

Haematological and Biochemical Changes in Sheep Associated with Low Dose Feeding of *Anagallis Arvensis*

Abdul-Aziz M. Al-Mujalli

Dept. of Clinical Studies, College of Veterinary Medicine and Animal Resources,
King Faisal University Al-Ahsa, Saudi Arabia

Abstract:

In this study the hematological and biochemical blood constituents of sheep fed low doses of *Anagallis arvensis* were investigated. The levels of alanine aminotransferase (ALT), glucose, and creatinin when compared with preinduction levels showed significant increase levels. On the other hand red blood cell (RBC), white blood cell (WBC), Hemoglobin (Hb) and packed cell volume (PCV) were significantly lower than preinduction values. However calcium (Ca), phosphorus (P), magnesium (Mg), aspartate aminotransferase (AST) and urea values were within the normal levels. The present findings indicated that *Anagallis arvensis* was toxic to sheep in the daily low dose of 5 gm/kgbw.

Introduction:

The plant family primulaceae in Saudi Arabia consists of 4 genera with 4-5 species (Shaudhary and Al-Jowaid, 1999). *Anagallis arvensis* L. is a polymorphic species widely spread in Al-Ahsa, where it grows well in wet habitat, heavy alluvial soil, canal banks and also as a common weed in cultivation.

Kotb,(1985) reported that the active principle of *Anagallis arvensis* were acired volatile oil, enzymes , saponins , tannins , bitter principle and a compound known as primin. Roots contain cyclamen, a crystallizable glucosidal saponin. Chevallier (1996), recorded that *Anagallis arvensis* contains saponins (including anagallin), tannins and cytotoxic substance. The plant was found toxic to dogs, rabbits and sheep, with signs of general depression , thirst and diarrhea (Riet-Correa *et al* 1998). The same authors described four cases of *Anagallis arvensis* poisoning in cattle of different ages. Morbidity rate was 7-30% and case fatality rate was 50-86%.. The animals were in the fields 7 to 45 days before developing clinical signs. Eight of 289 ewes died after grazing in the same field after showing clinical signs for 2-15 days. Sadekar *et al* (1996), reported dullness,

anorexia and constipation after feeding *Anagallis arvensis* with pathological changes in kidneys and livers in sheep.

When the green plant collected from a field where an outbreak had occurred was administered to sheep at doses of 160 and 224 g/kg bw clinical and pathological signs similar to those observed in field cases were observed (Rivero, *et al.*, 2001).

Cases of acute mortality in sheep, characterised by severe nephrosis and resultant uraemia, were investigated on two farms 150 km apart in the Winter Rainfall area of the Republic of South Africa. This condition was experimentally reproduced by dosing sheep with *Anagallis arvensis* L plants. The most conspicuous lesion was coagulative necrosis with intratubular haemorrhage in the renal cortex. The, clinical signs and the pathology of the experimental disease were described (Schneider, 1978).

The present study was undertaken to study the haematological and biochemical changes in sheep fed low dose of the plant *Anagallis arvensis*.

Materials and Methods:

Plants: *A.arvensis* plant was freshly collected every day from different farms in Al-Ahsa area.

Animals: six adult female sheep were used in this experiment. They were obtained from sheep farm of Training and Research Station, King Faisal University. The leaves of the: *Anagallis arvensis* plant was administered to the animals in a dose of 5 g./kg.bwt. daily for 4 weeks. Blood samples were taken every week for haematological and biochemical analysis. Also clinical signs were observed daily.

Blood picture: Total RBCs, WBCs, Hb, and PCV, were recorded by automatic coulter counter,.

Biochemical analysis included Creatinine, BUN, GPT(ALT),GOT(AST), and glucose. Also mineral(Ca, Mg and P) were analysed according to the set description of Bayer Corporation, SERA PAK (1997), with the aid of AMES QUIK-LAB chemistry analyzer, Miles Inc., Germany.

statistical analysis :One way analysis of variance (Anova) was performed on the data and means were compared by the Duncan test.

Results & Discussion:

The results of the hematological and biochemical analysis are presented in Fig. 1, 2 and 3.

There was highly significant increase in ALT, glucose and creatinine levels. The hematological study revealed highly significant decrease ($p < 0.05$) in RBCs, Hb%, PCV and WBCs. There was no any significant changes of Ca, P, Mg, AST and urea.

Studies on the toxicity of *Anagallis arvensis* in sheep were done using small dose (5 g/kg.b.wt.) for 4 weeks. The clinical signs observed on sheep were mild and were mainly characterized by anorexia , restlessness, diarrhea, thirst and increased respiration. These signs were similar to those mentioned by Watt and Breyer – Brandwijk, (1962), Forsyth, (1968) and Kotb, (1985).

Hematological analysis revealed the occurrence of severe anemia as indicated by decreased hemoglobin concentration, lowering of packed cell volume and fall in erthrocytic count. These results could be attributed to the harmful effect of saponin, an active principle of *Anagallis arvensis*. ElGarieb (1990) reported similar findings.

The level of creatinine in the experimental sheep was increased significantly ($p < 0.05$). This increment is an indicator for renal function impairment due to toxicosis by *Anagallis arvensis* (Coles 1974, Metwalli 1987, and El.Garieb 1990). Increase in ALT is indicative of acute hepatic disease (Wrohlewski and La Due, 1956). There was a significant increase in serum glucose level of sheep. These results may be attributed to its role on hepatocytes.

It could be concluded that *Anagallis arvensis* was toxic to sheep in low doses and induces several changes in blood picture and biochemical changes. This toxicity was reported previously in sheep by Riet-Correa *et al.* (1998) and Sedekar *et al.* (1996).

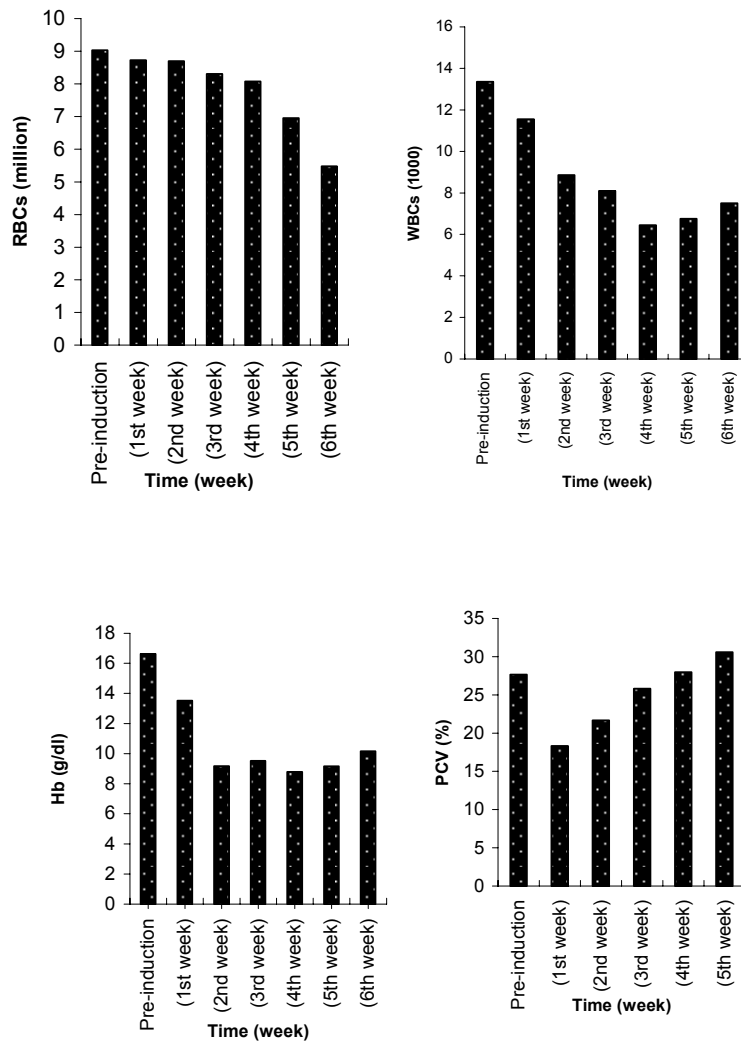


Fig. (1) : The concentrations of RBC, WBC, Hb, PCV in sheep blood prior and after 5 weeks of feeding *Anagallis arvensis*

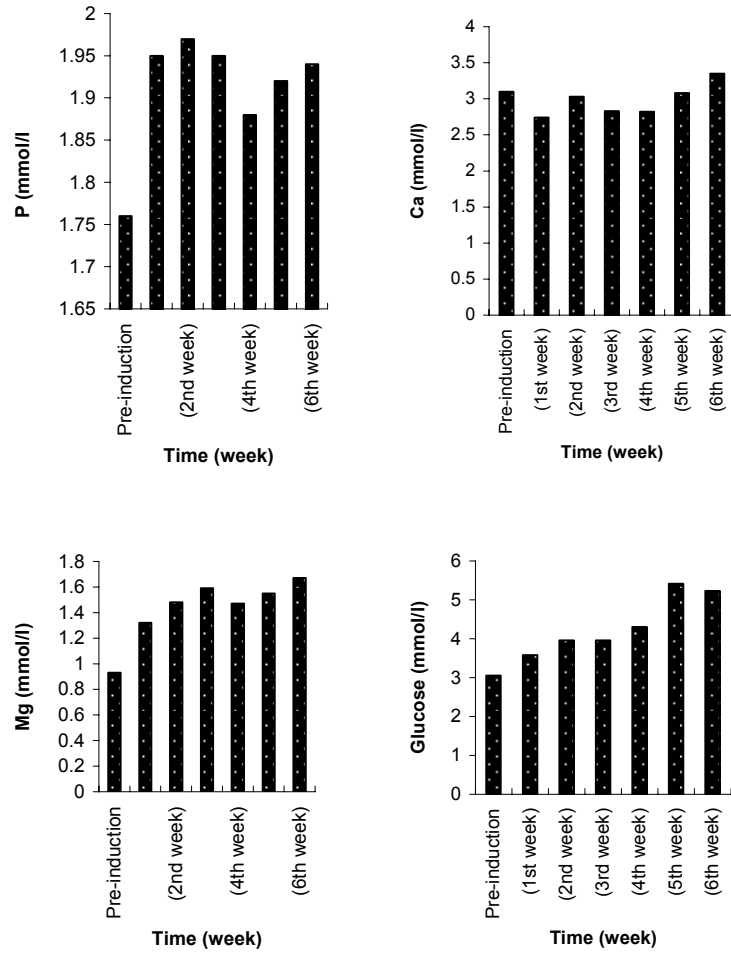


Fig. (2) : The concentrations of plasma glucose, calcium, magnesium and inorganic phosphate in sheep blood prior and after 5 weeks of feeding *Anagallis arvensis*

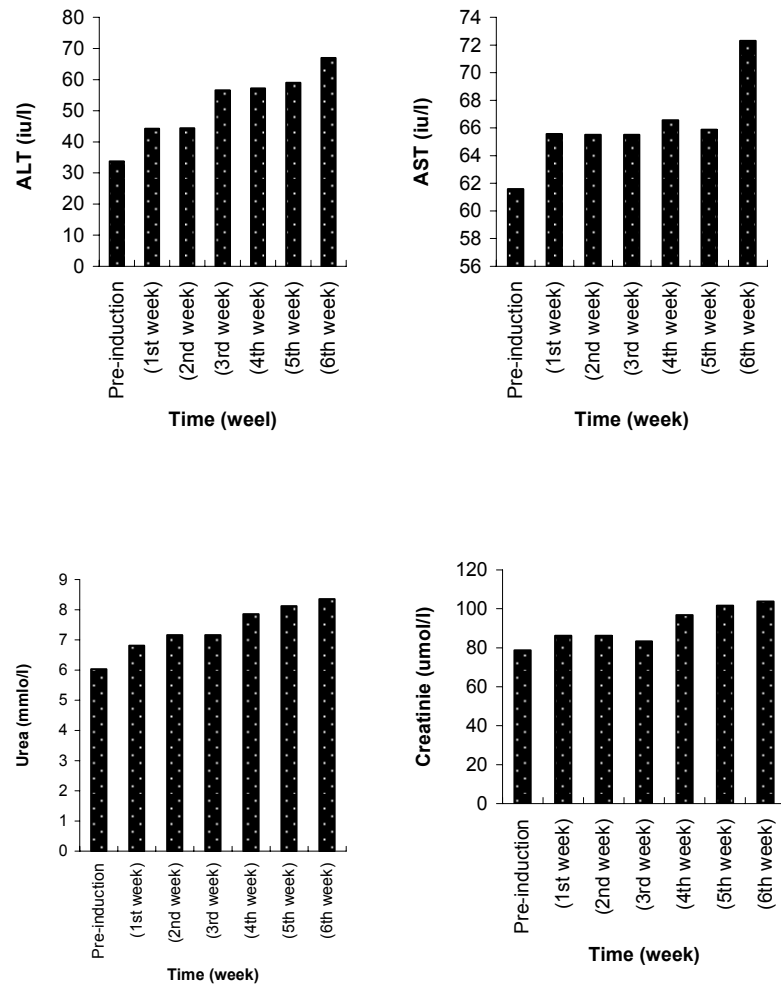


Fig. (3) : The concentrations of plasma urea, creatinine, ALT and AST in sheep blood prior after 5 weeks of feeding *Anagallis arvensis*

References:

1. Chevallier, A. (1966): The Encyclopedia of Medical Plants. A. Dorling Kindersely Book, London.
2. Coles, E. (1974): Veterinary Clinical Pathology. 2nd Ed. Philadelphia, London.
3. ElGarieb, S. (1990) : Metabolic disorder among sheep reared in Behera Governorate. M.V.Sc.Thesis, Fac. Vet.Med.Alexandria University.
4. Kotb, F.H.(1985): Medicinal plant in Libya . Arab Encyclopedia House, Beriut-Lebanon.
5. Metwalli, A.(1987): Clinical Laboratory investigation on, a common disease manifestation among some farm animals. M.Vet. Med., Alexandria University.
6. Riet-Correa, F., Rivero, R., Dutra, F., Timm, C.D. and Mendez, M.C. (1998): Recently encountered poisonous plants of Rio Grande do Sul and Uruguay. In : Toxic plants and other natural toxicants, eds., Garland, T.and Barr, A.C., CAB International , New York, USA.
7. Rivero R, Zabala A, Giannechini R, Gil J, and Moraes J. (2001): *Anagallis arvensis* poisoning in cattle and sheep in Uruguay. Vet Hum Toxicol. 43(1):27-30.
8. Shaudhary, S.A. and Al-Jowaid, A.A (1999): Vegetation of the Kingdom of Saudi Arabia. Ministry of Agriculture & water Kingdom of Saudi Arabia. 1419 H.
9. Schneider, D.J. (1978) : Fatal ovine nephrosis caused by *Anagallis arvensis* J. South African Vet.Assoc., 49, 321-324.
10. Watt, J.M. and Breyer –Brandwijk, M.G. (1962) : Medicinal and poisonous plants of Southern and Eastern Africa. E&S. Livingstone Ltd., Edinburgh and London, UK.P.870.

دراسة المتغيرات الدموية والحيوية في دم الأغنام بعد أطعامها عليقة منخفضة من نبتة عبيبة (عين الجمل أو صابونة الغيط)

عبدالعزیز بن محمد المجلی

كلية الطب البيطري والثروة الحيوانية، جامعة الملك فيصل
الأحساء، المملكة العربية السعودية

الملخص :

في هذا البحث تم دراسة المتغيرات الدموية والحيوية في دم الأغنام بعد أطعامها عليقة تحتوي على 5 جم لكل كجم من الوزن الحي للحيوان من نبتة عبيبة (عين الجمل أو صابونة الغيط). انزيم اية ال تي (ALT). الجلوكوز والكرياتينين اظهرت زيادة معنوية مقارنة بتركيز تلك المواد في الدم قبل إعطاء النبتة. اما كريات الدم الحمراء والبيضاء والهيموجلوبين وحجم الجزئيات المظفوفة أظهرت نقص معنوي مقارنة بتركيز تلك المواد قبل إعطاء النبتة. وكذلك أظهرت الدراسة عدم وجود تغيرات جوهريّة في مستوى الكالسيوم والفوسفور والمغنيسيوم واليوريا وانزيم اي سي تي (AST). لذا تخلص هذه الدراسة بان نبتة عبيبة (عين الجمل أو صابونة الغيط) ذات تأثير سام في الأغنام بالجرعة المنخفضة (5 جم /كجم من الوزن الحي يوميا / 4 أسابيع) التي استخدمت في هذه الدراسة.