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Central European Journal of Experimental Biology, 2012, 1 (4):118-125
(http://scholarsresearchlibrary.com/archive.html)

Central European Journal of Experimental Biology
Scholars Research Library

ISSN: 2278–7364

Hypotensive effect of aqueous and methanol leaves extracts of *Ocimum Basilicum* (sweet basil) on normotensive cats blood pressure

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ABSTRACT

Hypotensive effects of aqueous and methanol extract of Ocimum basilicum produced effect in a dose dependent manner. The doses of 1.5 and 10mg/ml produce a significantly decrease in both the systolic Blood pressure P< 0.05 in the two portions. The methanol extract significantly decrease the blood pressure when compared to that of aqueous. The pharmacologically antagonistic study of the extract revealed the hypotensive effect of Ocimum basilicum was not mediated via the adrenoceptor but it was attenuated by a cholinergic blockade. Preliminary phytochemical screening revealed the presence of reducing sugars, cardiac glycosides, resin, tannins, saponins, glycosides, flavonoids, glycerin and steroids. The median lethal dose (LD_{50}) in cats was calculated to be 1264.9 mg/kg body weight

Key words: *Ocimum basilicum* leaves, Blood pressure; Phytochemicals. Methanol, Aqueous

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INTRODUCTION

Ocimum basilicum, popularly known as sweet basil in English, in Hausa 'Dadoya', in Yoruba 'Efirin' and in Igbo 'Nchianwu". It is a member of mint family of lamiaceae (labiatae) [1] . This plants as well as oil from it have received lot of attention for its potential medicinal properties and the reported benefits using it internally in form of herbal infusion [2].

It is a dicotyledonous shrub grown in most parts of Nigeria and its medicinal properties have gained popularity in traditional medicine [3]. *Ocimum basilicum* plant species cures certain ailment or protect the host by providing a protective shield against these diseases[4] . Plant sources have proven to suppress enzymes that contain chronic disease such as asthma, diabetes and cancers [5]. It is a hairy plant that grows up in a maximum height of about 3 feet with white flower, a square stem and shiny oval leaves that are grayish-green beneath which are dotted dark oil cells. It is soft and cool to touch and if slightly bruised exhaled a delightful scent. Each variety of basil differs in height, colour of foliage and tests [6]. The leaves and flowering tops are antispasmodic aromatic, carminative, digestive, galactogogue, stomachic and tonic [7] .

The aims of research is to investigate the effect of Methanol and Aqueous extracts of leaves of *Ociumum basilicum* on cat blood pressure, and also to carry out preliminary phytochemical analysis of the extract and also to determine the possible mechanism of action of the extracts on cat blood pressure. Lastly, to determine the median lethal dose (LD_{50}) of the *ocimum basilicun* using cats.

MATERIALS AND METHODS

Drugs
All chemicals and drugs used were obtained commercially and of analytical grade.
Atropine(100µg/ml) , Nifedipine ((10µg/ml) Adrenaline ((10µg/ml) and propananol (4mg/ml) ,Acetylcholine ((10µg/ml)

Collection of Plant Material
The plant was collected from Zaria, collection was based on the information obtained from knowledgeable elders such as traditional healers and herbalists on the use of herbs. The leaves was identified by taxonomical means and authenticated by Mal Musa Mohammed (Herbarium keeper) at the herbarium unit in the Department of Biological Sciences, Ahmadu Bello University Zaria, Nigeria where a Herbarium specimen with voucher number 9022 was deposited.

Extraction of Plant Material
The powder (100 g) was macerated in 2.5L of distilled water at room temperature for 24 hours. It was then filtered using a filter paper (Whatmann size, No 1) and the filtrate evaporated to dryness in water bath at 40^0 C. A brownish residue weighing 25.5grams as the aqueous extract was obtained which was kept in air tight bottles in a refrigerator until use.

The powder (100 g) was macerated in 2.5L of methanol water at room temperature for 24 hours. It was then filtered using a filter paper (Whatman size, No 1) and the filtrate evaporated to dryness in water bath at 40^0 C. A brownish residue weighing 6 grams was obtained as the methanol extract which was kept in air tight bottles in a refrigerator until use

Animal Management
Three matured male cats weighing between 2.55-2.30 kg were used in this experiments. The cats were maintained in the Animal house of the Department of Human Physiology, Ahmadu Bello University, Zaria, Nigeria. This research was carried out in Ahmadu Bello University,Zaria ,Nigeria in accordance with the rules governing the use of laboratory animals as accepted internationally.

Experimental Procedures:
Acute toxicity study:
The lethal dose (LD50) of the plant extract was determined by [8] method using 13 cats. In the first phase 9 cats were divided into 3 groups of 3 cats each and were treated with the aqueous extract of the plant at doses of 10mg/kg, 100mg/kg and 1000mg/kg bodyweight intraperitoneal. They were observed for 24 hours for signs of toxicity. In the second phase 4 cats were divided into 4 groups of 1 cat each and were also treated with the aqueous extract at doses of 600, 1000, 1600 and 2900mg/kg bodyweight *(i.p).*The final LD_{50} was calculated.

Phytochemical Screening:
The extract was screened for the presence of various phytochemicals employing standard screening test [9] . Intra carotid blood pressure was recorded under thiopental anesthesia (45mg/kg *b.w I.V)* The anterior aspect of the neck was dissected to exposed the carotid arteries, then the left carotid artery was then cannulated with polyethylene catheter and then connected to a pressure transducer coupled to microdynanometer (UGO Basil model 7050) Heparinized normal saline was injected to prevent blood clotting. For the route of administration of drugs and extracts, the left femoral vein which was exposed and cannula was inserted. The blood pressure was recorded on the recording paper (UGO Basil), the machine was set at a speed of 24mm/min and sensitivity at 8.

Statistical Analysis
The result of the experiment are expressed as mean $\pm$ SEM. Analysis of variance was performed and sequential differences among the means were calculated at a level of $P<0.05$ [10]

RESULTS

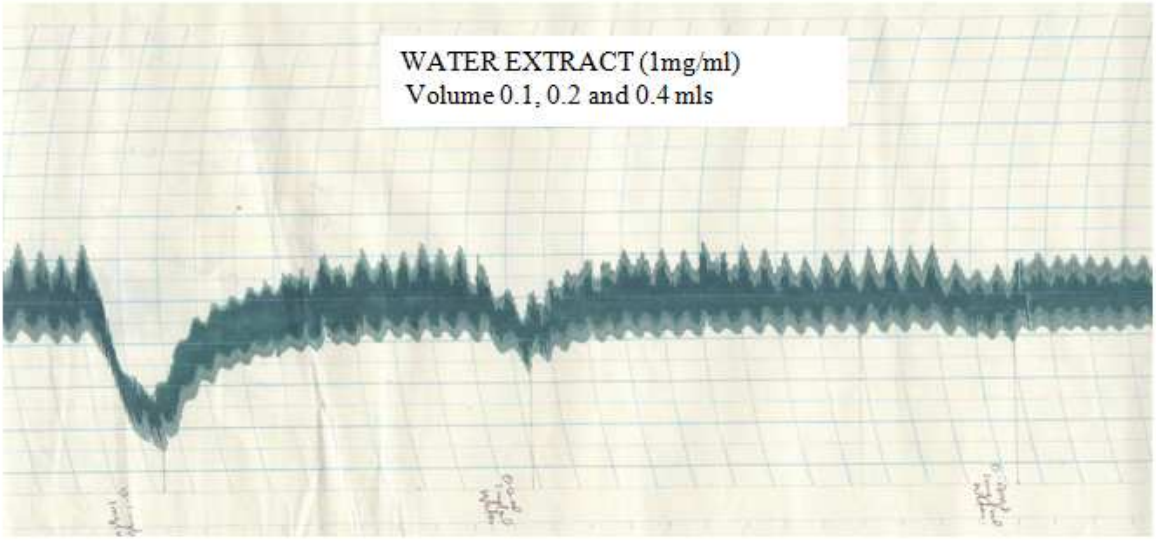
Phytochemical Analysis

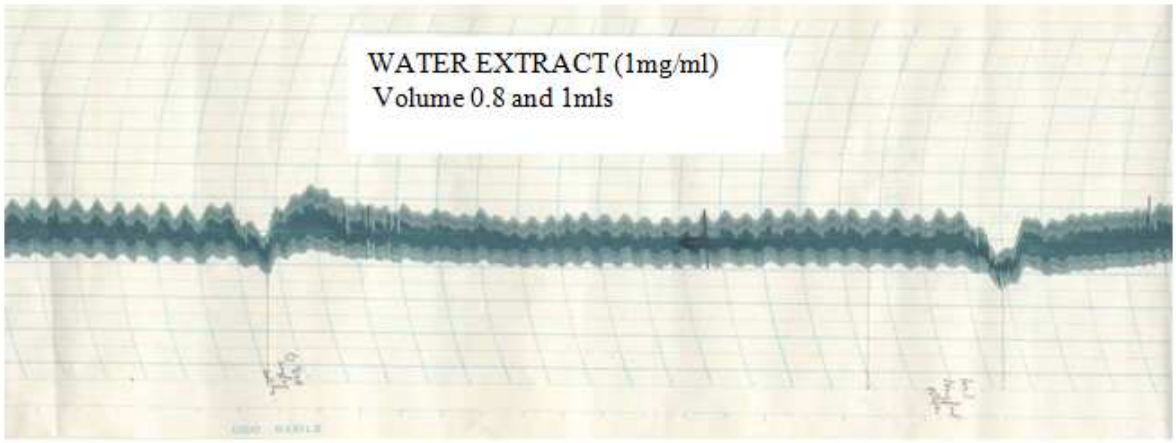
Freshly prepared extracts were subjected to preliminary phytochemical screening test for various constituents. This revealed the presences of reducing sugar, cardiac glycoside, resin, tannin, saponin, glycoside, flavonoid, glycerin and steroid.

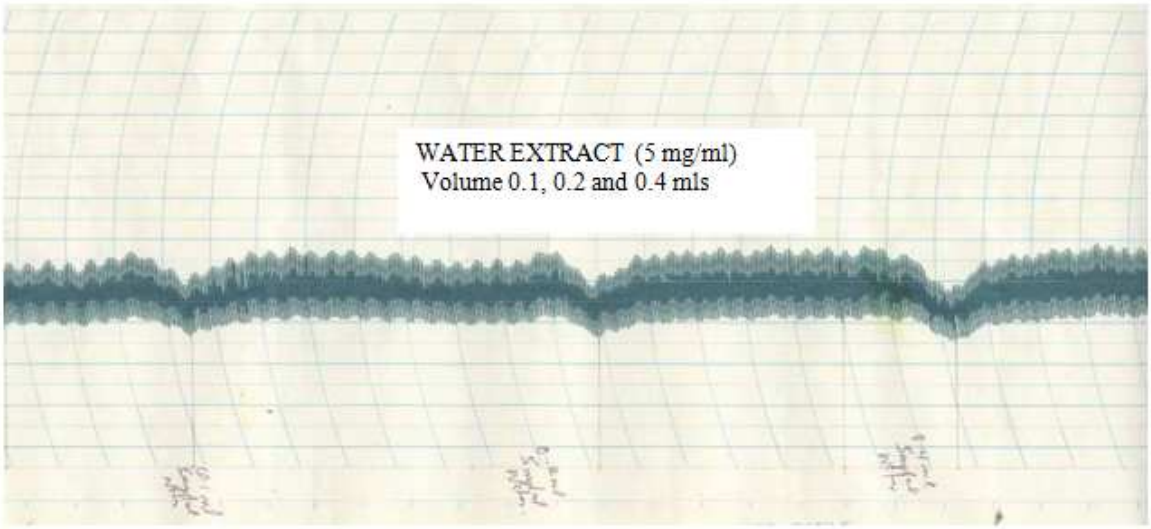
Acute toxicity study (LD_{50})

The sign of toxicity were first noticed after 2-8 hours of extract administration. There was decreased locomotor activity and decreased in sensitivity to touch. Also there was decreased feed intake and prostration after 15 hours of extract administration.

The median lethal dose (LD_{50}) in cats was calculated to be 1264.9 mg/kg body weight



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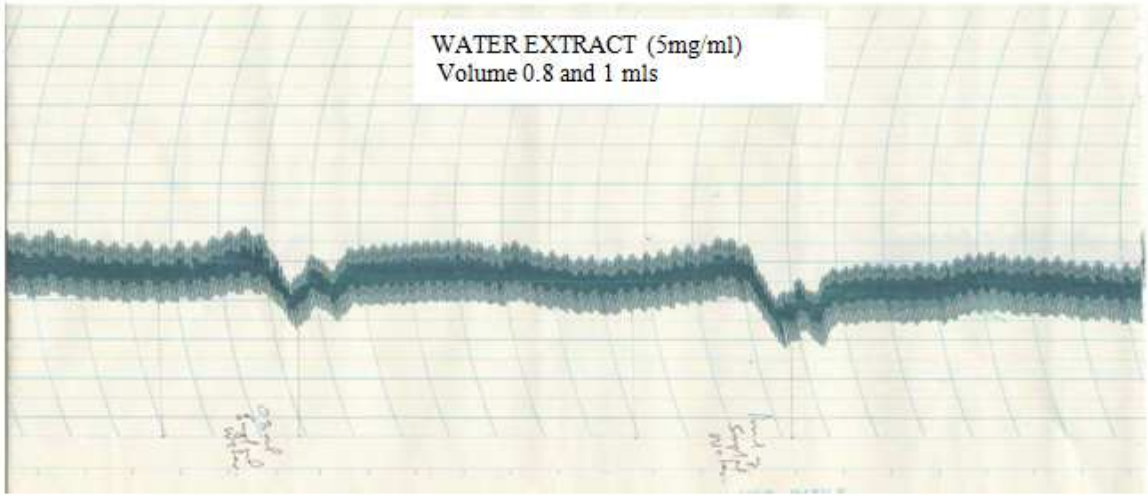
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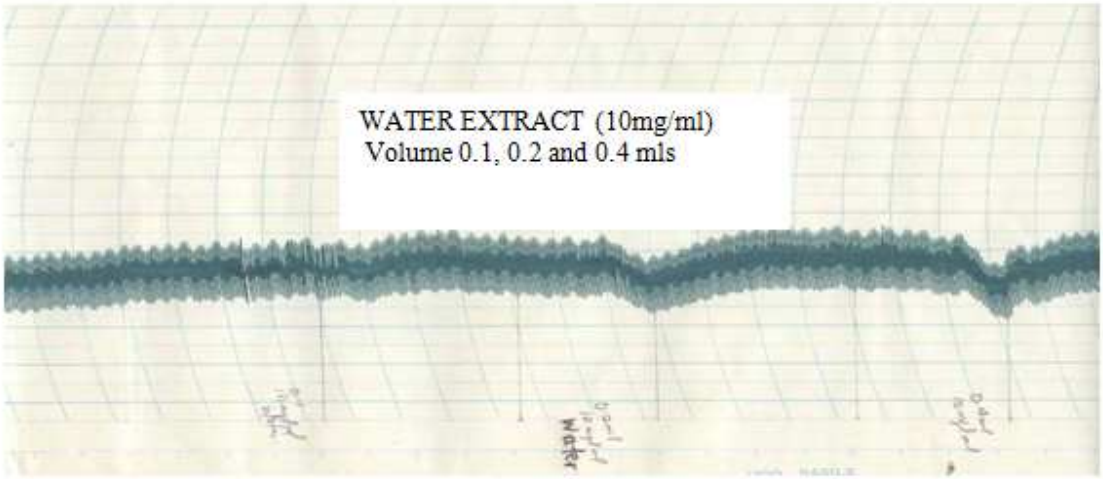
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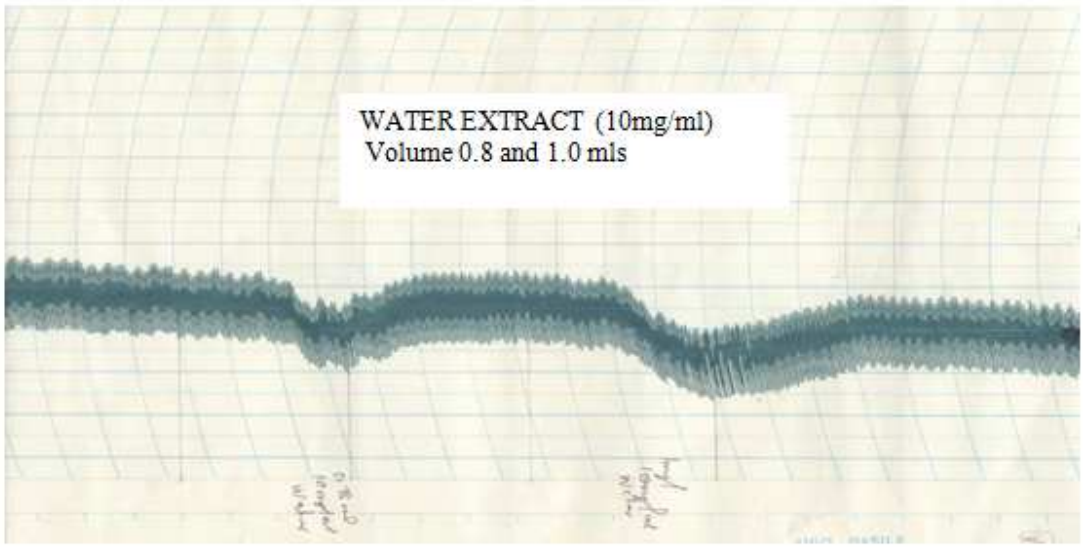
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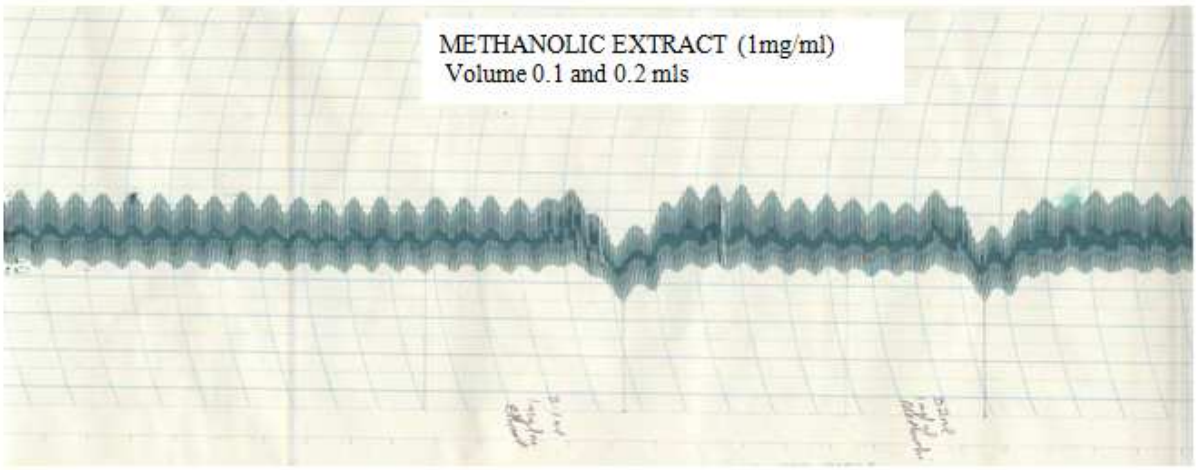
Volume 0.8 and 1.0 mls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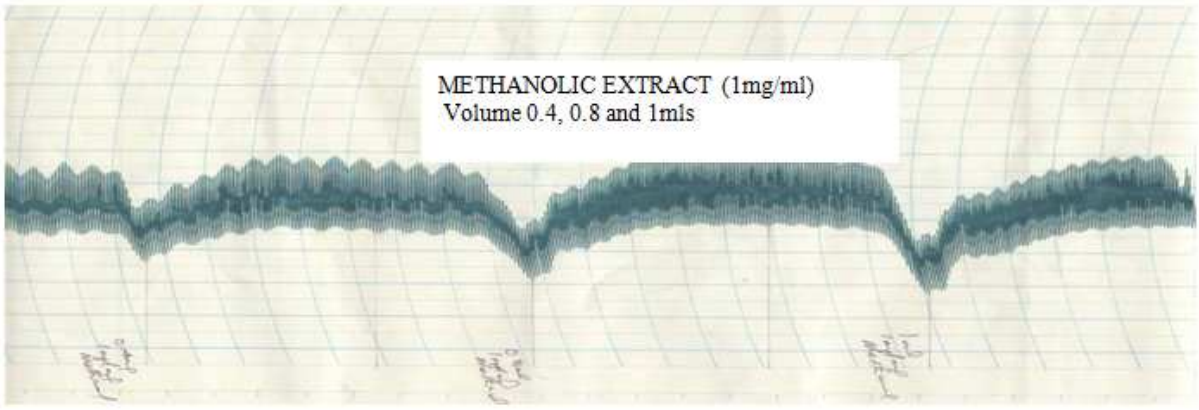
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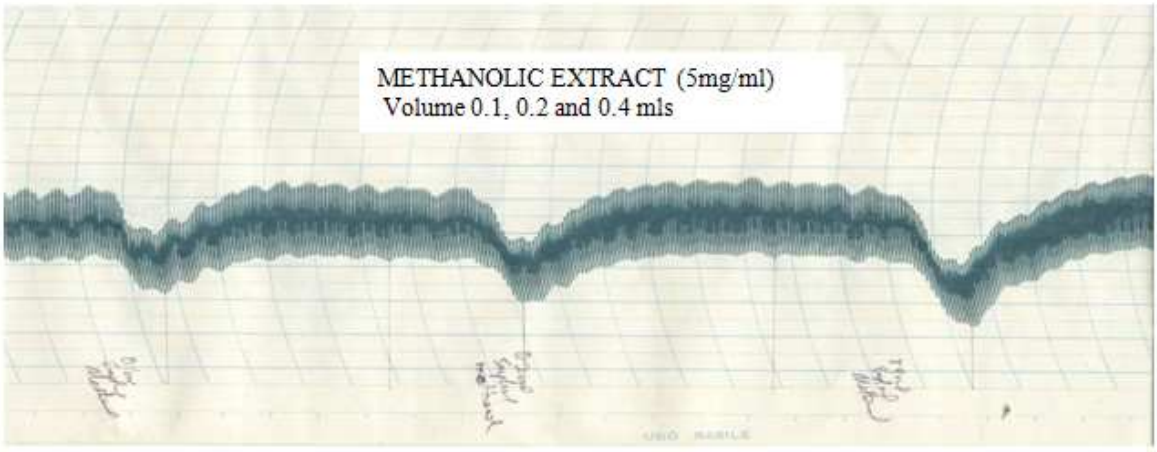
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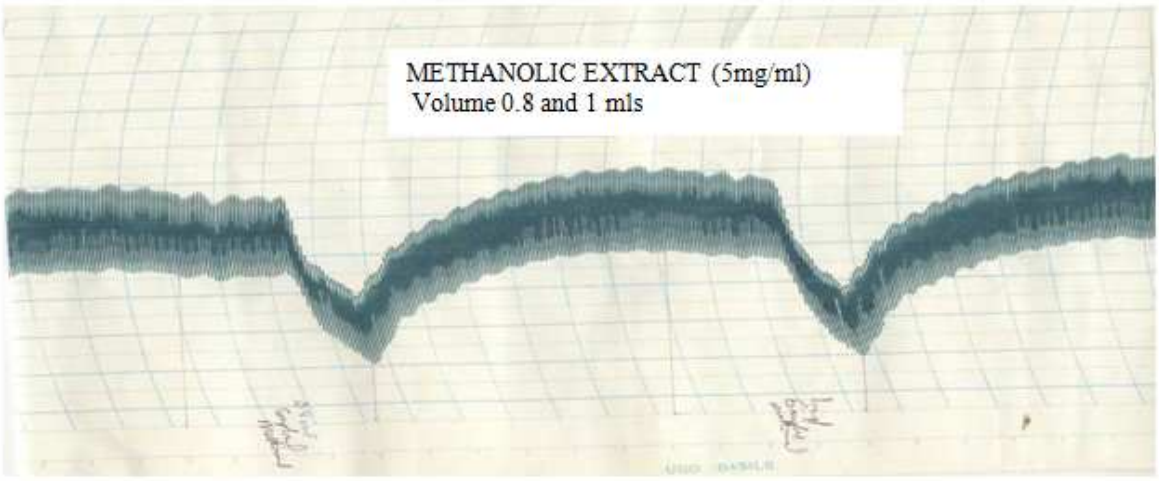
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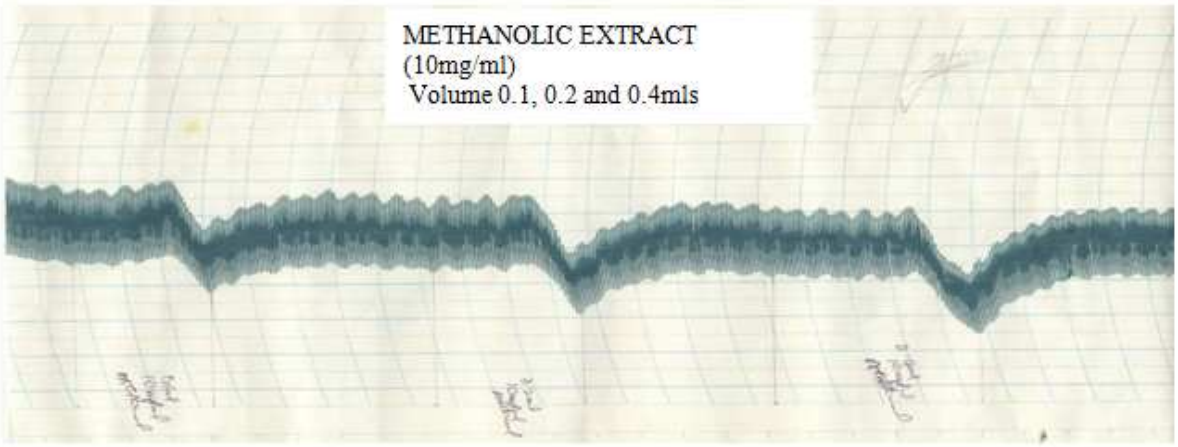
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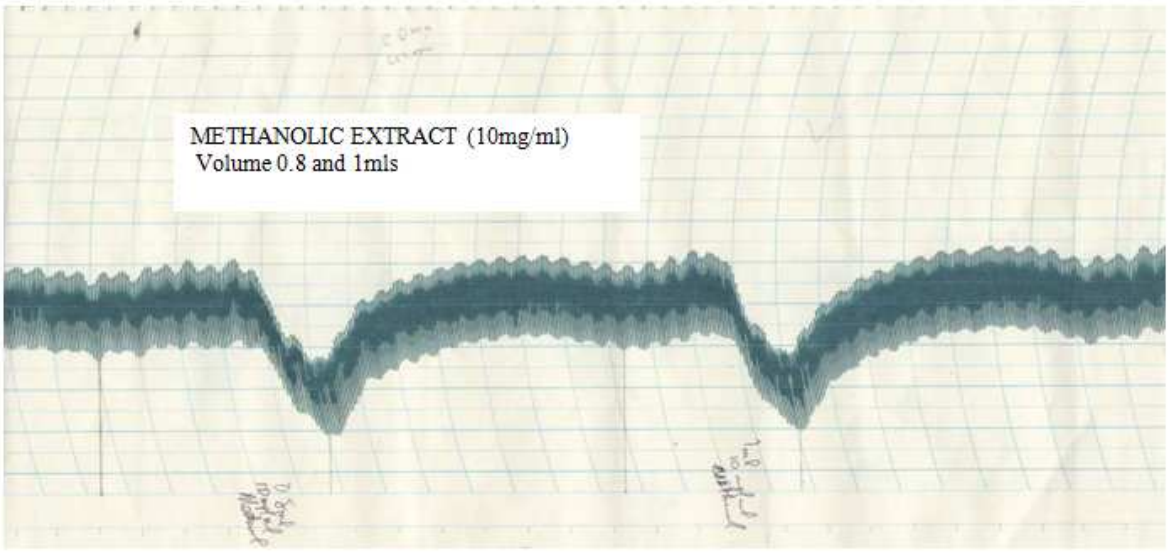
(10mg/ml)
Volume 0.1, 0.2 and 0.4mls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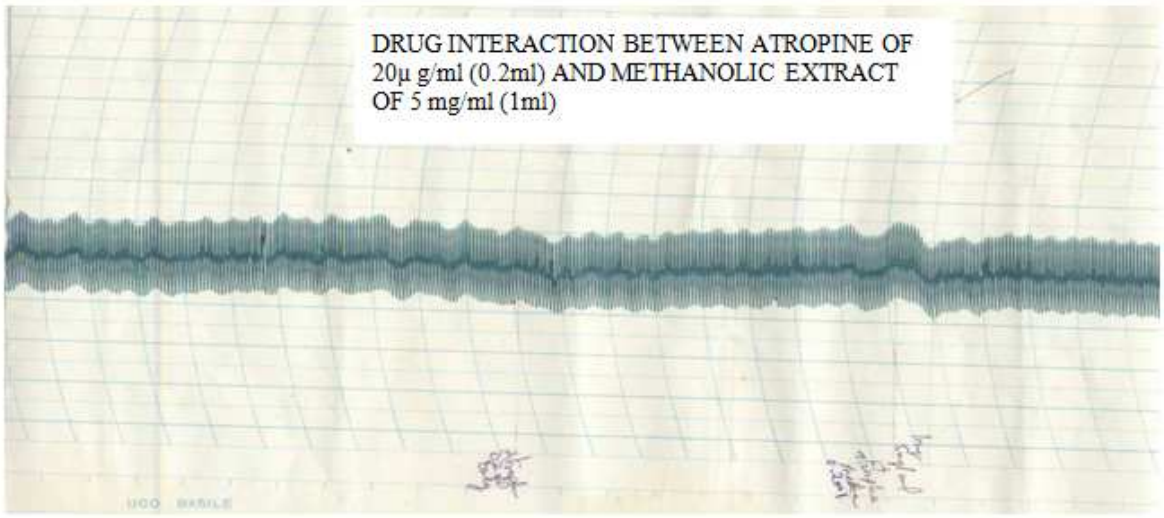
Volume 0.8 and 1mls


DRUG INTERACTION BETWEEN ATROPINE OF
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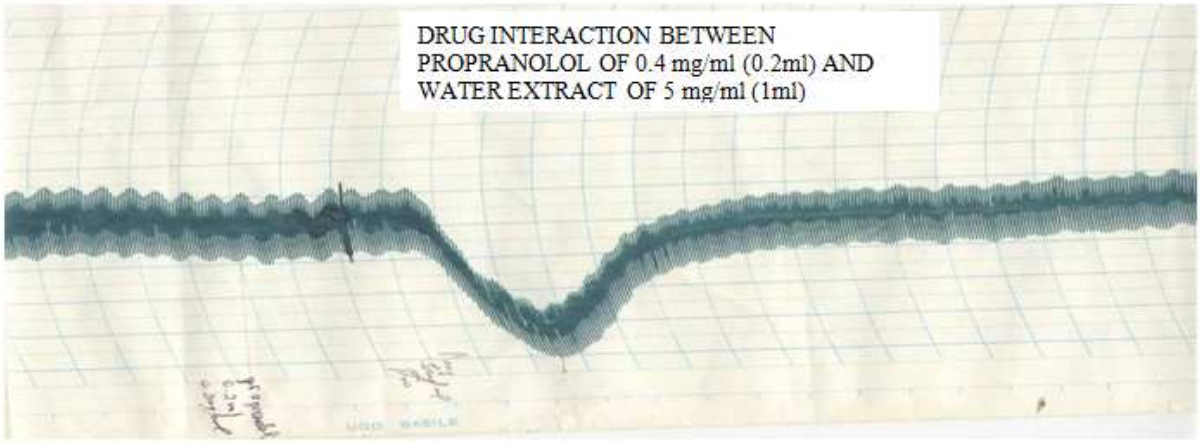
OF 5 mg/ml (1ml)


DRUG INTERACTION BETWEEN
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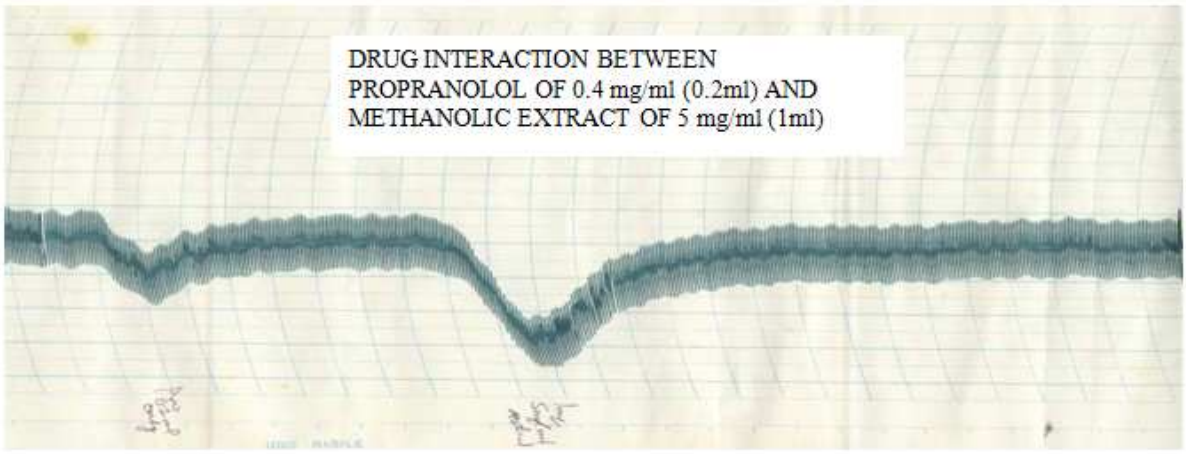
WATER EXTRACT OF 5 mg/ml (1ml)



DISCUSSION

The results of the present studies showed that *Ocimum basilicum* has a hypotensive effect in cat. The systolic and diastolic blood pressure was reduced as compared to control normal saline. The reduction in the blood pressure was statistically significant (P< 0.05). Similarly the heart rate was also reduced by the plant

When compared, the normal basal rhythm with aqueous extract of the 1mg/ml, 5mg/ml and 10mg/ml, there was a significant decrease in the blood pressure. Therefore, *ocimum basilicum* could also be used to manage systolic hypertension type which is characterized by sustained increased in cardiac output due to increased systolic pressure [11].

The comparative analysis between normal basal rhythm and methanol extract of stock concentration of 1mg/ml, 5mg/ml and 10mg/ml showed a significant decrease in the blood pressure P< 0.05. Thus the decrease in blood pressure profile indicate that methanol extract exhibited blood lowering activity which manifested as a result of general decrease in the activity of blood pressure parameter due to decrease in heart and cardiac outputs. For the pharmacological antagonistic studies showed that the depressor effect of the extract is not mediated via adrenergic receptor since application of propranolol could not abolish the depressor effect of the extract .However cholinergic blockade with atropine a muscarinic receptor significantly attenuated the magnitude of the fall in blood pressure induced by the extract P<0.05 .This suggest that *Ocimum basilicum* may be exerting it hypotensive effect through acetylcholine related mechanism i.e. through cholinergic receptors.

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