

بعض التغيرات الكيميائية في دم وسيرم الدم  
للأغنام بعد تغذيتها على مخلفات المحاصيل

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أجرى عسر الهضم الحاد على ٢٥ من الأغنام المصرية وذلك بتغذيتهم على نباتات عباد الشمس، مصاصة القصب، وعروش البسلة، درنات البطاطس، وعروش الفول الأخضر.

لوحظ نقص في مستوى النيتروجين الغير بروتيني ولقد بدأ هذا النقص معنويًا (  $23.14 \pm 4.1$  مجم في المائة ) باستخدام عروش البسلة في تغذية الحيوانات بينما ظهرت زيادة غير معنوية بتغذيتهم على عروش الفول الأخضر.

شوه نقص عام في مستوى البولينا في الدم ولقد بدأ هذا النقص معنويًا بتغذية الحيوانات على درنات البطاطس وعباد الشمس والبسلة. سجلت زيادات في مستوى نيتروجين الأحماض الأمينية في دم الحيوانات وقد بدت هذه الزيادة واضحة وذلك بتغذية الحيوانات على عروش الفول الأخضر ود رنات البطاطس وكذلك عروش البسلة.

لوحظ نقص معنوي في مستوى البيلوروبين الكلي في سيرم الحيوانات وذلك بتغذيتهم على عروش الفول الأخضر ود رنات البطاطس وعروش البسلة وسجلت زيادة معنوية في مستوى هذا المركب بالتغذية على عباد الشمس. لوحظ زيادة معنوية في مستوى البيلوروبين المباشر في سيرم الحيوانات وذلك بتغذيتهم على عباد الشمس ونقص معنوي في هذا المركب بتغذيتهم على عروش الفول الأخضر.

لوحظ زيادات في مستوى الكولستيرول الكلي في سيرم الحيوانات ولقد بدت هذه الزيادات واضحة بتغذيتهم على عباد الشمس وعروش الفول الأخضر. سجلت زيادات في مستوى نشاط انزيمات ترانس أمينيز في سيرم الحيوانات بتغذيتهم على تلك النباتات خاصة نبات عباد الشمس.

My dear Mr. [Name]

I have just received your letter of the 10th inst.

and am very glad to hear from you.

I am sorry to hear that you are not well, but I hope you will soon be better.

I am writing you a few lines to let you know that I am still thinking of you.

I am sure you will be able to get over your illness soon.

I am very sorry to hear that you are not well, but I hope you will soon be better.

I am writing you a few lines to let you know that I am still thinking of you.

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BLOOD AND SERUM CHANGES IN RAMS OVERFED  
WITH SOME LOCAL FEED STUBBLES  
(With 4 Tables)

By

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SUMMARY

Study of blood and serum changes in rams overfed with *Hilanthus annuus*, *Saccharum officinarum*, *Pisum sativus*, *Solanum tuberosum* and *Vicia Foba* was proceeded. The following results were recorded:-

1. General decrease of blood N.P.N. level especially in group overfed with *Pisum sativus*.
2. Blood urea level was generally decreased. Significant drop was evident in overfeeding with *Solanum tuberosum*, *Hilanthus annuus* and *Pisum sativus*.
3. Evident increase of amino azot nitrogen blood level after overfeeding with *Vicia Foba*, *Solanum tuberosum* and *Pisum sativus* was noticed.
4. Significant decrease of total serum bilirubin was recorded in all group except those overfed with *Hilanthus annuus* where it increased.
5. Increased level of direct serum bilirubin was noticed after overfeeding with *Hilanthus annuus* while an opposite phenomena appeared in overfeeding with *Vicia Foba*.
6. Total serum cholesterol was generally increased especially with *Hilanthus annuus* and *Vicia Foba*.
7. S-GOT and S-GPT levels were increased especially after overfeeding with *Hilanthus annuus*.

INTRODUCTION

In Egypt, sheep graze stubbles and residues of seasonal plants and crops and sometimes these materials include different types of grass growing beside the main crop. During this periods many patients (sheep )



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were delivered at Assiut Vet. clinic with history of digestive troubles during these periods.

Rumen fluid analysis was studied in such cases showing acute signs of overfeeding (AMER et al., 1977).

Since the severity of indigestion affects the blood components (EL-SEBAI, 1974) it appears valuable to investigate changes under such conditions. In addition, the chemical measurement of blood constituents is of a great value in evaluating the physiological status of animals.

#### MATERIALS AND METHODS

##### Animals:

Twenty five rams of local breeds, one year age and of 27-35 Kg Bwt were used. Full technique of induced acute overfeeding in experimental animals, by *Hilanthus annuus*, *saccharum officinarum*, *Pisum sativus* *Solanum tuberosum* and *Vicia Foba*, was described by (AMER et al. 1977).

##### Methods:

Whole anticoagulated blood was used for the determination of N.P.N. B.U., Amino azot after the method described by AITSKA, (1970). Blood serum was used for total cholesterol determination (ILCA, 1962). Total and direct bilirubin, S-GOT and S-GPT were estimated using the Test-Kits supplied by the Boehringer and Sons, Mannheim, West-Germany.

Obtained data were statistically analysed according to SNEDECOR, (1962).

#### RESULTS AND DISCUSSION

Tables 1, 2 & 3 show some of the biochemical changes of whole blood as well as blood serum in experimental sheep. The various constituents will be dealt separately.

## BLOOD ANALYSIS IN OVERFED RAMS

### Nitrogen Constituents:

Before feeding ( 24 hours starving ) the levels of N.P.N., B.U. and Amino azot are presented in Table (1). Values obtained approach that recorded by COLES, (1967) and KUDRIAVTSEV, et al. (1972). After feeding and with the appearance of the clinical signs of indigestion in all groups, the N.P.N. decreased. This decrease was unpredictable in indigestion with *Vicia Foba*, while *Solanum tuberosum*, *Saccharum officinarum* and *Hilanthus annuus* resulted in insignificant decrease. *Pisum Sativus*, on the other hand, resulted in acute indigestion with highly significant decrease of N.P.N.

Blood urea levels had a rather similar behaviour with that of N.P.N. and indigestion could influence the metabolism of urea where it drops. Acute indigestion, induced by *Saccharum officinarum* and *Vicia Foba*, resulted in a rather significant decrease, while in case of *Solanum tuberosum* and *Hilanthus annuus* the drop recorded a high significant value ( $P \leq 0.01$ ) to reach 23.72 mg% when compared with initial value ( 30.52 mg% ) for *Solanum tuberosum* and from 37.12 mg% to 23.04 mg% for *Hilanthus annuus*. The same index was very significantly decreased (  $P \leq 0.001$  ) for *Pisum sativus* (Table 1). EL-SEBAII, (1974) could demonstrate a drop of B.U. in sheep experimentally fed maize, maize flour and dates.

Blood amino azot nitrogen behave a rather opposite direction where it raised (Table 1). Analysis of results indicated that *Pisum sativus*, *Solanum tuberosum* and *Vicia Foba* recorded a very highly significant elevations ( $P \leq 0.001$ ). Minor elevation was only detected in case of *Saccharum officinarum* and *Hilanthus annuus*.

### Serum bilirubin:

As shown in Table 2 the total serum bilirubin levels in starved (before feeding) sheep ranged from 0.13 - 0.76 mg%. Mean value of direct bilirubin levels were between 0.05 to 0.33mg%. These Figures lies within normal values described by COLES, (1967). Induced acute indigestion with



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*Pisum sativus* and *Vicia Foba* lowered significantly ( $P \leq 0.05$ ) the total serum bilirubin from 0.28 to 0.20 mg% for the former and from 0.76 to 0.40 mg% for the second. *Solanum tuberosum* has more high effect and the values decreased from 0.24 to 0.15 mg%. On the contrary, highly significant ( $P \leq 0.01$ ) increase in total serum bilirubin occurred in indigestion caused by *Hilanthus annuus*. *Saccharum officinarum* seems to have no significant effect on total serum bilirubin (Table 2).

Direct serum bilirubin level in starved sheep ranged from 0.05 mg% to 0.33 mg%. Following acute indigestion with *Vicia Foba*, the direct serum bilirubin dramatically decreased from 0.18 mg% to 0.07 mg%. That with *Hilanthus annuus*, the comparative values were elevated.

Acute overfeeding with *Solanum tuberosum* and *Pisum sativus* have a minor influence on direct bilirubin level (Table 2).

Feeding with *Saccharum officinarum* had an opposite effect and direct bilirubin elevated. These results need further investigation to study the real factors that cause such an elevation or drop of this pigment in serum and the role may be played by the liver.

Total serum cholesterol:

As general total serum cholesterol level was elevated in all experimental animals fed with feed residues. The maximum value (175.3mg%) was detected in case of over feeding with *Hilanthus annuus*, while no marked changes could be stated with *Saccharum officinarum*. Again one could not interpret the role played by *Hilanthus annuus* leading to such hypercholesterolaemia.

Serum Got and Gpt:

Levels of serum GOT and GPT were presented in table (3). It is obvious that the recorded levels in starved sheep ranged from 27.8 to 28.9 mU/ml for the former and from 7.2 to 11.6 mU/ml for the latter. These values are within the levels reported by ZIMMERMANN *et al.* (1965).

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Induced acute indigestion provokes an increase of both enzyme activity. *Hilanthus annuus* recorded the highest activity for GOT (81.2 mU/ml) and GPT (43.41 mU/ml). The increase induced by *Solanum tuberosum* was not as high as *Hilanthus annuus*. With *Vicia Foba* the activity reached its lowest ( 19.4 mU/ml ) for GPT. Whether a period of transitory damage to liver cells had occurred during this phase, one cannot prove without specific technique, as it is well known that the activity of these enzymes accompany cell necrosis of many different tissues including the liver ( COLES, 1967; CORNELIUS and KANEKO, 1963 ). MULLEN, (1976) referred an elevated serum enzymes caused by metabolic disturbance following over feeding with carbohydrate or protein in cattle.

## REFERENCES

- Amer, A.A.; El-Amrousi, S.; Sanna, M. Nassar; A. Mottalib and T.A. El-Allawy (1977): Ruminal changes in sheep after over feeding with some feed stubbles. *Assiut Vet. Med. J.*
- Coles, E.H. (1967): *Veterinary Clinical Pathology*. W.B. Saunders company, Philadelphia and London, 1st. Ed.
- Cornelius, C.E. and Kaneko, J.J. (1963): *Clinical biochemistry of domestic animals*. Academic Press. New York and London, Ed.
- El-Sevaidi, (1974): Some studies on indigestion in sheep. Thesis, M.V.Sc. Medicine, Assiut University.
- Ilca, Z. (1962): Rapid method for determination of total cholesterol in blood serum. *Ges. Inn. Med.* 17, 83.
- Kudriatsev, A.A.; and Kydriavsev, L.A. (1972): Morphological and biochemical picture of blood and bone marrow in animals 1st Ed. Medicine Moscow, U.S.S.R.
- Mullen, P.A. (1976): Overfeeding in cattle, Clinical, biochemical and therapeutic aspects. *Vet. Rec.* 98, No. 22, 439-443.
- Raitska, U.I. (1970): Zootechnical and biochemical analysis of ration, metabolic products and animal products. All Soviet Research Institute of Animal, Production, U.S.S.R.



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Snedecor, G.M. (1962): " Statistical methods " 4<sup>th</sup> Ed., The Iowa State College Press. Ames, Iowa.

Zimmermann, H.J.; Schwartz, M.A.; Boley, L.E. and West, M. (1965): Comparative serum enzymology. J. Lab. Clin. Med., 66, 961-972.



## BLOOD ANALYSIS IN OVERFED RAMS

Table (1): Changes of blood non protein nitrogen, blood urea and amino azot in indigested sheep.

Indices	Non-protein nitrogen mg%		Blood urea mg%		Amino azot mg%	
	Starved	Indigested	Starved	Indigested	Starved	Indigested
Vicia Foba	21.76 $\pm$ 3.41	31.12 $\pm$ 3.90	23.52 $\pm$ 8.08	22.24 $\pm$ 7.86	2.90 $\pm$ 0.99	4.84 $\pm$ 1.71***
Solanum tuber- osum	25.26 $\pm$ 3.59	21.86 $\pm$ 3.20	30.52 $\pm$ 7.17	23.72 $\pm$ 6.39**	2.98 $\pm$ 0.96	6.71 $\pm$ 1.32***
Saccharum officinarium	25.64 $\pm$ 1.96	23.14 $\pm$ 4.10	31.28 $\pm$ 3.92	26.28 $\pm$ 8.20	3.05 $\pm$ 0.66	3.34 $\pm$ 0.92
Hilanthus annus	29.56 $\pm$ 4.15	23.52 $\pm$ 6.78	37.12 $\pm$ 8.30	23.04 $\pm$ 7.90**	3.12 $\pm$ 0.86	3.88 $\pm$ 1.00
Pisum sativus	30.28 $\pm$ 4.45	23.14 $\pm$ 4.10**	40.56 $\pm$ 8.91	22.28 $\pm$ 3.11**	3.30 $\pm$ 0.63	7.02 $\pm$ 0.33***

\* Significant at 0.05.

\*\* Significant at 0.01.

\*\*\* Significant at 0.001.

+ Standard Error.

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Table (2): Changes in direct and total serum bilirubin and total serum cholesterol in indigested sheep.

Groups	Total bilirubin		Direct bilirubin		Total serum cholesterol	
	Starved	Indigested	Starved	Indigested	Starved	Indigested
Hilanthus annus	0.13±0.05	0.2±0.06 <sup>xx</sup>	0.07±0.05	0.19±0.03 <sup>x</sup>	125. ±18.10	175.3±26.18
Saccharum officinarum	0.13±0.05	0.27±0.05	0.05±0.03	0.13±0.04	129.4±21.07	129.3±25.08
Pisum sativus	0.76±0.29	0.40±0.25 <sup>x</sup>	0.33±0.14	0.11±0.03	123.6±18.41	160.8±20.20
Solanum tuberosum	0.24±0.05	0.15±0.04 <sup>xx</sup>	0.15±0.02	0.14±0.03	134.8±14.16	157.6±15.0
Vicia Foba	0.28±0.09	0.20±0.02	0.18±0.06	0.07±0.04 <sup>xx</sup>	130.0±13.20	170.6±23.28

x Significant at 0.05.

xx Significant at 0.01.

xxx Significant at 0.001.

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## BLOOD ANALYSIS IN OVERFED RAMS

Table (3) : Blood serum GOT and GPT in indigested sheep.

Indice Groups	Serum GOT mu/ml		Serum GPT mu/mL	
	Starved	Indigested	Starved	Indigested
Vicia Foba	27.40 $\pm$ 4.06	6.300 $\pm$ 4.72 **	11.60 $\pm$ 2.07	19.40 $\pm$ 0.75 ***
Solanum tuberosum	28.90 $\pm$ 1.68	49.60 $\pm$ 2.16 **	9.90 $\pm$ 1.10	20.80 $\pm$ 3.65 ***
Hillanthus annus	27.10 $\pm$ 1.13	81.20 $\pm$ 6.26 ***	9.80 $\pm$ 1.59	43.40 $\pm$ 3.94 ***
Pisum sativus	23.86 $\pm$ 1.05	62.20 $\pm$ 4.15 ***	7.20 $\pm$ 1.28	27.00 $\pm$ 2.57 ***
Saccharum officinatum	26.00 $\pm$ 1.20	65.20 $\pm$ 6.35 ***	9.20 $\pm$ 1.66	35.10 $\pm$ 3.27 ***

GOT Glutamic Oxamtransaminase

GPT Glutamic pyruvic transaminase

\* Significant at 0.05.

\*\* Significant at 0.01.

\*\*\* Significant at 0.001.

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Constituents	Moisture %	Protein extract %	Ash %	Carbohydrates d %	Crude fibers %
** Barseem	86.31	2.54 18.00	0.46 1.92	6.39 46.00	3.80 28.00
Vicia Foba	84.40	3.35 21.50	0.73 2.11	5.92 38.00	3.49 22.40
Pisum sativus	7.96	7.70 8.40	0.85 7.70	39.20 42.60	36.51 39.80
Sacchrum officinorum	65.76	1.01 2.10	0.46 0.99	20.89 61.00	10.89 31.80
Solanum tuberosum	79.10	1.66 8.70	0.05 1.10	17.74 86.00	0.35 1.30
Hilianthus annus	70.26	0.44 1.48	0.21 1.67	12.90 43.40	12.54 48.80

<sup>\*</sup> Technical bulletin of Ministry of Agriculture (1968)<sup>\*\*</sup> Abou Akkada *et al.* (1958).<sup>\*\*\*</sup> The second figures are colulated according to dry matter.*Assiut Vet.Med.J.Vol. 7, No,13&14,1980.*