

RESEARCH ARTICLE

Evaluation Fitness of Alcoholic Extract of *Laurus nobilis* Leaves on Lipid Profile and some Physiological Parameters in Female Albino Rats Treated with Depakin Drug

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ABSTRACT

The present study aimed to explain the effect of ethanolic extract of *Laurus nobilis* leaves on lipid profile and some physiological parameters in treated with depakin drug in the female albino rats. Twenty subjects were used in the experimental and were divided into four groups, G1 control, G2 with alcoholic extract, G3 only depakin drug, G4 alcoholic extract, and depakin drug. The first group was dosed with a concentration of 0.9 mL physiological saline solution. Each group animal was given an intraperitoneal injection, and the dose lasted 30 days once daily. The results reveal a substantial drop ($p < 0.05$) in weight, lower cholesterol, triglyceride, Low-density lipoproteins (LDL), and very low-density lipoproteins (VLDL) levels, and a significant rise in LDL and VLDL levels. ($p < 0.05$) in the red blood cells (RBCs), Hb, WBCs, and PLT count in alcoholic extract compared with the rest of the group rats. The ethanolic extract of *Laurus nobilis* leaves possesses loss of weight and hypolipidemia.

Keywords: Depakin (Sodium valproate), *Laurus nobilis* Leaves, Lipid profile.

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INTRODUCTION

Cholesterol and triglycerides are insoluble in water; therefore, they must be carried through the bloodstream with proteins.¹ To avoid toxicity, significant quantities of fatty acids from meals must be in the form of triglycerides.¹ As a result, these lipoproteins are essential in the absorption and transportation of dietary lipids via the small intestine, including the transport of lipids from the liver to peripheral organs and vice versa. (reverse cholesterol transportation).² It also works as a toxic foreign hydrophobic and amphipathic compounds transporter, such as bacterial endotoxin, from infection and invasion spots.³

The LDL are cholesterol-rich particles originating from VLDL; they carry most of the cholesterol in the bloodstream.⁴ LDL particles range in size and density, and substantial quantities of tiny dense LDL particles are seen in relation to hypertriglyceridemia, obesity, low HDL levels, type 2 diabetes (T2D), i.e., people with metabolic syndrome, and inflammatory and infectious conditions.⁴

One of the mechanisms HDL may follow to be anti-atherogenic is the reverse transfer of cholesterol from peripheral tissues to the liver, in which high-density lipoproteins (HDL) particles play a significant role.⁵ As a result, HDL particles

contain anti-oxidant, anti-inflammatory, anti-thrombotic, and anti-apoptotic effects, which may contribute to their capacity to prevent atherosclerosis.⁶

As it is known in Arabic island, AL Ghar is an evergreen plant characterized by dark green, perfumed, and smooth leaves. It is known in English as bay leaf, bay laurel, and Turkish laurel, which are derived from *Laurus nobilis* L. (Lauraceae family), and it is native to the Mediterranean area and Europe.⁷

This plant is industrially important as it is used in many products concerning drugs, cosmetics, and foods.⁸ Its dried leaves and essential oils are widely used in food manufacturing for flavoring meat products, soups, and seafood.⁹ Laurel's volatile oils work on suppressing the development of tuberculosis as well as supporting the immune system.¹⁰ Laurel's leaves are rich in important trace elements, tannins, and phytoncides, which help in riding the body of toxins.¹¹ *L. nobilis* has the effect of reducing the levels of glucose in the blood serum. Therefore, it is used for preventing and treating Type II diabetes.¹² Furthermore, it lowers total cholesterol and LDL cholesterol while increasing HDL cholesterol.¹³

Depakin (Sodium valproate or valproic acid) is an anticonvulsant that is commonly used in the treatment of

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childhood refractory epilepsy due to its good efficacy and mild side effects.¹⁴ It has a wide range of pharmacological effects, ranging from boosting gamma-aminobutyric acid (GABA) transmission to decreasing the production and/or effects of excitatory amino acids, regulation of dopaminergic and serotonergic transmission, and blockade of voltage-gated sodium channels;¹⁵ moreover, it is nearly completely processed in the liver, primarily through glucuronidation. Then it goes through further metabolism with oxidation, a complicated process involving several cytochrome P450 enzyme systems. It also includes several metabolites that may affect both its efficacy and toxicity.¹⁶ It is now being used to treat nerve degeneration, cardiovascular illness, autoimmune disorders, and diabetes mellitus.¹⁷ Because epilepsy and bipolar disorder require lifetime therapy, the ongoing and long-term usage of Depakin becomes a serious worry for patients owing to the possible side effects. Rare severe side effects such as hepatotoxicity and hematologic abnormalities have also been observed with depakin therapy.¹⁸

MATERIALS AND METHODS

Collection of Plant and Preparation of Extract

The leaves of the *Laurus nobilis* plant were purchased at a local market. They were then dried in the shade and pulverized in a mechanical grinder. The resulting material (250 gm) was extracted in 70% ethanol using a Soxhlet apparatus at 45°C for 24 hours. The extract was concentrated in vacuo and preserved in a vacuum desiccator for complete solvent removal before being weighed.^{19,20}

Animals

Adult albino rats weighing 230–250 g were chosen for this study and bred in the Animal House Lab at the Faculty of Education for Girls, University of Kufa, Iraq. These animals were maintained in a conventional laboratory environment with regular food and access to water.

Experimental Design

A total of 20 rats were separated into four groups, each with five rats, and were given the intraperitoneal injection therapy for 1-month.

Group I: Only distilled water was supplied to the normal control group.

Group II: were fed a 150 mg/kg body weight alcoholic extract of *Laurus nobilis* L. leaf.

Group III: Depakin (sodium valproate) drug 500 mg/kg of body weight.

Group IV: alcoholic extract + Depakin drug.

Sample Collection

At the experiment’s start and end, the animals’ weights were recorded. After 24 hours after the final dosage, the animals were killed, and heart blood samples were obtained using two groups of labeled tubes. The first tube group contains ethylenediamine tetraacetic acid (EDTA) and is then used for the determination of blood parameters those results (red blood corpuscles count, hemoglobin concentration, total white blood cell count, and platelets count). The second group of tubes (gel tube) and then centrifuged at 3000 r.p.m for 15 minutes to isolate serum for determining biochemical parameters that include cholesterol, triglyceride, (HDL-C, LDL-C, and VLDL-C).

Statistical Analysis

The data of the experiment were calculated by using a one-way analysis of difference, and the group differences were calculated using Duncan multiple range tests; data are presented as mean± SM, and the different letters investigate a significant difference (p <0.05).

RESULTS

Effect of Alcoholic Extract for *Laurus nobilis* leaves on average weight in Rat Treated with Depakin.

The findings of this investigation were shown in Table 1 as changes in the body weights of the experimental animals, with the change indicated by the average of the end and beginning body weights. The body weight of the group treated with *Laurus nobilis* leaves extract was significantly lower (p <0.05) compared to the control group. Moreover, found a substantial (p <0.05) rise in the body weight of the animal given depakin drug.

The Effects of the Alcoholic Extract on Certain Hematological Parameters in *Laurus nobilis* Leaves

Table 2 shows a substantial drop (p <0.05) in levels of (plt, WBC, Hb, and RBC) in the depakin drug group in comparison to the control group. When rats were given alcoholic extract, their levels of (PLt and WBC) increased significantly when compared to the control group.

The Effect of Alcoholic Extract of *Laurus nobilis* Leaves on Lipid Profile.

The results in Table 3 revealed a substantial rise (p <0.05) in levels of (Cholesterol, Triglyceride, LDL, and VLDL) in the group treated with depakin drug compared to the control, whereas rats treated with the extract exhibited

Table 1: Effect of alcoholic extract for *Laurus nobilis* leaves on average weight rats treated with Depakin drug at 500 mg/kg.

Average	After	Before	Weight groups
32.00 ± 8.18 ab	265.00 ± 26.28 a	236.33 ± 17.03 a	Control
25.33 ± 9.02 c	211.67 ± 33.29 b	237.00 ± 40.78 a	Extract
39.33 ± 10.21 a	281.33 ± 27.42 a	242.00 ± 24.02 a	Depakin
17.00 ± 4.35 b	259.00 ± 14.93 ab	242.00 ± 14.52 a	Extract + Depakin

Means ± SD

As indicated in the columns, differences between a, b, and c are significant (p <0.05).

Table 2: Effect of alcoholic extract for *Laurus nobilis* leaves on Some Hematological Parameters PLT, WBC, Hb, and RBC in Rat Treated with Depakin drug.

PLT 10^3 mm^3	WBC $(X*10^3) \text{ mm}^3$	Hb (Mg/dl)	RBC $(X*10^6) \text{ mm}^3$	Parameters Group
420.00 ± 26.05 c	7.33 ± 0.40 b	14.30 ± 0.89 a	6.65 ± 0.07 a	Control
616.33 ± 24.50 a	10.00 ± 1.83 a	13.30 ± 1.41 ab	6.25 ± 0.47 ab	Extract
242.33 ± 28.57 d	3.03 ± 0.61 c	11.13 ± 1.49 b	5.52 ± 0.46 c	Depakin
543 ± 47.15 b	9.70 ± 1.75 ab	11.86 ± 1.62 ab	5.87 ± 0.20 bc	Extract + depakin

Means ± SD

As indicated in the columns, differences between a, b, and c are significant ($p < 0.05$).**Table 3:** Effect of alcoholic extract for *Laurus nobilis* leaves on Lipid Profile (cholesterol, triglyceride, HDL, LDL, and VLDL) in Rat Treated with Depakin drug.

VLDL (mg/dL)	LDL (mg/dL)	HDL (mg/dL)	Triglyceride (mg/dL)	Cholesterol (g/L)	Parameters groups
25.03 ± 0.50 b	87.53 ± 2.70 ab	23.40 ± 1.05 c	124.66 ± 2.52 b	89.00 ± 3.0 a	Control
20.03 ± 0.42 c	78.76 ± 7.04 bc	32.47 ± 1.26 a	99.67 ± 2.08 c	66.33 ± 5.85 b	Extract
26.10 ± 0.20 a	93.80 ± 2.16 a	25.23 ± 1.68 bc	130.00 ± 1.00 a	94.67 ± 2.51 a	Depakin
18.46 ± 0.55 d	77.54 ± 5.31 c	27.34 ± 2.35 b	92.00 ± 2.64 d	68.67 ± 6.65 b	Extract +depakin

Means ± SD

As indicated in the columns, differences between a, b, and c are significant ($p < 0.05$).

a significant increase in HDL levels compared to the control.

DISCUSSION

Depakin (Sodium valproate) treatment results were accompanied by a notable increase in body weight among other healthy subjects who had undergone the treatment with the drug for 4 weeks. The increase in body weight caused by the drug's mechanism is not understood; energy input and energy output balance affect the body weight; As a result, the drug may alter either energy input, physical activity (PA), or energy output. Changes in energy input or output may result from or be related to changes in biological functions such as hormone levels. In vitro studies show that the drug stimulates pancreatic insulin secretion, increasing hunger and energy storage, resulting in weight gain. 20 Drug treatment has been developed to increase postprandial insulin and proinsulin levels.²¹

The alcoholic extract of the Bay leaves causes the body weight to decrease significantly since it contains various bioactive compounds, including flavonoids and alkaloids, which act as anti-hyperglycemic that restores blood glucose levels to standard range and boosts glycogenesis activity by improving glucose uptake by cells. These findings follow the results of this research paper.²²

Depakin drug chemical substance acts as an immune system suppressant, which leads to a decrease in the level of (PLT, WBC, HB, and RBC). The causes of that condition are linked to vitamin B12 and folic acid deficiency.²³ Although, after treating the subjects with the alcoholic extract the level of (PLT, WBC, HB, and RBC) increased slightly due to the anti-oxidant effect in the extract of *Laurus nobilis* leaf, which acts as free radicals scavenger, which is responsible for distorting all the blood cells.²⁴

This study found that subjects treated with the alcoholic *Laurus nobilis* leave extract had lower levels of cholesterol, TG, LDL, and VLDL. Table 3, the best explanation for this condition is that it may be caused by flavonoids, polyphenols, and the extracted substances from *Laurus nobilis* leaf, which played a significant role in managing lipids profile. One of the most complicated types of diabetes is hyperlipidemia, which is responsible for neurological disorders, the formation of atherosclerosis and cardiovascular diseases, and more severe complications.²⁵ This treatment also resulted in a decrease in the cholesterol and triglycerides value. This effect may be due to inhibiting triglycerides secretion from the liver into the blood,²⁶ reducing the activity of lipases enzyme and decreasing cholesterol level,²⁷ as well as reducing the concentrations of triglycerides, cholesterol, and low-density lipoprotein, which might be related to the effect of laurel leaves in reducing liver enzymes that are responsible for producing fatty acids or related to the inhibition of Acetyl-CoA Synthetase, which is an essential enzyme to the synthesis of fatty acids.²⁸ Low dense LDL particles are more vulnerable to oxidation, which might be due to enhanced uptake of macrophages.²⁹ These findings show that the anti-oxidant activity of *Laurus nobilis* may play a preventive function in cataract development risk. The active components of *Laurus nobilis* leaves which are being studied. The main components of the 81 active compounds that account for 98.74 per cent of the total oil of *Laurus nobilis* are monocyclic monoterpenes such as 1.8-cineole, alpha-terpinyl acetate (8.82 %), and terpinene-4-ol (4.25%).³⁰

CONCLUSION

In accordance with the findings of this study, we concluded that the alcoholic extract of *Laurus nobilis* decreased the body weight and blood lipid profile (Cholesterol, triglyceride, LDL) levels.

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