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STUDY THE ENHANCE ROLE OF GARLIC AND CURCUMIN ON HEMATOLGICAL PARAMETERS IN MALE RABBITS

Fayrouz A. Khaled*[1] and Rouaida A. Qataf[1]

[1*]Department of Chemistry, Faculty of Science, Omar Al-Mokhtar University, El -Beida-Libya.

ABSTRACT

Garlic *(Allium sativum)* is an essential vegetable listed in the most top twenty important vegetables, with various uses throughout the world, traditional use as either as raw vegetable for cooking, additionally Garlic play an important role throughout history as a treatment for many disease in traditional and modern medicine. The importance of Garlic and its effect treatment for many disease and disorders comes from that it has richest sources of total phenolic compounds among the usually consumed vegetables, where as highly ranked regarding its contribution of phenolic compounds in human diet. Curcumin, is a major essential compound constituent of turmeric, due to its antioxidant properties and effect, it has a various biological activities. The objective of this study was to evaluate the haematology of rabbits garlic and curcumin supplemented diets using 15 male rabbits garlic (1mg/kg BW) curcumin (40mg/kg BW), were orally administered by gavage alone or in combination. The examined doses were given to rabbits each other day. Results indicated that treatment with garlic and curcumin did not affect red blood cells (RBC), white blood cells (WBC), platelet count (PLT), hemoglobin (Hb), mean cell volume (MCV) and finally the mean cell of hemoglobin (MCH) and mean cell hemoglobin concentration (MCHC). On the other hand increase RBC, WBC, PLT, Aim: The overall aim of this research was to ascertain the comparative of the garlic and curcumin on hematolgical parameters of male rabbits.

KEYWORDS

Garlic, Curcumin, Hematolgical parameters and Rabbits.

Author for Correspondence:

Fayrouz A. Khaled,
Department of Chemistry,
Faculty of Science, Omar Al-Mokhtar University,
El -Beida-Libya.

Email: fayalzobair@yahoo.com

INTRODUCTON

Researchers are seeking out for secure choices: for illustration, phytobiotics, non-antibiotic prophylactics, and characteristic items for making strides execution of creatures. A few considers have been examined the advantageous impacts of garlic on human and creatures, as antimicrobial, antiviral, antiparasitic and antioxidant properties[1]. The lion's share of fundamental oils includes blends of

phenolics and polyphenols, terpenoids, saponines, quinine, esters, flavone, flavonoids, tannins, alkaloids and nonvoltiles buildups; be that as it may their concentration is variable. These compounds have numerous benefical impacts as antimicrobial, stomach related framework, chemical stimulators cancer prevention agents, anticoccidail and for improve utilization of supplements by improving assimilation, assimilation and liver function[2].

The benefits of garlic, for human, incorporate lessening the overall plasma cholesterol, blood weight and platelet conglomeration[3]. Natural products of animals, plants and microbial sources have been used by man for thousands of years either in the pure forms or crude extracts to treat many disease[4]. Garlic (Allium sativum L.) is one of those plants that were genuinely explored over a few a long time and utilized for centuries to battle irresistible maladies[5].

The ordered position of garlic and related genera had been a matter of discussion for long period of time. The foremost later classification plot of garlic was lesson Liliopsida, subclass Liliidae, super order Liliianae, arrange Amaryllidales, family Alliaceae, subfamily Allioideae, tribe Allieae and class Allium which is primarily based on the groupings of atomic ribosomal DNA[6]. Garlic (Allium sativum) has been a subject of considerable interest as a medicinal and therapeutic agent worldwide since ancient times[7]. Main pharmacological effects of garlic are attributed to its organo sulfur compounds[8]. Allicin - the main bioactive component of garlic - may account for some effects of garlic[9]. *In vitro* studies have shown that garlic possesses antibacterial, antifungal, antiparasitic, antiviral and antioxidant properties[10]. It has benefits in lowering total plasma cholesterol, reducing blood pressure and decreasing platelet aggregation[11]. Also[12] reported that garlic supplementation by 0.25% delivered critical ($P < 0.05$) impacts on weight pick up, bolster admissions and nourish transformation proportion and signifcantly upgraded the hematological parameters of rabbits as well. Turmeric (Curcuma longa) may be a the rapeutic plant broadly utilized and developed in tropical districts. Plant extricates were found to have antifungal, imunomodulatory and antioxidative[13,14] as well as antimutagenic exercises[15].

Turmeric powder is a rich source of beneficial phenolic compounds: The curcuminoids, where three main curcuminoids, curcumin, demethoxycurcumin and bisdemethoxycurcumin 16 have been isolated from turmeric. Supplementation of turmeric powder at 0.20 and 0.40g/kg to the commercial diet for rabbits positively affected the body weight gain in rabbit does[17]. On the other hand[18] noted that dietary inclusion of turmeric powder at 0, 0.15 and 0.30% had no beneficial impacts on blood parameters and meat characteristics of growing rabbits reared under summer stress. In any case, data around ideal level of garlic and turmeric powder as development promoters and common cancer prevention agents in developing rabbit is rare. Therefore, the aim of this study was to evaluate the potential of increasing levels of garlic and turmeric powder as phytogenic additives on growth performance, carcass characteristics, serum biochemical metabolites and antioxidant enzyme activities in growing rabbits.

MATERIAL AND METHODS

In this study, the effect of garlic and curcumin on hematological parameters, biochemical indices of male rabbits were investigated. Garlic and curcumin was purchased from were purchased from public market for medicinal herbs in Al-Bayda city.

Mature male New Zealand White rabbits age of 6 months were used. Animals were individually housed in cages and weighed weekly throughout 6-weeks experimental period. Feed and water were provided ad libtum. Rabbits fed pellets which consisted of 30% berseem (Trifolium alexandrinum) hay, 25% yellow corn, 26.2% wheat bran, 14 % soybean meal, 3% molasses, 1% CaCl2, 0.4% NaCl, 0.3% mixture of minerals and vitamins and 0.1% methionine. The vitamin and mineral premix per kg contained the following IU/gm for vitamins or minerals: vit A-4000,000, vit D3-5000, 000, vit E-16,7g, K0.67g, vit B1-0.67g, vit B2-2g, B6-0.67g, B12-0.004g, B5-16.7g, Pantothinc acid-6.67g, Biotein-0.07g, Folic acid-1.67g, Choline chloride 400g, Zn-23.3g, Mn-10g, Fe-25g, Cu-

1.67g, I-0.25g, Se-0.033g and Mg-133.4g (Rabbit premix produced by Holland Feed Inter. Co.). The percentage of pellets contents were confirmed by chemical analysis as follows[19]: they contained 15.8% crude protein, 11.3% crude fiber, 3.7% ether extract, 7.2% ash, 92.9% organic matter and 62.4% nitrogen free extract % as DM basis. Fifteen mature male rabbits were randomly divided into four equal groups (each three rabbits) as follows: - Group I: Rabbits were used as control daily for 6 successive weeks. Group II: Rabbits were treated with garlic. Garlic was given daily by gavage at a dose of 40mg/kg B.W[20] which dissolved in corn oil for 6 successive weeks. - Group III: Rabbits were treated daily with curcumin by gavage at a dose of 1mg/kg B[21]. The blood samples were collected in two tubes: one containing EDTA (anti-coagulant) and the other containing Heparin (anti-coagulant). EDTA was utilized to look at non coagulated blood in no time after collection by Molecule counter (from ERMA INC.-Tokyo. Model PCE-210) for measuring total leukocyte counts (TLC), total erythrocyte count (TEC), platelet count (PLT), haemoglobin (Hb), packed cells volume (PCV), mean cell volume (MCV), mean cell haemoglobin (MCH) and mean cell haemoglobin concentration (MCHC). Statistical analysis, Data were analyzed according to[22]. The statistical indication values of the results for both control and treated animals was calculated by F test with 5% significance level. Data of the present study were statistically analyzed by using Duncan's Multiple Range Test[23].

RESULTS AND DISCUSSION

Table No.1 and Figures No.1 to Figure No.7 represent the hematological parameters of male rabbits treated with garlic and curcumin. Results indicated that treatment with garlic and curcumin did not affect red blood cells (RBC), white blood cells (WBC), Haematocrit (HCT), platelet count (PLT), hemoglobin (Hb), mean cell volume (MCV), mean cell hemoglobin (MCH) and mean cell hemoglobin concentration (MCHC). On the other hand increase RBC, WBC, PLT, Hb, MCV, MCH, and MCHC.

Table No.1. Changes in red blood cells (RBC), white blood cells (WBC), haematocrit (HCT), platelets count (PLT), hemoglobin (Hb), mean cell volume (MCV), mean cell hemoglobin (MCH) and mean cell hemoglobin concentration (MCHC) of male rabbits treated with garlic and curcumin.

Discussion

Garlic for many years ago has been known as medicinal treatment in folk and modern medicine not just only for culinary. The utilize of garlic could be as raw vegetable (fresh leaves or dried cloves), or after processing in the form of garlic oil, garlic extracts and garlic powder .Each forms of theses have differences chemical composition and bioactive compounds content between the various sources[24].

The general increase in PCV, RBC, WBC and Hb of rabbits fed garlic and curcumin supplemented diets indicates that garlic and curcumin may contain blood forming factors that may cause increase the blood production by the rabbits fed supplemented diets than those fed unsupplemented diets. Previous research suggests that these herbs may have a vital role in boosting the immune system of the rabbits. Garlic treatment increased the number of RBCs, WBCs counts and Hb concentration in male rabbits[25]. Garlic significantly prevented the reduction of RBCs caused by lead intoxification in rabbits. However[26] *et al* reported that rabbits treated with garlic showed insignificant reduction in RBCs count[27]. Suggested that garlic contains some constituents that may play a role in the work of organs related to blood cell arrangement such as thymus, spleen and bone marrow to invigorate more blood generation. In expansion[28], proposed garlic compounds might have a stimulatory impact on a few haematopoetic development components (cytokines) which connected with particular receptors on the surface of haematopoietic cells, controlling the expansion and separation of forebear cells and the development and working of develop cells. The mechanism of garlic chemical components results from active oxygen scavenger competes with hemoglobin in the RBCs for oxygen resulting in tissue hypoxia, which in turn stimulates the kidney to form and secrete erythropoietin. The

end-product of metabolism of garlic in the body may also step up Hb synthesis and RBC production by their indirect effect on erythropoietin[27]. Also, garlic contain natural sulfur compounds which act as antioxidant active substances that implies the antioxidant action of garlic sulfhydryl groups on RBCs counts[29].

Moreover[30], reported that several vitamins like vitamin B1, B2, B6, B9, C and E are present in garlic have a role in RBCs formation, maturation and in hemoglobin biosynthesis, absorption and utilization. For more, the effect of garlic on WBCs count[12], indicated garlic treatment might help in boosting the immune system of the rabbits[31]. suggested the anti-infection properties of garlic that stimulate immune functions. Also, garlic possess some important phytochemicals such as flavonoids, steroidal glycosides, alkaloids, saponins, tannins, phenolics, pectin and amino acids, with their biological and physiological roles to stimulate the immune system and organs related to blood cell formation particularly the bone marrow[32]. On other hand, the reported studies about Curcumin in turmeric suggested the ability of turmeric to accelerate the emulsification of fat by stimulating the production of bile[33] so that the digestion of fat will be more optimal. Optimized fat digestion will indirectly increase the provision of substrates for ß-oxidation or fat metabolism which eventually enhances the production of succinyl-CoA through Krebs metabolic cycle[34]. Considering succinyl-CoA is one of the materials needed for hemoglobin (heme in particular) synthesis[35], enhanced succinyl-CoA production was therefore most likely to be followed by the increase of hemoglobin synthesis. The principal component of erythrocytes is hemoglobin, which makes up about one-third of the erythrocytes content[36].

Hence, improved hemoglobin concentration due to turmeric extricate ought to be taken after by the improved erythrocytes concentration. Hematocrit measures the rate of the volume of entire blood that's made up of ruddy blood cells[36]. Hematocrit is emphatically influenced by ruddy blood cells concentration within the blood. Thus, alongside with the concentration of erythrocytes, turmeric having significant effect ($P \leq 0.05$) on hematocrit level (Table No.4) could be accepted. In disagreement with the present results[37], showed that turmeric and cinnamon either alone or together did not change levels of hematocrit. Similarly[38], the reported results showed almost no changes in hemoglobin and hematocrit values of broilers fed up to 8g/kg turmeric powder. The normal PCV indicates the absence of normocytic anemia which is reportedly characterized by normal MCV and MCH and only detected by a decreased number of RBCs or PCV[39]. The result is corroborated by the normal RBCs which further elucidated the absence of hemolytic anemia and depression of erythrogenesis. The normal hemoglobin concentration for all the experimental rabbits is probably an indication that these feed additives supplement supported hemoglobin synthesis[40], is among other factors, primarily affected by protein intake or may be due to iron deficiency and its improper utilization for the formation of hemoglobin[41,42]. Explained the relationship between normal range of Hb values and the vital physiological of hemoglobin with oxygen during transport gases (oxygen and carbon dioxide) to or from the tissues of the body and how has been stay constant and at normal level all the study time.

Table No.1

S.No	Parameter	Control	Garlic	Curcumin
1	RBC $\times 10^6$ (µl)	6.47± 0.050 [a]	6.26± 0.105 [ab]	6.05± 0.109 [b]
2	WBC $\times 10^3$(µl)	8.59± 0.13 [a]	8.48± 0.20 [ab]	7.89± 0.24 [b]
3	HCT$\times 10^3$(µl)	40.45±0.264 [a]	41.08± 0.477 [b]	42.56± 0.329 [b]
4	PLT $\times 10^3$(µl)	287.97±5.826 [a]	468.19±22.194 [b]	326.88± 7.550 [b]
5	Hb (g/dl)	12.62± 0.13 [c]	13.36±0.18 [b]	14.16± 0.15 [a]
6	MCV (fl)	68.43 ±0.40 [c]	72.86 ± 0.79 [b]	75.25 ± 0.60 [a]
7	MCH (pg)	22.55 ±0.13 [b]	24.20 ±0.51 [a]	23.19 ±0.51 [ab]
8	MCHC (dl)	33.10 ± 0.19 [a]	33.20 ± 0.077 [a]	32.59 ± 0.135 [b]

Values are expressed as means ± SE; n = 5 for each treatment group. Mean values within a row not sharing a common superscript letters (a, b, ab, c) were significantly different, $p<0.05$.

CONCLUSION

Treatment of rabbit with garlic and curcumin as verbal organization for 6 weeks enhance the hematological parameters.

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CONFLICT OF INTEREST

We declare that we have no conflict of interest.

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