (wistar strain) were divided into five groups of five animals each. Animals in group 1 (control group) were administered equi-volume (per kg body weight) of normal saline. Animals in group 2 were administered 0.2ml/kg of hepatitis B virus serum. Those in group 3, 4, and 5 were respectively pretreated with 0.2ml/kg of hepatitis B virus serum ip, 3hours daily before they were treated with 50, 100 and 200mg/kg of the C. metuliferus alkaloids orally using orogastric tube daily for a period of 14 days [9]. After twenty four (24) hours of the last administration, the animals were made unconscious using petroleum ether, and blood samples were collected through cardiac puncture for biochemical studies.

Statistical Analysis
The results were presented in mean±SEM, and the levels of significance were carried out using two-way ANOVA and student t-test, and a probability value of P<0.05 was considered statistically significant.

Results and Discussion

The results on the effect of the alkaloids of C. metuliferus fruit on the biochemical parameters of hepatitis B virus – induced hepatotoxicity in albino rats

<table>
<thead>
<tr>
<th>Treatment (Mg/kg)</th>
<th>Total protein (g/L)</th>
<th>Albumin (g/L)</th>
<th>ALP (u/L)</th>
<th>ALT (u/L)</th>
<th>AST (u/L)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Normal saline</td>
<td>72.25±2.53</td>
<td>27.50±1.60</td>
<td>345.75±42.29</td>
<td>12.20±1.93</td>
<td>55.00±5.61</td>
</tr>
<tr>
<td>HBV + 50 alkaloids</td>
<td>78.25±3.35</td>
<td>30.25±0.63</td>
<td>212.50±44.17</td>
<td>14.00±1.15</td>
<td>61.25±4.50</td>
</tr>
<tr>
<td>HBV + 100 alkaloids</td>
<td>71.50±1.55</td>
<td>27.75±1.89</td>
<td>182.25±3.81</td>
<td>10.00±2.50</td>
<td>61.75±2.50</td>
</tr>
<tr>
<td>HBV + 200 alkaloids</td>
<td>75.50±4.09</td>
<td>31.75±0.75</td>
<td>131.50±18.73</td>
<td>12.50±2.84</td>
<td>5.25±15.63</td>
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References