Investigative Study Of The Hematological Effects Of Zingiber Officinale In Rabbits

Bahaa Ameen Abdul Hussien, Suha Allawi

Abstract: Background; Ginger has many effects in vitro and in animal experiments, like anti nausea and anti vomiting, also it has anti lipidemic activity.The present study aimed to evaluate the effect of ginger on blood cells and other hematological effects. **Material and methods**; 18 New Zealand rabbits subdivided into 3 groups each one consists from 6 rabbits, the once was control group (administered distilled water for 20 days), and the twice group (administered ginger extract 100% w\v for 20 days), and the third group (administered ginger extract 50% w\v for 20 days). **Results**; the ginger extract 100% was more effective in changing WBC count and HB concentration more than 50% and more than DW group, while ginger extract 50% also caused the change in WBC count and HB but less than that of 100% and more than that of DW.

Keywords: Ginger, RBC , WBC , PCV , HB

1. INTRODUCTION

1.1 Zingiber officinale (Ginger)

Medicinal Parts: The medicinal part is the root. Flower and Fruit: The flower scape grows directly from the root and terminates in a long, curved spike. [1]. A white or yellow flower grows from each spike. The Leaves, Stem and Root: Ginger is a creeping perennial on a thick tuberous rhizome, which spreads underground. In the first year, a green, erect, reed-like stem about 60 cm high grows from this rhizome. The plant has narrow, lanceolate to linear-lanceolate leaves 15 to 30 cm long, which die off each Year [2, 3] . The ginger Characterized by: The fracture is short and fibrous. The odor and taste are characteristic, aromatic and pungent. The plant is indigenous to southeastern Asia, and is cultivated in the U.S., India, China, the West Indies and tropical regions. Ginger root consists of the peeled, finger-long, fresh or dried rhizome of Zingiber officinale. [3, 4]. Ginger has many effects in vitro and in animal experiments, like anti nausea and anti vomiting , also it has anti lipidemic activity [4,5]. The present study aimed to evaluate the effect of ginger on blood cells and other hematological effects in the New Zealand rabbits, and also to detect which type of blood cells will increase or decrease in their number [6].

2 Materials and methods

2.1 Animals

A group of 18 female rabbits were kept in the same conditions of light, temperature, and the diet and water provided persistently in the animal house of veterinary medicine collage.

2.2 Extraction of ginger

The ginger was brought from local market it was fresh, and the dried under sunlight, after that it powdered by the blender, the powder amount was 500 gm which then directed to Soxhlet extractor apparatus (Bavco – Co. – Italy) with a suitable amount of ethanol for ethanolic extraction, when the extract completed the solvent evaporated with rotary evaporator (Bavco – Co. – Italy) to obtain the pure extract which dissolved in distilled water to obtain (100% w\v) ginger solution, also the stock solution (100%) was diluted to obtain 50% w\v) ginger solution.[7].

2.3 The experiment design

The rabbits divided into 3 groups each one consists from 6 rabbits, the once was control group (administered distilled water for 20 days), and the twice group (administered ginger extract 100% w\v for 20 days), and the third group (administered ginger extract 50% w\v for 20 days).

2.4 Parameters

That were estimated; WBC count, RBC count, PCV, and HB, the cell counting was done with Neubauer chamber cell counting, while PCV and HB measured with Reflotron system (Roche co. Germany). These parameters were evaluated for each group before to start the experiment to record the normal values, and then during the experiment at 1,5,10,15,20 day after administration.

2.5 Statistical analysis

After the data were collected they represented as (Mean ± SE), the significant differences between means were checked by Student's t-test (Paired t test). Results were considered statistically significant when ($P < 0.05$)[8].

3 Results

The results of ginger groups (50 and 100%) compared with DW group: The ginger extract 100% was more effective in changing WBC count and HB concentration more than that of 50% and more than DW group, while ginger extract 50% also caused the change in WBC count and HB but less than that of 100% and more than that of DW. (table 1,2) While there was no change in RBC count, and PCV. (table 3,4).

4 Discussion

The ginger has many physiological effects in the body[1,9], especially on the blood, the present study deals with the investigation what the plants to affect the body tissues, the results that appeared in present study revealed that ginger has a clear hematological effect especially on the WBC, and HB, while the RBC and PCV stay without change in either concentrations of ginger extract. The ginger extract 100% was more effective in changing WBC count and HB concentration more than that of 50% and more than DW group, while ginger extract 50% also caused the change in WBC count and HB but less than that of 100% and more than that of DW. The effect of 100% on WBC count started at 5th day which caused a significant difference comparing with 1st day after administration of extract, and effect become clear and more at the 10th , 15th, and 20th day after administration and there was a highly significant difference comparing to 1st day after administration, the WBC count was 7124±0.5. While in comparing to 50% group the 100% group exert a clear difference more than that in 50%, and there was a

highly significant difference at day 10th, 15th and 20th, and also was highly significant difference comparing to DW group. While 50% group caused a significant difference at 10th, and highly significant difference at 15th , 20th comparing to 1st day, and comparing with DW there was significant difference at 5th , 10th , while highly significant difference at 15th , 20th and the WBC count was 11300 ± 0.4. The effect of ginger extract 100% on HB also was clear and more than 50% and DW group. The ginger 100% caused an elevation in HB concentration in same group and caused a significant increase at 10th day, and highly significant increasing at 15th, 20th days in comparing with 1st day of administration, and it was 13.3. Also ginger extract 100% was more effective than 50% and there was significant difference at 15th, 20th day after administration. The HB in 100% group was more than that in DW and there was significant difference at 10th, 15th and highly significant at day 20th. The 50 exerted a significant increase in HB at day 15th and highly significant increase at 20th comparing to 1st day after administration and HB was 12.3. Also the 50 was more effective than DW and there was sig diff at day 15th, hs diff at day 20th of treatment. On the other hand the ginger extract was not exert any change on the RBC count and PCV in each concentrations, this leads to ensure that ginger not affect the blood viscosity and thickness[10], and not affect the blood flow,[10,11]. While its effect on WBC count is clear and caused a reduction in the total count, these reduction it can to be with benefit as immunosuppressant and as antinflamatory, and this character of ginger make it to use in cases of autoimmune diseases[12] , and inflammatory processes [10,12] . Its effect on HB which increasing effect in each concentrations, these activity of ginger can useful in case of anemia[11] , and in same time not change the blood viscosity by increasing the HB concentration , not affect the RBC count [10,11].

5 Conclusions

The ginger has safe and beneficial effect on the blood and can protect the body against anemia and autoimmune diseases.

6 Acknowlegement

A special thanks for the physiology stuff in Vet. Medicin college for their cooperation and assistance**.**

7 References

[1] Ginger wikipedia, free encyclopedia (2014).

[2] Ginger as an antiemetic in nausea and vomiting induced by chemotherapy; a randomized, cross-over, doubleblind study. Medind. Retrieved 2013-7-21

[3] Ernst, E.; & Pittler, M.H. (2000). "Efficacy of ginger for nausea and vomiting: a systematic review of randomized clinical trials" (PDF). British Journal of Anesthesia 84 (3): 367–371. doi:10.1093/oxfordjournals.bja.a013442. PMID 10793599. Retrieved 6 September 2006.

[4] Wood, C.; Pittler, MH (2000). "Comparison of efficacy of ginger with various antimotion sickness drugs". British journal of anaesthesia 84 (3): 367–71.

[5] Grøntved, A.; Pittler, MH (2000). "Ginger root against seasickness. A controlled trial on the open sea". British journal of anaesthesia 84 (3): 367–71.

[6] Malloy MJ. , and Kane JP. (2007): Agents used in Hyperlipidemia. In: Katzung B.G. Basic and Clinical Pharmacology. 9th ed. McGraw Hill. Boston Pp; 560-572.

[7] Soxhlet extractor, principles, From Wikipedia, the free encyclopedia (2014).

[8] Hill A.B. (1991): Brodford Hill's Principles of Medical Statistics. 12thed. Hodder and Stoughton. London. Pp. 78-84.

[9] Abd-Elraheem A. Elshater, Muhammad M. A. Salman and Mahrous M. A. Moussa (2009):Effect of Ginger Extract Consumption on levels of blood Glucose, Lipid Profile and Kidney Functions in Alloxan Induced-Diabetic Rats. South Valley University, Faculty of Science, Zoology Department Egypt. Acad. J. biolog. Sci., 2 (1): 153-162.

[10] Maralla, Swaroopa.; Kesireddy, Sathyavelu Reddy.; Wudayagiri, Rajendra (2012): Effect of ginger consumption on serum makers of general metabolism, liver and kidney functions and lipid profiles in ethanol induced withdrawal rats Journal of Pharmacy Research; Vol. 5 Issue 1, p485

[11] Modaresi, M. ; Dept. of Physiol., Islamic Azad Univ., Isfahan, Iran ; Mesri Pour, M. ; Zohrabi, D. (2012): The effect of Ginger (Zingiber officinale) on blood chemical parameter in mice, Chemical, Biological and Envi , 86-89.

[12] Carrasco FR, Schmidt G, Romero AL, Sartoretto JL, Caparroz-Assef SM, Bersani-Amado CA, Cuman RK (2009): Immunomodulatory activity of Zingiber officinale Roscoe, Salvia officinalis L. and Syzygium aromaticum L. essential oils: evidence for humor- and cell-mediated responses. J Pharm Pharmacol. Jul;61(7): 961-7.

Table 1 *coparison among the effect of ginger extract 100% , 50%, and DW group on WBC count*

Day	Ginger group 100%	Ginger group 50%	DW group	
1	15200±0.8	15230±0.5	15630±0.6	
5	14930±0.5 s*, ns#, s♠	15100 ±0.4 **ns*, s♠**	15630±0.6	
10	11618±0.5**hs*, hs#, hs♠**	14500±0.5 **s*, s♠**	15630±0.6	
15	7416±0.4 **hs*, hs#, hs♠**	13100±0.6 **hs*, hs♠**	15630±0.6	
20	7124±0.5 **hs*, hs#, hs♠**	11300±0.4 **hs*, hs♠**	15630±0.6	

Table 2 *coparison among the effect of ginger extract 100% , 50%, and DW group on hemoglubine HB*

Day	Ginger group100%	Ginger group50%	DW group	
1	10.5±0.02	10.4±0.01	10.4±0.02	
5	11.2±0.02 **ns*, ns#,ns♠**	10.6±0.02 **ns*, ns♠**	10.4±0.02	
10	11.8 ±0.01**s*, ns#, s♠**	11.00±0.01 **ns*, ns♠**	10.4±0.02	
15	12.5±0.03 **hs*, s#, s♠**	11.5±0.03 **s*, s♠**	10.4±0.02	
20	13.3±0.02 **hs*, s#, hs♠**	12.3±0.02 **hs*, hs♠**	10.4±0.02	

S=significant difference (p<0.05).
NS=non significant difference (p>0.05).
HS=highly significant difference (p<0.01).
(*= comparing in the same group).
(#=comparing between ginger 100% and ginger 50% group).
(♠=comparing to distilled water group).

Table 3 *effect of ginger extract on RBC count*

Day	Ginger group100%	Ginger group50%	DW group	
1	4670000 ±0.7	469000±0.5	4880000±0.5	
5	4670000 ±0.7	469000±0.5	4880000±0.5	
10	4670000±0.7	469000±0.5	4880000±0.5	
15	4670000±0.7	469000±0.5	4880000±0.5	
20	4670000±0.7	469000±0.5	4880000±0.5	

There is no difference.

Table 4 *effect of ginger extract on PCV*

Day	Ginger group100%	Ginger group50%	DW group	
1	33.3±0.07	33.3±0.07	33.4±0.07	
5	33.3±0.07	33.3±0.07	33.4±0.07	
10	33.3±0.07	33.3±0.07	33.4±0.07	
15	33.3±0.08	33.3±0.07	33.4±0.07	
20	33.3±0.07	33.3±0.07	33.4±0.07	

There is no difference.