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Effect of Ethanol Leaf-Extract of *Ocimum basilicum* on Plasma Cholesterol Level of Albino Rats

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Abstract: The effect of ethanol leaf-extract of *Ocimum basilicum* on plasma cholesterol level was investigated on albino rats. The animals were grouped into four (A, B, C and D) containing six rats each. The plant extract was administered through oral intubation at 200mg/kg, 400mg/kg, 600mg/kg and 0mg/kg of body weights to the animals in groups A, B, C and D respectively. Blood samples were collected on the fifteenth day following the last day of the two-week period of administration. The mean cholesterol levels (mmol/l) of the animals showed that the extract significantly ($p<0.05$) and dose-dependently decreased the plasma cholesterol concentrations of the animals.

Key words: Leaf-Extract · Ocimum Basilicum · Plasma Cholesterol and Albino Rats

INTRODUCTION

Since the inception of life, man has been interested in naturally occurring compounds. Plants have often been the most important sources of these compounds. This is because most plants are autotrophs and are able to synthesize a large variety of basic organic compounds such as carbohydrates, proteins, terpenes, steroids, alkaloids and glycosides [1].

Traditional medicine is an act of using plant leaves, barks, roots or any other part in the crude form for treatment of various diseases [2]. Generally plants which produce constituents having medical values are called medicinal plants. This constituents or substances differ from plant to plant, thus the plant kingdom provides a large store of various chemical substances with potential therapeutic properties which have been utilized in treatment and cure of human and other animal diseases. In the pre-christian era, traditional medicine was virtually the only means of curing infections [3]. Tradomedicine is, in fact, as old as creation [4]. Hence mankind has used plant extracts for thousands of years for the prevention of disease, treatment of disease symptoms, as insecticides to control microbial growth, for weed control and many other functions. Many of these activities are due to the presence of highly diverse secondary metabolites called phytochemicals produced by plants to deal with their environmental stresses [5-6]. These phytochemicals include flavonoids, carotinoids and glycosides.

Cholesterol is one of the lipids that are crucial constituents of biological membranes [7]. It is synthesized from isoprene units and is abundant in the brain, liver, adrenal glands and nervous system [8]. The liver produces sufficient cholesterol (in the absence of enough dietary cholesterol) for all normal body functions. Higher cholesterol levels are found in males and older people. It is carried in the blood in the form of lipoprotein [9]. The cellular supply of cholesterol is maintained at a steady level by three distinct mechanisms viz: regulation of activity and level of β-hydroxyl β-methylglutaryl reductase enzyme (HMGR), regulation of excess intracellular free cholesterol and cholesterol acyltransferase and regulation of plasma cholesterol levels through low density lipoprotein receptor-mediated uptake and high density lipoprotein mediated reverse transport [10].

Nevertheless, research on most of the medical plants still thrives. *Ocimum basilicum* (scent leaf) for instance, is one of the widely studied medicinal plants. The plant belongs to the family of *lamiaceae* and is used by traditional medicine practitioners to cure various kinds of ailments like convulsion and coronary heart disease. These naturally occurring phenolic compounds in medicinal plants could have some physiological effects on the plasma cholesterol level; hence this work investigated the effect of ethanol leaf-extract of *Ocimum basilicum* on plasma cholesterol level using albino rats.

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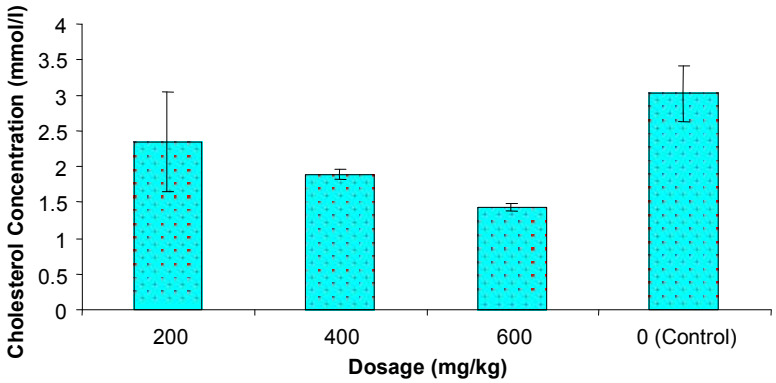

Fig. 1: Mean cholesterol concentrations (mmol/l) after the administration of the extract.

MATERIALS AND METHODS

Materials: Twenty-four male albino rats were gotten from University of Nigeria Nsukka (UNN). Fresh leaves of *Ocimum basilicum* were collected from Abakaliki, Ebonyi State, Nigeria. All chemicals and reagents were of analytical standard.

Methods

Extraction of Plant Materials: Fresh leaves of *Ocimum basilicum* were air-dried at room temperature. The dried sample was ground with electric blender to powdery form. 500g of the ground sample was soaked with 1200ml of ethanol and left for 48hours. The solution was filtered with muslin cloth and the filtrate was then allowed to evaporate under room temperature to obtain a sticky extract of *Ocimum basilicum*.

Administration of Extract: The extract was administered to the animals by oral intubation for two weeks. The animals in groups A, B, C and D received 200mg/kg, 400mg/kg, 600mg/kg and 0mg/kg body weights respectively.

Collection of Blood Samples: Blood samples were collected from the animals through cardiac puncture into labeled clean EDTA bottles.

Determination of Cholesterol Level: Spectrophotometric method as described by Allain and Roschlaw (1979) [4] was used.

RESULT AND DISCUSSION AND CONCLUSION

The extract of *Ocimum basilicum* significantly ($p<0.05$) reduced the plasma cholesterol concentrations (Fig. 1). The reduction in the cholesterol level of the rats was highly pronounced in group C (that received 600mg/kg) than in groups A and B (that received 200mg/kg and 400mg/kg respectively) showing that the effect of the extract on cholesterol concentrations of the rats was dose-dependent. Macrophages treated with 600mug/ml of the extract reduced newly synthesized unesterified cholesterol by about 20-30% than those administered with a dosage of 20mug/ml [11]. Siegel *et al.*, (2010) [8] reported that disorders indicate that excessive consumption of foods high in fat including liquid and sterols increase the risk of developing arterial diseases.

In conclusion, ethanol leaf-extract of *Ocimum basilicum* could have an anticholesterolaemic activity.

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