



Effect of aquatic and alcoholic extracts *Nigella sativa* seeds on liver and kidney functions and efficacy in the blood of males albino rats

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Introduction

Since the beginning of human life, medicinal plants have been used as Kadawis [1]. The inscriptions and antiquities revealed to the ancient civilizations, including Egyptian, Babylonian, Persian and Roman, showed evidence of the adoption of skilled doctors to study the plants and used them in the treatment of their patients [2]. At present, there is great interest in the use of plants as a treatment for their adverse effects, and the use of plant supports has increased significantly during the past three decades because medicinal plants are available, cheap and easy to use [3]. And plants have always been the main source of nutrition human and animals, in recent years there has been increasing interest in alternative treatment and therapeutic use of natural products [4]. Despite the trend towards industrial medicine, the use advanced drugs, treatment of traditional plant legumes still plays an important role in world medicine [5]. And that 80% of the world population use the basis of their treatment plant as a basic component of health care and the global market of herbal medicine [6]. *Nigella sativa*, a family-owned family of Ranunculaceae, has been used to improve health and treat diseases for centuries, especially in the Middle East, Southeast Asia [7]. Which have a high concentration on several traditional uses and

Abstract

The study carried out to investigate the effect of orally feeding from each *Nigella sativa* aqueous and alcoholic extracts at 50 and 100 mg/kg concentration of animal body weight liver and kidney functions parameters in male rats for 21 days. Randomly divided in to (5) groups, each group included (5) animals. The results showed a significant decrease ($p < 0.05$) in Urea, ALP, ALT and AST. led to a significant increase ($p < 0.05$) in total protein, albumin, globulin with the increased concentration of extract, when compared with values in control group. The study concluded that, the aquatic and alcoholic extracts *Nigella sativa* seeds did not give any effects toxicity on liver and kidney functions in male rats.

therapeutic properties [8]. The therapeutic wands of the black bean are attributed to several active compounds and compounds including proteins, amino acids, carbohydrates, fiber, oils (fatty acids, especially polyunsaturated fatty acids, volatile oils, metals, alkaloids, flavonoids, Other vehicles [9]. The most effective compounds are Thymoquinone and Di-Thymoquinine [10]. It is used as a residue, diuretic, immune enhancer, preservative for stress, anti (for cancer, bacteria, tumor, fungal, oxidation and diabetes)[11]. The objective of the study was to determine the effect of black seed and hydrolysis seeds in protecting the liver and kidneys of male white rats.

Materials and methods

Collection and preparation of samples: Black seed was obtained from local markets and was diagnosed by specialists and was fresh and dry, It was cleaned from foreign materials and then grinded with a national electric blender (Japan) for a fine powder.

Detection of active compounds in black seed extract:

Both of the following active compounds were detected as reported in [12].

Resins- Saponins- Tannins - Glycosides- Alkaloids- Coumarin- Flavonoids- Phenols.

Preparation of black bean seed extracts:

Aqueous extract: The aqueous extract was obtained using a method [13], 100 g of black seed powder was weighed in an analytical balance, In a flask add 200 ml of distilled water and leave for 24 hours in the refrigerator after stirring, The treatment was then mediated by the medical gauze. The washing process was then returned using 100 mL of distilled water and the filtration was returned. The washing and re-filtration process was then repeated, using 50 mL distilled water. Vaporizer display for evaporation using rotary vapor evaporator, supplied by Heidolph, Germany, At 70 ° C until a concentrated liquid is obtained. Finally, the center is placed in plastic containers that are known as freezing at 20 ° C until use.

Alcoholic Extract: Alcohol was extracted in the same way as the previous method, except for distilled water with ethanol at 95% concentration and at 40 ° C in the rotary evaporator

Animals used in the study: Rattus norvegicus of the (Sprague dawely) (200-220 g), obtained from the National Center for Control and Research in Baghdad, randomly divided the animals into 5 groups containing each group 5 animals. It was placed in metal cages with metal covers and dimensions (19 x 25 x 21 cm), with a floor covered with sawdust. The cages cleaning and sterilization were taken care of with crosswise switch every two days. The animals were subjected to laboratory conditions from a light cycle divided into 12 light hours and 12 hours of darkness. The temperature was set at 22 ± 2 ° C. The animals were left for two weeks to adapt to the new conditions and to make sure they were free from disease. The animals were fed to the fodder consisting of 35% wheat, 34% yellow corn, 20% soybean, 10% animal protein, 1% powdered milk and 50g preservatives and antifungal substances. adlibitum) and in sufficient quantities throughout the breeding and treatment of animals. The oral extracts were injected using tubular feeding, and for 21 days. The distribution of experimental totals was as follows:

- 1- Group control
- 2- The aqueous extract group was administered at a concentration of (50 mg / kg body weight). The dose was 2 ml twice a day, morning and evening
- 3- The aqueous extract group was injected with a concentration of 100 mg / k body weight. The dose was 2 ml twice day, morning and evening
- 4- The extract of alcohol extract was administered at a concentration of 50 mg / kg body weight. The dose was 1 ml twice a day, morning and evening.
- 5- The extract of alcohol was administered at a concentration of 100 mg/ kg body weight. The dose was 1 ml twice a day, morning and evening.

Get blood samples: After 21 days, the animals were hungry for 10 hours and then weighed by chloroform. The blood samples were then removed by cutting the jugular vein in the neck, collecting about 6-8 ml of

blood. Test tubes free of anticoagulant left for about a quarter of an hour in a water bath at 37 ° C until coagulation, And then placed in the centrifuge for 15 minutes at 3000 cycles / minute, and the serum was withdrawn by micro-pipette and placed in new plastic tubes and clean (Plane tubes) and kept at -20 (m) until the conduct of special biochemical tests, which include both urea, protein Albumin, ALT, ALP, AST and using several standard solutions (Kits) manufactured by BIOLABO SA, France [14]. The Determination globulin in blood serum according to the following equation [15].

Concentration of globulin (g/dl) = Total protein Conc. – Albumin Conc.

statistical analysis:

The results were analyzed statistically and using SAS, 2001, according to one-way analysis of variance. The mean of the coefficients of the coefficients were tested using the Duncun multiple rang test at a significant level (0.05) to determine the significant differences between the aggregates [16].

Results and discussion

Table (1) shows the results of the chemical detection of extracts of black aqueous and alcohol seeds, containing resins, sapphones, tannins, alkaloids, clicosides, phenols, flavons and coumarin. These results are consistent with what he said [17]. Table (2) shows that the effect of the oral dose of black seed aqueous extract at concentrations of 50, 100 mg / g bw in the blood of male rats for 21 days, Resulted in a significant decrease ($p < 0.05$) in the values of urea, And a significant increase ($p < 0.05$) in the values of total protein, albumin and globulin increased the concentration of the water extract compared with the control group values. The reduction of urea was agreed with what he mentioned [18] When using the black bean extract at a concentration of 0.5mg for 25 days in the chicken chicks. The oral dose of black seed extract with concentrations of 50, 100 mg / g body weight in the blood of male rats for 21 days resulted in a significant decrease ($p < 0.05$) in urea values, And a significant increase ($p < 0.05$) in the values of total protein, albumin, and globulin increased concentration of the extract compared to the values of control group table (3). That the reason for the decrease in urea may be due to the content of black seed on phenolic compounds, which is a powerful antioxidant that works to reduce oxidative damage to the liver and kidney and maintain the renal function. The increase in protein and albumin can be attributed to black seed protein content of amino acids that help build albumin protein, The high concentration of albumin in the blood may be due to the high concentrations of phenolic compounds, Caffeic acid, as well as the classics, flavonoids and vitamin E, all of which reduce oxidative stress by removing free radicals (ROS, RNS), thereby inhibiting protein oxidation of its consumption as an antioxidant and stimulates the activity of antioxidant

enzymes such as catalase catalysts that protect cells and tissues from oxidative damage [19; 20].

Table (4) shows that the effect of the oral dose of black seed extract at concentrations of 100, 50 mg / kg bw in the blood of male rats for 21 days, led to a significant decrease in the values of ALP, ALT and AST by increasing the concentration of the extract compared with the values of the control group. These results were agreed with [21] who used black seed powder concentrations (0.01g/kg, 0.2g/kg, 1g/kg) for 28 days resulting in reduced enzyme effectiveness.

Table (5) shows that the effect of the oral dosage of extract of black bean seeds at concentrations of 50, 100 in the blood of male rats for 21 days, led to decrease values ALP, ALT, AST by increasing

concentration of the extract compared with the values of the control group.

The oral dosage of black bean seed extracts didn't give any toxic effects in liver function of rats evaluated by enzyme activation values, the effects of protecting the liver may come from containing the seeds of the black bean on some active compounds hymoquinone, monoterpenes, tocopherols, phytosterols and phenols.

The pharmacologic properties of the seeds of the same pill are some effective compounds such as volatile oils and thymoquinone which have a protective effect against hepatotoxicity and kidney nephrotoxicity induced by some toxins or anti-cancer drugs [1]. either some other compounds may have tocopherols, phytosterols and phenols [22].

Table (1) Type of active compounds found in the aqueous and alcohol extracts of the black bean.

Type of sample	Type of extract	Resins	Saponins	Tannins	Glycosides	Alkaloids	Coumarin	Flavonoids	Phenols
Black seed	aqueous	+	+	+	+	+	+	+	+
	alcoholic	+	+	+	+	+	+	+	+

Table (2) Effect of aqueous black seed extract in the blood proteins of male rats.

Type of transaction	concentration	Measured Standards (g/dl)			
		Urea (mg/dl)	Total protein	Albumin	Globulin
the control	zero	51.00 a 0.57±	6.93 c 0.31±	3.85 c 0.11±	3.08 c 0.34±
aqueous extract (mg / kg body weight)	50	47.00 c 0.37±	9.00 b 0.03±	4.50 ab 0.28±	4.50 ab 0.20±
	100	45.66 b 0.88±	9.70 a 0.20±	4.90 a 0.28±	4.80 a 0.11±

The figures followed by vertically different letters mean that there are significant differences at the probability level ($P \leq 0.05$).

Table (3) Effect of black seed alcohol extract in the blood proteins of male rats.

Type of transaction	concentration	Measured Standards (g/dl)			
		Urea (mg/dl)	Total protein	Albumin	Globulin
the control	zero	51.00 a 0.57±	6.93 c 0.31±	3.85 c 0.11±	3.08 c 0.34±
alcoholic extract (mg / kg body weight)	50	46.66 b 0.88±	8.00 b 0.11±	4.10 ab 0.44±	3.90 b 0.57±
	100	44.66 c 0.33±	9.00 a 0.21±	4.60 a 1.52±	4.40 a 0.88±

The figures followed by vertically different letters mean that there are significant differences at the probability level ($P \leq 0.5$).

Table (4) Effect of aqueous black seed extract the activity of blood enzymes of male rats.

Type of transaction	concentration	IU/L (Measured Standards		
		ALP	ALT	AST
the control	zero	145.00 a 0.57±	34.00 a 1.51±	44.00 a 1.66±
aqueous extract (mg / kg body weight)	50	142.00 b 0.44±	33.66 a 0.68±	41.66 b 0.16±
	100	139.00 c 0.34±	32.33 b 0.31±	39.00 c 0.28±

The figures followed by vertically different letters mean that there are significant differences at the probability level ($P \leq 0.05$).

Table (5) Effect of black seed alcohol extract in the activity of blood enzymes of male rats.

Type of transaction	concentration	IU/L)(Measured Standards		
		ALP	ALT	AST
the control	zero	145.00 a 0.57±	34.00 a 1.51±	44.00 a 1.66±
alcoholic extract (mg / kg body weight)	50	141.66 b 0.47±	32.33 b 0.88±	42.66 b 0.16±
	100	137.00 c 0.33±	31.33 c 0.31±	38.00 c 0.28±

The figures followed by vertically different letters mean that there are significant differences at the probability level ($P \leq 0.05$).

Reference

- [1] Ali, B.H. and Blunden, G. (2003). Pharmacological and toxicological properties of *Nigella sativa*. *Phytother Res.* 17:299-305.
- [2] Shams al-Din, Ahmed (2000). Medications with herbs and plants, ancient and modern. Scientific Books House Beirut, Lebanon. P. 62-68.
- [3] Amin, K.A and Nagy, M.A. (2009). Effect of Carnitine and herbal mixture extract on obesity induced by high fat diet in rats. *Diabetology and Metabolic Syndrome*, 1-17.
- [4] Schwartsmann, G; Ratain, M.J; Cragg, G.M; Wong, J.E; Saijo, N; Parkinson, D.R; Fujiwara, Y; Pazdur, R; Newman, D.J; Dagher, R. and Di Leone, L. (2002). Anticancer Drug Discovery and Development throughout the World. *J. Clin. Oncol*, 20: 47s-59s.
- [5] Newman, D.J.; Cragg, G.M. (2007). Natural products as sources of new drugs over the last 25 years. *J. Nat. Prod.* ;70(3):461-77.
- [6] WHO. traditional medicine strategy 2002-2005. Geneva: World Health Organization; 2002.
- [7] Sayed, M.(1980). Traditional medicine in health care. *J. Ethnopharmacol* ; 2:19-22.
- [8] Shrivastava, R.M; Agrawal, R.C. and Parveen, Z.J. (2011). A review on therapeutic applications of *Nigella sativa*. *J. Chem. Chem. Sci.* ; 1:241-8.
- [9] Ali, K; Hasanah, M; Ghazali, A; Yassoralipour, Y. and Ali, G. (2011). Physicochemical characteristics of nigella seed (*Nigella sativa L.*) oil as affected by different extraction methods. *J. Am. Oil Chem. Soc.* ; 88:533-40.
- [10] Daba, M. and Abdel-Rahman, M. (1998): Hepatoprotective activity of thymoquinone in isolated rat hepatocytes. *Toxicol Lett*, 95: 23-29.
- [11] Al-Logmani, A. and Zari, T. (2011). Long-term effects of *Nigella sativa L.* oil on some physiological parameters in normal and streptozotocin-induced diabetic rats. *Journal of Diabetes Mellitus*, 1: 46-53.
- [12] Shihata, I.M. (1951). A pharmacological study of *Anagallis arvensis*. M. D. Vet. thesis, Cairo Univ .
- [13] Harborne, J.B. (1984). *Phytochemical Methods, A guide to modern techniques of plant analysis*. 2nd. ed. Chapman and Hall Ltd. , London.
- [14] Al-Janabi, Qassem Aziz Razouqi. (2008). A study of the effect of water extracts of grape seeds on the oxidative stress of hydrogen peroxide in male rats. Master Thesis, Faculty of Education, University of Tikrit.
- [15] Tietz, N.W. (1987). *Fundamentals of clinical chemistry*. W.B. Saunders Co, Philadelphia, USA. Pp: 940.
- [16] Tietz, N. W. (1999). *Text book of clinical chemistry*, 3rd Ed. C. A. Burtis, E. R. Ashwood. W.B. Saunders; 826-835.
- [17] Gilani, A.H; Jabeen, Q. and Asad Ullah Khan, M. (2004). A review of medicinal uses and pharmacological activities of *Nigella sativa*. *Pak. J. Biol. Sci.* ; 7 (4): 441-451.
- [18] Ahmed Khan, T; Noman Khan, M; Hasan, R; Fatima, H. and Kousar, E. (2013). Effects of *Nigella sativa* (Black Seed) on Serum Levels of Urea and Uric Acid in Acetaminophen Induced Hepatotoxicity of Commercial Layer Chickens. *J. World's Poult. Res.* 3(4): 89-92.
- [19] Mann a, C; Migliardi, V; Sannino, F; DeMartino, A. and Capasso, R. (2005). Protective effects of synthetic hydroxytyrosol acetyl derivatives against oxidative stress in human cells. *J. Agric. Food Chem.* 53: 9602-9607.
- [20] Roche, M; Dufour, C; Loonis, M; Reist, M; Carrupt, P.A. and Dangles, O. (2009). Olive phenols efficiently inhibit the oxidation of serum albumin-bound linoleic acid and butyrylcholine esterase. *Biochimica et Biophysica Acta General Subjects.* (4): 240-248.
- [21] Dollah, M.A. ; Parhizkar, S. ; Latiff, L.A. and Hassan, M.H.B. (2013). Toxicity effect of *Nigella sativa* on the liver function of rats. *Adv Pharm Bull*; 3(1):97–102.
- [22] Ramadan, M.F; Kroh, L.W. and Morsel, J.T. (2003). Radical scavenging activity of black cumin (*Nigella sativa l.*), coriander (*Coriandrum sativum l.*), and niger (guizotia abyssinica cass.) crude seed oils and oil fractions. *J. Agric. Food Chem.* ;51(24):6961-9.

تأثير مستخلصات بذور الحبة السوداء المائية والكحولية في وظائف وفعالية الكبد والكلى لذكور الجرذان البيض

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الملخص

أجريت هذه الدراسة لمعرفة تأثير التجرع الفموي لمستخلصات بذور الحبة السوداء *Nigella sativa* المائية والكحولية بتركيز (50 و 100 ملغم/كغم من وزن الجسم) في وظائف وفعالية الكبد والكلى لذكور الجرذان البيض لمدة 21 يوماً، وزعت الحيوانات إلى خمسة (5) مجاميع ضمت كل مجموعة خمسة (5) حيوانات وبأوزان متقاربة، اظهرت نتائج التجرع الفموي بالمستخلصات المائية والكحولية حصول انخفاض معنوي ($P<0.05$) في قيم كل من اليوريا، ALP، ALT و AST. كما ادى الى حصول ارتفاع معنوي ($p<0.05$) في قيم كل من البروتين الكلي والاليومين والكلوبيولين مع زيادة تركيز المستخلصات (50 و 100 ملغم/كغم من وزن الجسم) مقارنة مع قيم مجموعة السيطرة. يستنتج من الدراسة ان مستخلصات بذور الحبة السوداء المائية والكحولية لم تعطي اي تأثيرات سمية على وظيفة كبد وكلى ذكور الجرذان البيض.