STUDY OF URINE ANALYSIS IN SOME CATTLE DISEASES

Thesis presented

By

Mohamed Hassan Mohamed Nasser

(B.V.Sc.,Zagazig ,1979)

Under the Supervision

of

Prof. Dr. A.H.Mahmoud
Prof. Of Medicine and
Infectious Diseases
Faculty of Vet. Med.
Zagazig University

Prof. Dr. M.M.El-Shinnawy
Head of the Department of
Medicine and Forensic
Medicine
Alexandria University

For

The Degree of M.V.Sc.

(General Medicine and Laboratory Diagnosis)

To

Faculty of Vet.Medicine

Alexandria University

(1984)

بسم الله الرحمن الرحيم

قررت لجنه الحكم والمناقشه ترشيح السيد ط٠ب/ محمد حسن محمد ناصر للحصول على درجه الماجستير فى العلوم الطبيه البيطرية تخصص (طب عام وعلاجى)٠

أعضاء اللجنه

الاستاذ الدكتور/ حسن محمد غريب
أستاذ الاهراض الباطنيه والمعدية المتفرغ
بكليه الطب البيطرى جامعة الزقازيق

الاستاذ الدكتور/ حسن محمود الجندى
أستاذ الامراض الباطنيه والمعدية
كليه الطب البيطرى ـ جامعة القاهرة

الاستاذ الدكتور/ أحمد حسنى محمود
أستاذ الامراض الباطنيه والمعدية المتفرغ
كليه الطب البيطرى ـ جامعة الزقازيق
(والمشرف على الرساله)

الاستاذ الدكتور/ متولى محمد الشناوى
أستاذ ورئيس قسم طب الحيوان والطب الشرعى
كليه الطب البيطرى ـ جامعة الاسكندرية
(والمشرف على الرساله)

ACKNOWLEDGEMENT

Humble thanks to our mercifull God who enabled me to finish this research.

I am greatly indebted Prof. Dr. A.H. Mahmoud, Prof. of Medicine, Faculty of Vet. Med. Zagazig University and Prof. Dr. M.M. El-Shinnawy, head of the department of Veterinary Medicine and Forensic Medicine, Alexanderia University, who encouraged me during this work & offered me all the facilities which were needed to accomplish what was achieved.

Heartly thanks are due to all my Colleagues and workers in the department of Vet. Medicine and Forensic Medicine specially Dr. M. Ismail lecturer of Medicine, Faculty of Veterinary Medicine, Alexanderia University.

I would like to thank all my Colleagues in Dessoq Vet. Clinic and Sayed Abdelall, owner of Shabs El-Malh farm.

Contents

INTRODUCTION

INTRODUCTION

The kidney performs two major tasks, the elimination of wastes which result from body metabolism or from the introduction of forign substances into the body; and excretion of normal constituents in the plasma so that the concentration of substances in the blood is maintained within the limits consistent with health.

Collection of urine from grazing farm animals is important in nutrional studies such as balance and metabolism trials; it is also important in endocrine work and diagnosis of some diseases.

Urine is of outstanding importance as an excretory product the formation of urine by the kidneys represents one of the main mechanisms for the excretion from the body of the products of metabolism, and for maintaining the composition of the blood and tissue fluids approximately constant level.

Some urinary constituents such as urea, ammonia, uric acid, hippuric acid, phosphate, sulphates, etc., vary greatly in concentration. Certain constituents notably creatinine and neutral sulpher remain quite constant for a given individual.

Routine urine analysis is an important first step in the evaluation of renal function. An appreciation of the character and constituents of normal urine in the various species of animal is essential to be able, correctly, to interpret the significance of any abnormal feature detected during routine analysis.

Urine analysis provides a valuable aid in cattle in the process of diagnosis within no time which gives a great help in early treatment to be applied by the veterinarian.

Whenever an evaluation of renal function in needed the first step should be a routine urine analysis

The object of this study was to estimate , among cattle the variation in the following:-

I. The physical characters of cattle urine (colour, odour, transparency, foam, reaction and specific gravity) in health and in different diseased conditions.

II. The chemical characters of cattle's urine in health and in different diseased conditions as follows:-

A. Qualitatively (protein, glucose, blood, Bile pigment and acetone in health & diseased conditions.

B. Semi-quantitatively (Blood, urobilinogen, bilirubin, protein, nitrite, acetone, ascorbic acid , glucose and pH.)

C. Quantitatively (total protein, urobilinogen, creatinine, urea,glucose, calcium, inorganic phosphorous and magnesium) in both of healthy and diseased cattle.

LITERATURE

Physical characters of urine in normal cattle:

Abdulla (1959) revealed that the most important factor in the determination of the reaction of the urine is the composition of the food ingested. Most foods of vegetable origin give rise to an alkaline urine because they contain an excess of base-forming elements.

Dukes (1955) reported that the ruminant urine was normally alkaline rather than acidic in reaction.

Cornellius and Kaneko (1963) stated that the normal PH in cattle and sheep was 7.00 - 8.00.

Wolf (1962); Galambos *et al.*, (1964) and Coles (1967) used the measurement of specific gravity of the urine for evaluation of kidney properties.

Weeth. *et al.*, (1969) found that determination of specific gravity by refractometer was ranged from 1.0030-1.0413 in normal bovine urine.

Richards and Wotton, (1976) determined the specific gravity of urine in Grezing cattle ranged 1.002 - 1.003 and PH averaged 6 - 8.5.

The physical characters of urine diseased animals:

Henson, et al. (1965) stated that wide spread eskelated myodegeneration in cattle was associated with a disease syndrome characterized by a febrile course, abnormally dark red urine, in coordination, recumbency and death when cattle fed with plants cassia occidentalis or cassia obtusifolia.

Martinovich and Wood_house (1971) found that the low copper level in farms causes an out break of post-parturient haemoglobinuria.

Kelly (1974) found that the haemoglobinuria occur in association with pre-renal diseases which causes intravascular hemolysis. The urine colour was from bright to dark red, and even reddish black,according to the concentration of haemoglobin. High specific gravity occurs in all diseases in which the volume of urine excreted was significantly reduced as febrile states and prerenal diseases.

Sharma, et al. (1976) buffaloes suffering from haemoglobinuria recorded, the PH of urine of buffaloes Varied from 7.9 to 8.2.

Samed, (1979) reported that the clinical manifestation and some biochemical estimations were studied in 12 buffaloes with haemoglobinuria in the Sugar cane region of Maharashtra. The clinical signs of coffee-coloured urine, aneamia and icterus were observed.

Total protein of healthy and diseased cattle in urine:

(A) Total protein in appearently healthy cattle:

Ordinarily the glomerular membrane of kidney prevent passage of large molecular protein, but during periods of systemic stress protein may be lost in the urine.

Sparacino, (1958) reported that the presence of protein in urine of healthy cattle averaged to 7 mg/100ml.

Romagnoli (1959) reported that the protein in urine of clinically healthy cattle averaged 3 mg/ 100 ml.

Cornellius and Kaneko (1963) stated that the most part of normal glomerular membrane of kidney does not permit the passage of plasma protein and such protein passed the membrane was reabsorped by the tubules so that the urine was free of protein. When the glomerular membrane was damaged any where along the uro-genital tract from the kidney down to the orifice of the urethra protein may be detected in urine.

Weeth, et al. (1969) determined the total protein in Herfored cattle urine by peper-strip electrophoresis and it amounted to 62.6 mg/ 100 ml.

Erln and Kolb, (1972) measured quantitatively and qualitatively the urinary protein in clinically healthy cattle and they found that total protein (perchloracetic acid precipitate in Folin-lowry method) in bovine averaged 13.2 ± 9.1 mg/ 100 ml.

(B) Total protein in diseased cattle urine:

El-Gindy (1966) reported that the significane of the appearance of the albumin in the urine was an aid of dagnosis in cases of traumatic pericarditis.

El-Gindy (1966) stated that, infestation of buffaloes with fasciola causes albuminuria and bilirubinuria.

Biancardi (1969) studied the protein, pseudoprotein albumin, indican, phosphate and acetone in 189 cattle where he found that 105 out of them suffering from traumatic reticulo-peritonitis.

Kelly (1974) found that the haemoglobinuria occur in association with pre-renal diseases which causes intravascular hemolysis and proteinuria.

Kurundkar, et al. (1981) found in case of haemoglobinuria serum were low in phosphorous (1.96 ± 0.57 mg %) and normal in calcium and high bilirubin (7.64 ± 1.19 mg%). Urine contained haemoglobin and albumin but no sugar.

Glucose in urine of healthy cattle and diseased conditions:

(A) Glucose in urine of healthy cattle:

Cornelius and Kaneko (1963) stated that normal urine contains no glucose. Although the glucose was freely . Filtered at the glomerular membrane reabsorption is complete in the proximal tubule if the load in the blood did not exceed 160 - 180 mg glucose/ 100 ml of blood above this level glucose will appear in the urine.

Morgan (1967) reported that the glucose was not a normal constituent of urine but may appear when the threshold was exceeded.

Kelly (1974) stated that the glucose in normal cattle urine was not found in urine due to the plasma concentration rarely rises above the renal thershold (about 170 mg/100 ml blood) so that tubular reabsorption was complete.

Sehilinger (1979) reported that the physiological glycosuria of 5.6 mg/100 ml up to 34.4 mg/100 ml occurs in cattle.

(B) **Glucose in urine of diseased conditions:**

Cornelius and Kaneko (1963) stated that the glycosuria was noticed in cases of convulsions and rabies.

Morgan (1967) reported that the glycosuria in violent exercise, fear, excitement, shock, hypothyroidism, general anaesthesia, asphyxia, convulsion, rabies, enterotoxemia of sheep, chronic liver disease and tubular toxicity.

Kelly (1979) stated that the glucosuria was associated with clostridium welchii type D enterotoxaemia, rabies and following parentral administration of glucose solutions.

Schilinger (1979) reported that the pathological glucose excretion in cattle as their lower threshold was of the order of 50 mg/100 ml. Glycosuria was induced with dexamethasone- 21 - 3, 6, 9 - trioxaundecanoate.

Ketone bodies in blood and urine of appearent healthy and diseased cattle:

Ketone bodies are formed in the liver and by the ruminal microorganisms in ruminant. These include acetone, aceto-acetic acid and beta-hydroxy butyric acid and related substances which are intermedialy products of fat metabolism due to the carbohydrate metabolism does not keep up with the carbohydrate needs of the body. The ketone bodies appear in the blood in relatively small amounts, traces of which are excreted in urine. With the exception of acetone, they can be utilized by the kidney as an energy source when were excessive that they occur in urine.

Robertson and Thin (1953) induced a marked ketosis in dairy cattle by withdrawing food for six days, but when feeding was resumed the animals showed a more rapid recovery than do cows suffering from spontanous acetoneamia.

Bullis, et al. (1965) found that the administration of growth hormone to cows at the rate of 0.1 to 0.5 mg per kg. causes an increase in milk production was the only observed result. However, when two cows were injected

with larger doses of growth hormone (1.0 mg. per kg., Kron feld (1965) a ketosis was induced.

Morgan (1967) stated that the ketonuria in cattle was commonly referred to as acetonemia, ketosis or hypoglycemia.

Kelly (1974) stated that cattle normally had a low blood glucose level (40 - 60 mg/100 ml) so that they were incipiently hypoglucaemic. As a result any condition in which the carbohydrate demands of the body exceeds the carbohydrate metabolism will result in ketosis and ketonuria.

Horber, et al. (1980) reported that the acetoacetate and beta-hydroxybutyrate in blood, milk, and urine as well as glucose and free fatty acid in blood were measured in total of 107 healthy dairy cows and 20 with primary ketosis. In cows with primary ketosis, ketone body concentration in blood, milk and urine were significantly higher, blood glucose lower and free fatty acid concentrations higher than in healthy animals. During the period of maximum lactation body concentrations of ketone may increase even in healthy cows.

Creatinine in urine of appearently healthy and diseased cattle:

Creatinine, which is the end product of muscle metabolism is excreted with great constancy in the urine.

Marshall, (1921) and Hunter, (1922) stated that the daily excretion of creatinine in urine was not affected by the dietary protein, exercise or daily urine volume, whereas Mitchell and Kruger, (1928); Hobson, (1939) and Hawk, et al. (1951) belived that creatinine output was greater during a period of work than during inactivity.

Butcher and Harris (1957) stated that, they found the creatinine excretion to be independent of the protein ingestion in ruminants.

De Groot and Aafjes, (1960) observed that, there were a small variation in diurnal urinary creatinine values.

Aafjes and De Groot (1961); Albin and clanton, (1966) urinary creatinine is belived to be relatively constant by an individual animal.

Robert and Clanton (1966) measured the variation in urinary creatinine as influenced by animals, rations, stage of production and time. The urinary creatinine levels in three normal cattle averaged 9.45 gm/day; 10.0 mg/day; 9.99 gm/day respectively. They also found that in four pregnant and lactating cows 11.72 gm/day; 10.36 gm/day; 7.45 gm/day; 9.81 gm/day respectively.

Urea in urine of appearently healthy and diseased cattle:

Urea is the main end product of protein metabolism in the body . This substances is filtered by the glomerulus and excreted in the urine .

About 2 per cent.is the average quantity of urea in urine ,but this quantity may be increased direotly with the quantity of animal food and exerition, and inversely with the volume of animal of urine passed. A pathological increase takes place in fevers and diabetes,als in poisoning by phosphorus or arseenic

Decrease of urea takes place phyiologically in diminished diet and sedentary habits. A pathological decrease takes place in certain liver diseases, in anaemia and other debilitating diseases, and particularly in kidney diseases.

It is in the pathological cases that urea determination are most important. In the former less urea is created in the body ; while in kidney diseases the urea is formed,but not eliminated, until the percentage of urea in the blood is much higher than in the healthy subject.

Campbell and Watts(I970) found that in extrarenal disease whih affeets renal efficiency may puch blood urea levels as high 200ml and sometimes higher.

There has been excessive loss of fliud and electrolytes and conditions associated with poor cardiac function irrespective of their etiology were liable to cause elevation in blood urea level such as shock,diarrhia and congestive heart failure.

Bilirubin and urobilinogen in urine of appearent healthy and diseased cattle:

Bilirubin originates as a catabolic product of haemoglobin metabolism. During periods of natural erythrocyte destruction the daily loss is so small that it can be eliminated unnoticed by a normal liver. However, during periods of excessive destruction the bilirubin may be elevated enough to cause icterus or jaundice.

Urobilinogen is conjugated bilirubin that has been eliminated as bile, reduced by intestinal bacteria, reabsorped into the circulation and excreted in the urine. Some urobilinogen is therefore, normally present in the urine.

Wallace and Diamond (1925) studied the value of the Ehrlich reaction for urobilinogen in the urine and faces has been well established for many years. One of the principale difficulties in applying this reaction on a large scale, as for example in using it as a screening method in searching for liver injury in the chemical industry or in clinical diagnosis generally.

Kühle (1926) reported that the only 60% of all cattle with established hepatopathy exhibited bilirubinuria. Since as high as 25% of normal cattle have been reported to have traces of bilirubin in the urine.

Berger (1956) studied the metabolism of urobilinooids in man and animals. They isolated only stercobilin from the urine of herbivora. In hepatic diseases, both bilirubin conjugates and urobilin were found in addition to the stercobilin.

Montemagno (1954) concluded from extensive clinical studies in cattle, horse and dogs, the elevations in the urinary urobilinogen were good diagnostic signs of hepatopathy.

Heidrich (1954) studied a group of 78 cattle with traumatic reticulitis, found that 20 tested positive for bilirubinuria with the methyelene blue test, 2 out of 3 cattle with acetoneamia and accompany hepatic lipidosis were also positive for bilirubin in urine .

El-Gindy (1957) suggested that methylene blue test in urine was useful test in the diagnosis of liver disease in cattle.

Cornelius and Kaneko (1963) stated that the free bilirubin does not normally pass the renal filter, only conjugated bilirubinuria in hepatic diseases with accompanied renal malfunction may be difficult to interpret because of shifts in the renal threshold for bile bigments.

El-Gindy (1966) stated that, infestation of buffaloes with fasciola causes albuminuria and bilirubinuria.

Medway, et al., (1969) reported that the correlation between the degree of urinary urobilinogen and liver damage had been found in cattle.

Doxey (1971) reported that the bilirubinuria in cattle should be interpreted with caution. Some normal cattle exhibit mild bilirubinuria and bilirubin wall appear in urine in some cases of traumatic reticulitis.

Freeman and Beeler (1974) reported that the high urinary output of urobilinogen may be the result as high production rate as in hemolytic disease; colonization of small intestine by bacteria and hepato-biliary disease; Whereas low urinary output of urobilinogen result from as nearly complete or complete obstructive jaundic;

administration of broad-spectrum antibiotic, reduced total renal function and inhibitors of proximal tubular secretion.

Minerals in urine of appearent healthy and diseased cattle:

Excretion of calcium in the urine and into the intestine was not altered by changes in calcium intake. Excretion of phosphorous in the urine, however, varied considerably and it was suggested that this process may be largely responsible for phosphorous homoestasis (In lactating animals the daily loss of magnesium in the milk, urine and faeces). Although there was no large, mobilizable store of magnesium in the body, some reserves do exist in saft tissues and bone and can be of importance in delicate situations.

Maynard (1947) reported that the herbivous excrete very small amount of phosphorous through urinary channels (94% of the urinary phosphorous was excreted in the inorganic form).

Blosser and Smith (1950) stated that, vary small amount of phosphorous were excreted in the urine at any time. They also mentioned that usual amount excreted were from 0.02 to 0.04 gm daily and normal magnesium level in cow's urine which amounted to 1.82 gm daily excretion.

Rook, et al. (1958); Storry and Rook (1962); Meyer (1963) and L'Estrange and Axford (1964) stated that the filtration rate fixes the threshold concentration in the plasma. This correlation between serum magnesium concentration and urine output has been demonstrated and the renal threshold for serum (or plasma) magnesium estimated in several investigations.

Wilson (1960) reported that the renal excretion of magnesium was controlled by a filter reabsorption mechanism in which the tubular reabsorption process acting act or near its maximum rate and the excretion was through to be partly or wholly independent of other ions.

De-Goot and Martin (1967) recorded that, the relationship between magnesium in plasma and urine makes the magnesium content in the urine an even better estimate of the magnesium status of an animal than the magnesium of the plasma.

Simesen (1977) stated that magnesium absorbed in excess of the body's requirement is excreted by the kidneys.

Field (1970) found that the lactation increased the fecal dry matter by 24 - 30% but there was no

consistent effect on urinary urine and milk was not correlated with faecal magnesium excretion. urinary and faecal calcium levels in lactating cows were lower than in non lactating cows. lactation increased the excretion of potassium in urine and faeces.

Sharma, et al.,(1976) estimated the perecntage of inorganic phosphorous, calcium, magnesium and protein in the whole blood, serum and plasma of buffaloes suffering from haemoglobinuria. They found that a sharp decrease in the inorganic phosphorous and no change in the level of calcium, magnesium and protein, Whereas the urine pH varied from 7.9 to 8.2.

Samed (1979) reported that the clinical manifestatation and some biochemical estimations were studied in 12 buffaloes with haemoglobinuria in the sugar concentration of Maharashtra. The clinical signs of coffee-coloured urine, aneamia and icterus were observed. Main calcium and inorganic phosphorous value were 10.68 and 1.97 mg/ 100 ml serum respectively.

Kurundkar, et al., (1981) found that the haemoglobinuria were low in phosphorous in serum (1.96 ± 1.19 mg%). Urine contained haemoglobin and albumin but not sugar, its pH varied from 6 to 8 .

Urine sediment in appearently healthy and diseased cattle:

Urinary sediments are of considerable value in the differential diagnosis of diseases of the urinary system. In all instances in which urine analysis reveals some other abnormal constituent suggesting renal or post-renal disease. The sediments obtained from urine of two types: The organized deposits and unorganized deposits.

Cornelius and Kaneko (1963) stated that the normal animal will show the presence of epithelial cell an occasional erythrocyte, leukocyte, triple phosphate and calcium phosphate crystals.

Weaver (1966) recorded that the urine of ruminant may contain triple and amorphous phosphate and calcium oxalate.

Material and Methods

(1) Material:

A. Animals:

A total of one hundred and eighty seven (187) cows were used for performing this work.

The condition and distributions of animals under investigation were as follows:

1. The first group consists of fifty (50) clinically healthy cows of 2-8 years old. The animals were free from internal parasites as proved by feacal examination. This group respresents the control animals. Thirty six cows of this group were randomly selected from the dairy herd at Rass-El-Soda Army Farm, Alexandria. The remainder (14 animal) were belonging to the Facutly of Veterinary Medicine, Edfina).

2. The second group consists of one hundred cows infested with fasciola. The animals were examined at private farm at Shabas El-Malh and Mahalet Malek in Dessouq Center (Kafr El-Sheikh Province). Another (15 Cows) belonging to this group were examined at the clinic of the Faculty of Veterinary Medicine, Edfina.

3. The third group twelve cows (12) of 4-7 years old suffered post-partuirent haemoglobinuria from the Veterinary Clinic of the Faculty of Veterinary Medicine, Edfina, Dessouq and Damanhour Veterinary Clinic.The diagnosis of this group based on clinical examination and laboratory tests.

4. The fourth group of ten cows (2-8 years old) suffered with pneumonia from the Veterinary Clinic of Faculty Medicine of Edfina. The diagnosis based on the clinical examination for each animal.

5. The fifth group four cows (2-6 years old) suffered with simple tympany, diagnosis by clinical examination, and Collected from the Edfina Veterinary Clinic of the Faculty Veterinary Medicine.

6. One rabied cow which was cows presented to the Veterinary Clinic of Faculty of Veterinary Medicine of Edfina. Rabies infection was varified at the El Agoza laboratories, Ministry of Public Health and departement of pathology Faculty of Veterinary Medicine, Zagazig University.

B. **Sampling:**

1. Urine Samples:

The urine samples from each animal was obtained in a suitable vessel by catheterization. The rubber catheter plastic bottles and test tubes were sterile . Introduction of a catheter into the urethra in the cow necessitates insertion of the end of one finger into the suburethral diverticulum.

Examination of urine sample in cattle:

The collected urine samples were subjected to the examination of the physical characters (colour, odour, aspect, transparency, reaction foamy and specific gravity). Urine samples were subjected to qualitative , semi-quantitative and quantitative analysis . The methods used here were in general after Bloom (1960) Benjamin (1961)and Cles (1967).

(1) Colour:

The colour of urine specimens were noted and recorded while observing the specimen in a test tube. The following colour designates were used:-

Colourless.	yellow brown.	brown.
Pale yellow.	greenish yellow.	green.
Yellow.	red.	blue.
Dark yellow	reddish brown.	milky.

(2) Odour:

The normal adour of urine is derived from the volatile organic acids present (urineferrous odour). An odour of ammonia may urea result from being converted to ammonia by bacterial action. Ketonebodies impart a characteristic Sweetish-fruity odour.

(3) Transparency:

The transparency of urine was observed in a test tube and recorded as clear, flocculent or cloudy.

(4) Foam (Froth)

Urine usually is not foamy, but yellow foam might occur following excretion of bilirubin. Surface tension may be altered and any agitation produced froth. This observation was the basis for one of the tests for detection of bilirubin. High protein concenteration in urine will alter surface tension and also produce foam.

(5) Reaction:

The reaction of urine was determined by using Litmus-paper as well as by the universal indicator paper (pH 1 - 14, Carlo Erba S.P.A. - Milano).

(6) Specific gravity:

The specific gravity was measured by Hydrometer-method (urinometer) Race and White (1979).

A weighted float is placed in a column of still urine. The level to which the float sinks was measured of the specific gravity. The float was actually displacing a certain weight of urine which represents specific gravity.

Chemical analysis:

The collected urine samples were subjected to:

I. Qualitative analysis:

1. Protein:

The following chemical test was carried out for protein detection:-

- Head coagulation test or boiling test:

Two-thirds of a test tube was filled with urine. The upper half of the fluid was gently heated.

Any turbidity which appeared that dissolved in 3% acetic acid indicated absent for protein.

2. Detection of glucose:

The glucose (reducing substance) in urine samples was detected by using the Benedict's test:-
To 5cc of benedict's reagent in a test tube, there were added 0.5cc of urine was added. The tube was immersed in a bath of boiling water of 10 minutes. A postive test for reducing substance is given when a red, yellow or green colour develops and when standing a definite coloured precipitate was formed.

3. Detection of blood:

The blood in urine samples was detected by using Benzidine test: (Benzidine reagent includs benzidine 25 grammes, glecial acetic acid 200 ml and distilled water to 1000cc). Benzidine reagent 2 ml was mixed with an equal volume of hydrogen peroxide 3%. Then 2 ml of urine were added and mixed. The appearance of a green-blue colour indicates the presence of blood.

4. Detection of ketone bodies:

Rothera's test was used for detection of ketone-bodies:-

Urine sample (20 ml) was saturated with ammonium sulphate crystals ina test tube. Then a few drops of concentrated ammonium sulphate (2 to 3 drops) and a few drops of freshly prepared 5 % Sodium-nitroprusside were added and the mixture was shaken. A permanganate tinge develops it indicates the presence of aceto-acetic acid and acetone.

II. Semi-quantitative test of urine analysis:

Semi-quantitative examination of urine samples was done by using combur 9 test struos produced by Macherey-Nagel, werkstra Be 6-8, D-5190 Duren.

Technique:

The fresh uncentrifuged urine sample were used after thorough mixing.

1. Test strip was immersed for one second into the urine samples.
2. The excess urine was wiped off from the rim of the vessel.

3. After 30 - 60 seconds, the test patches were compared with the colour scale on the lab .

(1) Blood:

Separate colour scales for erythrocytes and haemoglobin were scattered or compacted giving green dots on the test paper were indicated of intact erythrocyte (practical sensitivity limit 5 erythrocyte/ ml urine).
The detection is based on the pseudoperoxidative activity of haemoglobin and myoglobin, which catalyze the oxidation of an indicator by a organic hydroperoxide producing a green colour.

(2) Urobilinogen:

The determination of urobilinogen is based on a new specific reaction. As table diazonium salt reacts almost immediatly with urobilinogen to give a red AZo dye (practical sensitivity limit 0.4 mg/dl.). No discolouration of the test path or colour lighter than that shown for 1 mg/dl. Constitute a normal finding.

(3) Bilirubin:

The test for bilirubin is based on the coupling of bilirubin with a diazonium salt; resulting in a pink to bright red-violet colouration proportional to the bilirubin to the bilirubin concentration. Even the slight test pink colouration constitutes a positive .

(4) Protein:

The test is based on the "protein error" principle of indicators. The test Zone is burfered to a constant pH Value and change from yellow to greenish blue in the presence of albumin. Other proteins are indicated with less sensitivity. Reading after 60 second permits semi-quantitive evaluation of the test.

(5) Nitrite:

The presence of nitrite was indicated by a specific reaction that produced a pink to red colouration of Nitrite test field. The practical sensitivity limit was 0.5 mg/dl of urine. Even as light pink colouration indicated a significant number of bacteria.

(6) Ketone-bodies:

This test is based on the principle of legal's test (practical sensitivity limit for aceto-acetic acid 5 mg/ dl or 5 mmal/l.). A positive reaction was indicated by a colour change from beige to violet.

(7) Ascorbic acid:

The detection is based on the discolouration of tillmans reagent. In the presence of ascorbic acid a colour change takes place from blue to red.

(8) Glucose:

Glucose determination was based on the specific glucose-oxidase peroxidase reaction. A positive reaction was indicated by a colour change to orange or brown. After 60 second permits semi-quantitative evaluation of the test. The practical sensitivity limit in 40 mg. glucose / dl. of urine.

(9) PH:

The strip test contains the indicators. Methyl red and bromothymol blue. These give clearly distinguishable colours over the pH ranging from 5 to 9.

III. Quantitative analysis:

1. Determination of total protein in urine:

The best and most avialable method for determination of total protein in urine of normal and diseased cattle were measured by using " Standard Biuret Method" .

Principle of analysis:

Copper in alkaline solution reacts with peptide linkage of amino acid in protein producing a violet colour.

Reagent:

(A) Biuret reagent:

Nine grammes of sodium tartarate were dissolved in 500 ml. of 0.2 N. sodium hydroxide. These grammes of copper sulphate were added and dissolved by stirring, then 5 gm. of potassium iodide were added and the volume completed to 1 liter with 0.2 - sodium hydroxide.

(B) Protein standard solution: (0.5 gm/100 ml)

500 mg of dry crystalline bovine albumin was dissolved in 100 ml. distilled water and was kept frozen at - 15C° .The standard protein solution was standardized using kjeldhal method.

(C) Trichloroacetic acid 20%:

20 grammes of trichloroacetic acid were dissolved in 100 ml.

(D) N-Sodium hydroxide:

40 grammes of sodium hydroxide were dissolved in litre of distilled water.

Procedure:

1. 1 ml. of tested urine was mixed with 1 ml of trichloroacetic acid 20% .
2. The mixture was centrifuged and the supernatent was poured off.(1500 R/10 minutes).
3. The left precipitated protein was dissolved in 0.5 ml of N-sodium hydroxide 2.5 mls of water were then added.
4. The concentration of protein in this solution was 1/3 of that in the original urine standard 3 ml. of standard protein solution was used (0.5 gm. per 100 ml.) Blank. 3 ml. of water was used as blank.
5. To test, standard, and blank were added 5 ml Buiret reagent.
6. All the tubes were incubated at 37°C for 10 minutes.

7. The absorbance of test, standard and blank were measured. colorimetrically at wave length 520 n.m.

Calculation:

$$\text{Urine protein concentration} = \frac{T - B}{S - B} \times 0.5 \times 3$$

$$= \frac{6 - B}{S - B} \times 1.5$$

Where:

T = Test.

S = Standard

B = Blank

2. Determination of glucose in urine:

The glucose in normal and diseased urine samples from cattle were determined by Trinderp. (1969).

Principle:

The presence of Glucose in the sample was determined according to the reaction of glucose into gluconic acid and hydrogen peroxide by glucose oxidase. And when added phosphate buffer (phenol) and enzymes as amino-antipyrine (peroxidase) change into chromogen and water occured.

Glucose $\xrightarrow{\text{glucose oxidase}}$ gluconic acid + H_2O

H_2O_2 + phenol + amino-4-antipyrine $\xrightarrow{\text{peroxidase}}$ chromogen + H_2O

Reagents:

Reagent 1 buffer	phosphate buffer	150 mmol/L.
	phenol	10 mmol/L.
Reagent 2	amino-antipyrine	0.4 mmol/L.
	peroxidase	300 Iu / L.
Enzymes	glucose oxidase	10,000 Iu/L.

Procedure:

Working Solution:

The content of reagent 2 was added to the bottle of reagent 1 and mixed well. The working solution was stored in the original brown bottle and preserved on at 20 - 25°C for 5 days but 1 month store in the refigerator (2 - 8°C).

	Reagent blank	Standard	Sample
Standard (2 g/L.)	-	20 µl	-
Urine sample	-	-	20 µl
Working solution	2 ml	2 ml	2 ml

The contents in the tubes were mixed well and incubated at 37°C for 10 minutes The optical density of sample and standard measured against reagent blank at wave length 505 n m. in calorimeter.

Calculation:

$$\frac{\text{O.D. samples}}{\text{O.D standard}} \times n \quad \text{g./L.}$$

n = concentration of standard in g./L.

3. Determination of creatinine in urine:

Brod, J.& Sirota(1948)

method was used for quantitative determination of creatinine in normal and diseased urine samples as follows:

Principle:

Determination of creatinine in urine was made following the Jaffé reaction:

Reagents:

Reagent 1 (standard	Creatinine	10 mg./l (88-4 mol/L)
Reagent 2 (Alkaline reagent)	Sodium hydroxide	0.75 N
Reagent 3 (Color reagent)	Picric acid	0.04 mol/L.

Samples:

Urine was diluted 1/100 by distilled water just before determination.

Procedure:

	Reagent blank	Standard	Samples
distilled water	1.5 ml	-	-
urine sample	-	-	1.5 ml
standard(reagent 1)	-	1.5 ml	-
Reagent 2	0.5 ml	0.5 ml	0.5 ml
Reagent 3	0.5 ml	0.5 ml	0.5 ml

The reagents were mixed and were left ex actly 20 minutes and were measured calorimeterically at a wave length of 520 n m.

Calculation:

$$\frac{\text{O.D. sample}}{\text{O.D. standard}} \times n \times \text{dilution}$$

n = 40 when was calculated by mg/L.

Determination of urea in urine:

Chaney; Marbach. (1962) and Reiss, *et al.* (1965) method was used for quantitative determination of urea in urine of normal and diseased cows as follows:

Principle:

Enzymatic determination of urea according to the following reaction: $NH_2 - Co - NH_2 + H_2O \xrightarrow{urease} CO_2 + 2\ NH_3$.

The formed ammoniums ions were measured by the Berthelot reaction.

Reagents:

Reagent 1 (Standard)	Urea	0.3 gm./L.
Reagent 2 (enzyme)	Urease	10,000 I.u/L.
Reagent 3 (color reagent)	Phenol	1.07 gm./L.
	Sodium nitroprusside	4.9 gm./L.
Reagent 4 (Alkaline reagent)	Sodium hydroxide	50 gm./L.
	Sodium hypochlorite	4.2 gm./L.

Samples: Urine diluted 1:100 by distilled water.

Procedure:

(1) Working solution number 2:

The reagent 2 was dissolved in 5 mls. of distilled water. The working solution was stable for 4 days when kept in refrigerator (2 - 8°C) and stable for 24 hours at room temperature (20 - 25°C).

(2) Working solution number 3:

Reagent 3 was dissolved in 20 ml of distilled water mixed and transfered to a 500 ml graduated cylinder, The volume was completed to 500 ml. with distilled water. The working solution stable for 30 days at 20 - 25°C.

Procedure:

	Reagent blank	Standard	Samples
Working solution N.2	200 µl	200 µl	200 µl
Reagent 1 (standard)	-	20 µl	-
Sample.	-	-	20 µl
Distilled water	20 µl	-	-

The tubes were incubated for 10 minutes at 37°C mixed well then reagents were added as seen in table:

	Reagent blank	Standard	Samples
Working solution No. 3	5 ml.	5 ml.	5 ml.
Working solution No. 4	5 ml.	5 ml.	5 ml.

The reagents were mixed well and incubated for 15 minutes at 37°C and measured colorimetrically at a wave length (550 n.m.).

Calculation:

$$\frac{\text{O.D. samples}}{\text{O.D. standard}} \times n \times \text{dilution}$$

n = 0.3 when calculation by gm/ L.

Determination of urobilinogen in urine:

The Watson et al, method (1934) was used for quantitative determination of urobilinogen in normal and diseased urine samples.

Principle:

Urobilinogen and other reactive substances including prophobilinogen and melanogens, react with Ehrlich's producing a red colour.

Ascorbic acid acts as a reducing agent. Acidity of the mixture is decreased by subsequent addition of sodium acetate, which intensifies the urobilinogen aldehyde colour inhibiting formation of indole and skatole derivatives. The blank was prepared by adding sodium acetate prior to addition of Ehrlich's reagent, preventing development of the urobilinogen aldehyde pigment. Phenol sulfonphthalin was used as the standard rather than the pontacyl dyes recommended by Watson et al., (1934).

Reagents:

(1) Ehrlich's reagent:

700 mg. p-dimethylaminobenzaldehyde was dissolved in 150 ml conceutrated hydrochloric acid, 100 ml distilled

water was mixed. The reagent was stored in a brown glass bottle.

(2) Sodium acetate saturated solution:

1000 gm. sodium acetate (A.R.) triple hydrate was added to 1 liter of distilled water, and heated to approximatelly 60°C.

(3) Phenol sulfonphthalein dye standard:

20 mg. phenol sulfonphthalin (psp, phenol red) was dissolved in 100 ml 0.05% (W/V) sodium hydroxid. The acid form was used. The stock solution was diluted (1: 100) with 0.05% (W/V) sodium hydroxid

Procedure:

1. The presence of bilirubin in urine was tested by mixing 2 ml 10% (W/V) Barium chloride ($Bacl_2$) with 8.0 ml urine and filtred. The final result was corrected for dilution by multipling by 1.25.

2. 100 mg. Ascorbic acid was dissolved in 100 ml clear urine, to each of two tubes labeled "B" and "U" respectively.

3. Three mls of saturated sodium acetate was added to tube "B" and mixed well. Then 1.5 ml Ehrlich's reagent was added and mixed .

4. To tube "U" 1.5 ml Ehrlich's reagent was added and mixed throughly, and immediatly 3 ml saturated sodium acetate was added.

5. The absorbance of "U" and "B" were read calorimeterically at 560 n m.wave length within 5 minutes, against distilled water.

6. Standard phenol suflonphthalein was read against distilled water at same wave length.

Calculation:

Ehrlich's units per 100 ml urine = $\frac{AV - AB}{AS} \times 0.340 \times \frac{6.0}{1.5} = \frac{AV - AB}{AS} \times 1.38$ Ehrlich's units/100 ml urine

Where:-

AU = tested was added Ehrlich's reagent firstly and sodium acetate secondary.

AB = tested was added sodium acetate firstly and Ehrlich's reagent secondary.

AS = standard.

Determination of calcium in urine:

Clark and Collip (1925) method was used for quantitative determination of calcium in urine of normal and diseased cow.

Principle:

Calcium was precipitated from urine as the oxalate. The precipitate was dissolved in acid and the oxalate ion determined titrimetrically by titration with potassium permanganate.

Procedure:

1. 25 ml of urine was mixed with 1 gm activated charcol and filter.
2. Transfered of 10 ml of the cleared urine to a tube and 2 drops of methyl red solution was added.
3. Added 2 ml of ammonium oxalate solution and pH was adjust to 4.5 with 1 N Hcl and stood for 24 hours at room temperature.
4. The sample was centrifuged and suppernatant liquid was poured off the tube was hold opposite a filter paper for some minutes for removal adherent supper-natant in the tube.

5. The precipitate was dissolved in 4 ml of 1 N H_2SO_4 (sulforic acid) and placed in a boiling water bath, and mixed frequently to facilitate complete solution.

6. Titration with 0.01 N potassium permanganate solution until the first drop which gave the solution a pink colouration.

Calculation:

ml titrant used x normality of titrant x 4 = mg calcium / 100 ml urine.

Determination of inorganic phosphorous in urine:

Taussky et al., (1953).
method was used for quantitative determination of inorganic phosphorous in urine of normal and diseased cattle.

Principle:

The urine sample was diluted with distilled water (1:10). The phosphorous forms a phosphomolybdate complex in the presence of ferrus sulphate.

Reagents:

Reagent 1 (standard)	phosphorous	50 mg./L.
Reagent 2 (reducing agent)	sulfuric acid	
	ferrus ammonim sulphate	100 gm./L.
	ferus nitrate	2 gm./L.
Regent 3 (color reagent)	sulfuric acid	1.1 N
	ammonium hepta-molybdate	4.5 gm./L.

Samples:

Urine diluted 1: 10 in distilled water.

Procedure:

Working solution:

Equal volume from reagent 2 and 3 were mixed. The mixed solution was left stable for 1 month at 2-8°C in dark brown glass bottle.

Procedure:

	Reagent Blank	Standard	Sample
Sample	-	-	100 µl
Reagent 1	-	100 µl	-
Distilled water	100 µl	-	-
Working solution	2.5 ml	2.5 ml	2.5 ml

The contents of each tube was mixed well, and measured at 690 n m calorimeterically after 10 minutes.

Calculation:

$$\frac{\text{O.D. sample}}{\text{O.D. standard}} \times n \times \text{dilution} \quad \text{mg/L.}$$

n = 0.05 when calculation By gm./liter.

Determination of magnesium in urine:

Gindler & Heth, D. (1971) method was used for quantitative determination of magnesium in urine of normal and diseased cattle .

Principle:

Colorimetric determination of magnesium without deproteinization using calmagite was used. EGTA eliminate due calcium up to 150 mg./liter.

Reagents:

Reagent 1 (standard)	magnesium sulphate	25 mg/L.
Reagent 2 (color reagent)	calmagite	160 mg/L.
Reagent 3 (Alkaline reagent).	reagent pH 11 EGTA	70 mg/L.

Samples:

The urine was diluted 1:10 in distilled water.

Procedure:

The working solution was prepared by mixing from reagent 2 and reagent 3. The mixed reagents were stable for 4 days at 2-8°C.

	Reagent Blank	Standard	Sample
Distilled water	50 µl	-	-
Reagent 1	-	50 µl	-
Sample	-	-	50 µl
Working solution	2.5 ml	2.5 ml	2.5 ml

After 5 minutes the optical densities of the tube was measured in a colorimeter at wave length 520 n m .

Calculation:

$$\frac{\text{O.D. sample}}{\text{O.D. standard}} \times n \times \text{dilution mg/L.}$$

n = 0.025 when calculation per gm./liter.

Faecal Examination:

a) Sedmintation Method (Boddie, 1959)

A presentative sample of faeces was thoroughly mixed with tap water in a morter to form a suspension which was passed through a fine wire sieve. Filterate was collected in a plastic container. After standing for 10 - 15 minutes, the clear supernatant fluid was poured off and the sediment was thoroughly shaken and centrifugated for 1-2 minutes at 1000 r.p.m. A smear from the deposite in the bottom of the tube was examined under the microscope using a low power lens.

b) Floatation method(Benbrook and Sloss, 1955).

Approximately one gramme of faeces from the collected sample was transferred to a container, then small quantity of water was added and stirred thoroughly using glass rod. The watery suspension of faeces was poured through a fine wire into another container, and filterate was agitated thoroughly before pouring into a test tube up to its middle. Saturated sodium chloride solution was added up to 6ml from its top and the contents were mixed by repeated inversion of the tube, the sample was then centrifugated for 3 minutes at 1500 r.p.m. To a drop of water, place on a microscopic slide, a drop

of the prepared sample was added by means of glass rod and the diluted suspension carefully covered with a cover glass so that the fluids spread evenly under it. The slide was then examined microscopically using the low power, for survey and the high power for identification.

Microscopical examination of the urinary sediment:

Fresh urine sample was usually used for examination of urinary sediment.

Technique:

1. The specimen was mixed throughly and 15 ml was centrifuged for 15 minutes.

2. The supernatant fluid was poured off by inverting tube without wiping the lip of the tube.

3. The sediment was mixed the small amount of urine that remains in the tube (by holding the top of tube with a finger of the other hand) and one drops was placed on a slide and covered with cover glass and examined under the low power.

Sediment:

Urinary sediments could be classified as organized and unorganized or as cellular and organic, inorganic.

Organized sediment:

Vaginal epithelelium, erythrocyte, renal and bladder epithelial cells, leukocytes, casts were cyliner of protein,

fat, Hyaline casts contain no cells, renal tubular epithelial that was sheded.

Unorganized sediment:

Calcium, phosphate, oxalate, uric acid, ureats phosphate crystals were commonly seen in herbivorous urine.

Statistical analysis showing the maximum, minimum values, mean and standard deviation, was calculated according to the following equation. (Snedecor, 1956).

$$SD = \sqrt{\frac{x^2 - (x)^2}{n - 1}}$$

where: x^2 = Sum of square values

$(x)^2$ = Square of Sum of values

n = Number of animals.

Test of significance between two averages were made by the following formula:

$$= \frac{\bar{x}_1 - x^{-2}}{s_1^2 - s_2^2}$$

and degree of freedum = $n_1 + n_{2-1}$

The calculated "T" was compared to the tabulated "T" value present in the "T" table at the respective degree of freedom (D.F.).

The significance of differences among the mean evaluated as being:

(a) Non significant.
(b) Significant at 5% level of probability ($P < 0.05$)
(c) Significant at 1% level of probability ($P < 0.01$)

Results

The urine is formed by the filtering of plasma through the glomeruli of the kidney, and the tubules selectively reabsorb those substances useful to the body and leave behind or secrete into the urine those substances undesirable to the body. Laboratory tests have been developed to evaluate each of those processes of urine formation in health and disease.

(A) Urine analysis in apparently healthy cattle:

pH and specific gravity of the studied urine samples in clinically normal are demonstrated in table (1) and graph (I) & (II). It shows the maximum; minimum and mean values of pH (8.09 ± 0.06) and the mean of specific gravity in urine is 1.020 ± 0.001.

Table (2.) shows the qualitative tests and semiquantitative analysis of urine. Urine samples of clinically normal cows were lacking protein; glucose; bilirubin and blood. While 16 out of 50 cows were positive for urobilinogen. The semiquantitative analysis were also positive for protein(30mg) of 50 urine samples while they were negative for ketone-bodies and bilirubin. However these urine samples were negative for glucose; blood; nitrite and ascorbic acid.

Quantitative levels of total protein in urine ranged from 0.199 -- 0.000 with mean 0.062 ± 0.005 gm %, while the mean of urobilinogen was 1.09 ± 0.74 Ehrlich's units/ 100 ml urine.

The mean of creatinine, urea, glucose, calcium, inorganic phosphorous and magnesium were 2.29 ± 0.027 ; 18.28 ± 2.58; 0.030 ± 0.002; 0.021 ± 0.002 ; 0.79 ± 0.009 and 0.21 ± 0.02 gm./liter respectively. These results are demonstrated in table (3) which shows the maximum, minimum and mean levels of these constituents.

(B) Urine analysis in some diseased conditions:

(I) Fascioliasis: (according to the presence of ova in the faeces)

The mean levels of pH of urine samples from 110 cows infested with fasciola were 8.11 ± 0.03 while the average of specific gravity of urine varied from 1.035 to 1.009 with mean 1.030 as shown in table (4) and graph (I) and (II) .

Table (5) shows the qualitative and semi-quantitative analysis of urine of cows infested with fasciola.

Using the qualitative tests, the urine was negative for glucose, blood and protein while positive for

bilirubin and out of 100 urine samples and ketone-bodies 5 out of 100 urine samples.

By semi-quantitative analysis the urine samples were positive for protein, bilirubin, urobilinogen and ketone bodies (five cases), but they were negative for ascorbic acid, nitrite, blood and glucose in urine

Table (6) demonstrates the effect of fasciola infestation on quantitative analysis of urine of cows. The mean of total protein was 0.137 ± 0.006 gm./liter, with a significant increase. The average of the urobilingoen in urine was 0.156 - 58.96 Erlich's units/100ml urine with a significant increase. However, there was a significant decrease in creatinine level with mean 1.34 ± 0.008 gm./liter. In the mean time there was no change of urea; glucose and inorganic phosphorous.

The average level of calcium in urine was from 0.006 to 0.128 gm./liter with mean 0.043 ± 0.003 gm./liter with a significant rise. However, there was significant decrease of magnesium in urine and the averaged level was 0.040 to 0.34 gm/liter with mean 0.13 ± 0.006 gm/liter of magnesium.

(III) Post-parturient haemoglobinnuria:-

The mean pH values of the studied urine sample of 12 cow with post-parturient haemoglobinuria were 8.00 ± 0.11, while the mean of specific gravity in these cows were 1.030 ± 0.002. It means that there is a significant rise in the level of the specific gravity. These results are demonstrated in table (7).

Table (8) shows the qualitative and semi-quantitative tests in urine of 9 cows suffering from post-parturient haemoglobinuria. All the urine samples were positive for blood, protein, urobilinogen and ketone-bodies (6 samples and negative for glucose, nitrite.

Table (9) demonstrates the levels of total protein, urobilinogen, urea, creatinine, glucose, calcium, inorganic phosphorous and magnesium using the quantitative analysis of urine.

The total protein in the urine samples ranged from 3.00 - 1.00 gm % with mean 2.13 ± 0.17 gm % (with a significant increase).

The mean of urobilinogen in urine ranged from 2.08 - 2.25 Ehrlich's units/100 ml urine with mean 3.57 ± 0.26 Ehrlich's units/100 ml urine (significant increase).

The urea in urine of those animals ranged from 8.82 gm/liter to 56.45 gm./liter with mean 32.8 ± 5.72 gm./liter with a significant increase.

The mean of inorganic phosphorous in the urine was 0.002 ± 0.001 gm./liter with a significant decrease.

(IV) Pneumonia:

The mean pH values of the studied urine sample of 4 cows with pneumonia were 8.1 ± 012 , while the mean of specific gravity in those cows were 1.029 ± 0.003. This denotes that there is no a significant change in the level of the specific gravity. These results are demonstrated in table (10).

Table (11) shows the qualitative and semi-quantitative analysis of urine in 10 cows suffering from pneumonia.

Using the qualitative tests the urine was negative for glucose, Blood, while positive for protein. Three out of 10 cases with pneumonia were positive for bilirubin.

The urine was negative for blood, glucose, ketone-bodies, Nitrite and ascorbic acid, but all the 10 urine samples were positive for protein (30 - 100 mg); 3 cases out of 10 cases were positive for bilirubin and 2 cases out of 10 cases were negative for urobilinogen when using semiquantitative analysis.

Table (12) shows the results of quantitative analysis of urine in 10 cows suffering from pneumonia. It reveals that there is no significant changes in creatinine, urea, glucose, calcium inorganic phosphorous and magnesium levels (the mean were 2.006 ± 0.48 ; 18.6 ± 2.79; 0.016 ± 0.003; 0.032 ± 0.38 ; 0.36 ± 0.13 and 0.13 ± 0.028 gm/ litre respectively). However there is a significant change in the level of total protein which averaged from 0.04 — 0.991 gm% with mean 0.566 ± 0.09 gm% . In the sametime urobilinogen level in the urine of those cows averaged from 2.52 — 0.000 Ehrlich's units per 100 ml urine with

mean 0.480 ±0.48 Ehrlich's units/100 ml urine with no change.

(V) Simple Tympany:

The mean pH value and specific gravity of cows urine infected with simple tympany. (mean were 8.12 and 1.021 respectively). With no significant changes as is shown in table (13).

Table (14) shows the qualitative and semi-quantitative analysis of urine of 10 cows with simple tympany. The urine sample were negative for glucose, blood, nitrite, ketone-bodies and ascorbic acid in qualitative and semi-quantitative tests. However the protein was positive in semi-quantitative test (30 mg); bilirubin was positive (++) and urobilinogen (+).

Table (15) demonstrates the levels of total protein, urobilinogen, urea, creatinine, glucose, calcium, phosphorous and magnesium using the quantitative analysis of urine

(VI) Rabies:

The physical properties of urine of one rabied cow was examined. The colour was brownish red and turbied with urinferous odour, alkaline pH (7.5) and specific

gravity is 1.040. By the qualitative test, it revealed that the urine sample was positive for protein, bile, blood, Acetone and glucose. Using the semi-quantitative analysis, it was positive for glucose (500 mg); blood (+++); protein (100 mg); ketone-bodies (++) ; bilirubin (+) and urobilinogen (++) while it was negative for nitrite and ascorbic acid.

Quantitative analysis of the examined urine sample [illegible]

urea, calcium, inorganic phosphorous magnesium and glucose levels are 2.8 gm % . 2.35 Ehrlich's units/ 100 ml urine; 7.21 gm/ liter, 20.50; 0.030, 1.5, 0.050 and 5.5 gm./liter respectively.

Table (1): Shows the PH value and specific gravity of urine in appearently clinically healthy cows (control)

Variable	Number of examined animal	Conditions of animals	Maximum	Minimum	Mean ± S.E.
PH	50	Control	8.50	7.00	8.09 ± 0.06
Specific gravity	50	Control	1.040	1.010	1.020± 0.001

Table (2): Shows the qualitative ans semi-quantitative tests in urine of apperent clinically normal cows (control)

Conditions	Glucose		Blood		Protein		Ketone-bodies		Bilirubin		Urobil-inogen	Nit-rite	Ascorbic acid	
	qual.	Semi-qu.	qual.	semi-qu.	qual.	semi-qu.	qual.	semi-qu.	qual.	semi-qu.	semi-qu.	semi-qu.	semi-qu.	
	-ve	+ve	-ve	+ve	-ve	+ve	-ve	+ve	-ve	+ve	-ve	+ve	-ve	+ve
Apperently clinically normal (control) 50 animal	50	-	50	-	50	-	50	-	50	-	50 (30mg)	-	50	-
	50	-	50	-	50	-	50	-	50	-	32	18 (+)	50	-
	50	-	50	-	50	-	50	-	50	-	50	-	50	-

qual. = qualitative test

(-) ve = Negative

Semi-qu. = Semiquantitative

(+) = Slight positive

Table (3): Shows the normal levels of constituents of urine in appearently clinically healthy cattle.

Variable	Number of examined animals	Units	Appearently clinically healthy		
			Maximum	Minimum	Mean ± S.E.
Total protein	50	grammes %	0.199	0.000	0.062 ± 0.005
Urobilinogen	50	Ehrlich's units/ 100 ml urine	2.57	0.000	1.09 ± 0.740
Creatinine	50	grammes/liter	7.02	0.570	2.29 ± 0.027
Urea	50	grammes/liter	32.40	5.290	18.28 ± 2.580
Glucose	50	grammes/liter	00.060	0.000	0.03 ± 0.002
Calcium	50	grammes/liter	0.080	0.001	0.021 ± 0.002
Inorganic phosphorous	50	grammes/liter	0.020	0.000	0.79 ± 0.09
Magnesium	50	grammes/liter	0.080	0.000	0.21 ± 0.02

S.E. = Standard error of the mean.

Table (4):ShowS the PH value and specific gravity of urine of infested cattle with fasciolasis.

Variable	Conditions of animals	Number of examined animals	Maximum	Minimum	Mean ± S.E.	"t" test	
						"t" calculated	Tabulated
PH	Fascioliasis	110	8.50	7.50	8.11 ± 0.03		
Specific gravity	Fascioliasis	110	1.035	1.009	1.030± 0.001	500**	1.67

S.E. = Standard error of the means

** Significant rise in the specific gravity of urine (P<0.005) in fascioliasis

Table (5): Shows the qualitiative and semiquanaiitative tests of urine cattle infested with fascioliasis.

Conditions	Glucose		Blood		Protein		Ketone-bodies		Bilirubin		Urobil-inogen	Nit-rite	Ascorbic acid	
	qual.	Semi-qu.	qual.	semi-qu.	qual.	semi-qu.	qual.	semi-qu.	qual.	semi-qu.	semi-qu.	semi-qu.	semi-qu.	
	-ve	+ve	-ve	+ve	-ve	+ve	-ve	+ve	-ve	+ve	-ve	+ve	-ve	+ve
Fascioliasis 110 animals	110	-	110	-	110	-	110	-	- (30-100mg)	110	105	5	105	5
	-	110	-	110	-	110	-	110	105	5	-	110	-	110
	110	-	110	-	110	-	110	-	-	110	- (+)	110 (++)	110	- 110 -

qual. = qualitative test Semi-qu. = Semiquantitative

(-ve) = negative (+) = Slightly positive (+ +) = positive

Table (6): Shows the mean levels of quantitative analysis of urine includes total protein, urobilinogen creatinine, urea, glucose, calcium, inorganic phosphorous and magnesium of cattle infested with fasciola.

Variable	Units	Number of examined animals	Clinically healthy cattle			Number of examined animal	Diseased cattle			"t" test	
			Max.	Min.	Mean ± S.E.		Max.	Min.	Mean ± S.E.	"t" cal.	"t" tab.
Total protein	gm %	50	0.199	0.000	0.062±0.005	110	0.267	0.00	0.137±0.006	8.89**	1.67
Urobilinogen	Ehrlich's units per 100 ml urine	50	2.57	0.000	0.09 ±0.074	110	58.96	0.156	3.04 ±0.64	2.03*	1.67
Creatinine	g./L.	50	7.02	0.57	2.26 ±0.027	110	6.43	0.39	1.34 ±0.008	4.55**	1.67
Urea	g./L.	50	32.4	5.29	18.28 ±2.58	110	36.43	1.77	14.34 ±0.83	1.61	1.67
Glucose	g./L.	50	0.06	0.00	0.03 ±0.002	110	0.141	0.00	0.06 ±0.006	0.003	1.67
Calcium	g./L.	50	0.080	0.001	0.021±0.002	110	0.128	0.006	0.043±0.003	100.0**	1.67
Inorganic phosph.	g./L.	50	2.02	0.00	0.79 ±0.09	110	2.02	0.00	0.71 ±0.05	0.8	1.67
Magnesium	g./L.	50	0.80	0.00	0.21 ±0.02	110	0.34	0.04	0.13 ±0.006	4.0**	1.67

Max. = Maximum Min. = Minimum gm % = gramms percent g/L. = gramms per liter

S.E. = Standard error of the mean Cal. = Calculated Tab. = Tabulated

** Significant with ($P < 0.005$).

Table (7): Shows the PH value and specific gravity in urine of infected cattle with post-parturient haemoglobinuria

Variable	Conditions	Number of examined animals	Maximum	Minimum	Mean ± S.E.	"t" test	
						"t" Calculated	"t" Tabulated
PH	Post-parturient haemoglobinuria	12	8.50	7.50	8.00 ± 0.11		
Specific gravity	Post-parturient haemoglobinuria	12	1.045	1.019	1.030± 0.002	30.30**	1.67

S.E. = Standard error of the mean

** Significant increased on specific gravity of urine ($P < 0.005$) indiseased than normal

Table (8): Shows the qualitative and semi-quantitative analysis of urine in cows infected with post-parturient haemoglobinuria.

Conditions	Glucose		Blood		Protein		Ketone-bodies		Bilirubin		Urobil-inogen	Nit-rite	Ascorbic acid	
	qual.	Semi-qu.	qual.	semi-qu.	qual.	semi-qu.	qual.	semi-qu.	qual.	semi-qu.	semi-qu.	semi-qu.	semi-qu.	
	-ve	+ve	-ve	+ve	-ve	+ve	-ve	+ve	-ve	+ve	-ve	+ve	-ve	+ve
Post-part-urient haemoglob-inuria 12 animals	12	-	12	-	-	12	-	12 (++++)	-	12	-	12	3	6	3	6 (+)	-	12	-	12 (++)	-	12 (+++)	12	-	12	-

qual. = qualitative test Semi-qu. = Semiquantitative
(-ve) = negative (+) = slightly positive (++) = positive (+++) = strong positive
(++++) = very strong positive

Table (9): Shows the mean levels of quantitative analysis of urine includes total protein, urobilinogen creatinine, urea, glucose, calcium, inorganic phosphorous and magnesium of cattle infected with post-parturient haemoglobinurea

Variable	Units	Number of examined animals	Clinically healthy cattle			Number of examined animal	Diseased cattle			"t" test	
			Max.	Min.	Mean ± S.E.		Max.	Min.	Mean ± S.E.	"t" cal.	"t" tab.
Total protein	gm %	50	0.199	0.000	0.062±0.005	12	3.00	1.00	2.13 ± 0.17	23.00**	1.67
Urobilinogen	Ehrlich's units per 100 ml urine	50	2.57	0.000	0.09 ±0.074	12	4.52	2.25	3.57 ± 0.26	11.81**	1.67
Creatinine	g./L.	50	7.02	0.57	2.26 ±0.027	12	2.75	1.00	1.5 ± 0.15	1.33	1.67
Urea	g./L.	50	32.4	5.29	18.28 ±2.58	12	56.47	8.82	32.8 ± 5.72	3.83**	1.67
Glucose	g./L.	50	0.06	0.00	0.03 ±0.002	12	0.82	0.00	0.025±0.006	0.024	1.67
Calcium	g./L.	50	0.080	0.001	0.021±0.002	12	0.26	0.04	0.178±0.020	5.33**	1.67
Inorganic phosph.	g./L.	50	2.02	0.00	0.79 ±0.09	12	0.01	0.00	0.002±0.001	4.38**	1.67
Magnesium	g./L.	50	0.80	0.00	0.21 ±0.02	12	0.25	0.01	0.14 ±0.02	1.4	1.67

Max. = Maximum Min. = Minimum gm % = gramms percent g/L. = gramms per liter

S.E. = Standard error of the mean Cal. = Calculated Tab. = Tabulated

** -Significant with (P < 0.005).

Table (10): Shows the PH value and specific gravity of urine suffering from pnemonic cattle.

Variable	Conditions of animals	Number of examined animals	Maximum	Minimum	Mean ± S.E.	"t" test	
						"t" Calculated	"t" Tabulated
PH	Pneumonia	10	8.5	7.5	8.1 ±		
Specific gravity	Pneumonia	10	1.038	1.010	1.029 ± 0.003	0.64	1.67

S.E. = Standard error of the mean

Table (||): Shows the qualitative ans semi-quantitative tests of urine cattle suffering from penumonia

Conditions	Glucose		Blood		Protein		Ketone-bodies		Bilirubin		Urobil-inogen	Nit-rite	Ascorbic acid
	qual.	semi-qu.	qual.	semi-qu.	qual.	semi-qu.	qual.	semi-qu.	qual.	semi-qu.	semi-qu.	semi-qu.	semi-qu.
	-ve	+ve	-ve	+ve	-ve	+ve	-ve	+ve	-ve	+ve	-ve +ve	-ve +ve	-ve +ve
Pneumonia 10 animals	10	-	10	-	10	-	10	-	-	10	- 10 (30-100 mg)	10 -	10 - 3	7 3	7 (+)	2 8 (++)	10 -	10 -

qual. = qualitative test Semi-qu. = Semiquantitative

(-ve) = negative (+) = slightly positive (++) = positive

Table (12): Shows the mean levels of quantitative analysis of urine includes total protein, urobilinogen creatinine, urea, glucose, calcium, inorganic phosphorous and magnesium of cattle suffering from pneumonic cattle.

Variable	Units	Clinically healthy cattle: Number of examined animals	Max.	Min.	Mean ± S.E.	Diseased cattle: Number of examined animal	Max.	Min.	Mean ± S.E.	"t" test: "t" cal.	"t" tab.
Total protein	gm %	50	0.199	0.000	0.062±0.005	10	9.991	0.040	0.566±0.09	12.6 **	1.67
Urobilinogen	Ehrlich's units per 100 ml urine	50	2.57	0.000	0.09 ±0.074	10	2.52	0.000	0.480±0.48	0.86	1.67
Creatinine	g./L.	50	7.02	0.57	2.26 ±0.027	10	4.8	0.666	2.006± 0.48	0.40	1.67
Urea	g./L.	50	32.4	5.[illegible]	18.28 ±2.58	10	42	12	18.6 ± 2.79	0.13	1.67
Glucose	g./L.	50	0.06	0.00	0.03 ±0.002	10	0.027	0.000	0.016± 0.003	1.2	1.67
Calcium	g./L.	50	0.080	0.001	0.021±0.002	10	0.080	0.001	0.032± 0.038	0.64	1.67
Enorganic phosph.	g./L.	50	2.02	0.00	0.79 ±0.09	10	0.48	0.11	0.36 ± 0.13	2.05	1.67
Magnesium	g./L.	50	0.80	0.00	0.21 ±0.02	10	0.29	0.00	0.13 ± 0.28	0.25	1.67

Max. = Maximum Min. = Minimum gm % = gramms percent g/L. = gramms per liter

S.E. = Standard error of the mean Cal. = Calculated Tab. = Tabulated

** Significant with ($P < 0.005$).

Table (13): Shows the PH value and specific gravity of urine of infected cattle with simple tympany.

Variable	Conditions of animals	Number of examined animals	Maximum	Minimum	Mean ± S.E.	"t" test	
						"t" Calculated	"t" Tabulated
PH	Tympany	4	8.5	7.5	8.12		
Specific gravity	Tympany	4	1.030	1.010	1.021		

S.E. = Standard error of the means

Table (14): Shows the qualitative and semi-quantitative analysis in urine cattle suffering from tympany

Conditions	Glucose		Blood		Protein		Ketone-bodies		Bilirubin		Urobil-inogen	Nit-rite	Ascorbic acid
	qual.	semi-qu.	qual.	semi-qu.	qual.	semi-qu.	qual.	semi-qu.	qual.	semi-qu.	semi-qu.	semi-qu.	semi-qu.
	-ve	+ve	-ve	+ve	-ve	+ve	-ve	+ve	-ve	+ve	-ve	+ve	-ve	+ve	-ve	+ve	-ve	+ve	-ve	+ve	-ve	+ve
Simple Tympany 4 animals	4	-	4	-	4	-	4	-	4	-	-	4 (3 mg)	4	-	4	-	-	4	-	4 (++)	-	4 (+)	4	-	4	-

qual. = qualitative test
(-) = negative (+) = slightly positive
Semi-qu. = Semiquantitative
(++) = positive

Table (15): Shows the mean levels of quantitative analysis of urine includes total protein, urobilinogen creatinine, urea, glucose, calcium, inorganic phosphorous and magnesium of cattle suffering from simple tympany.

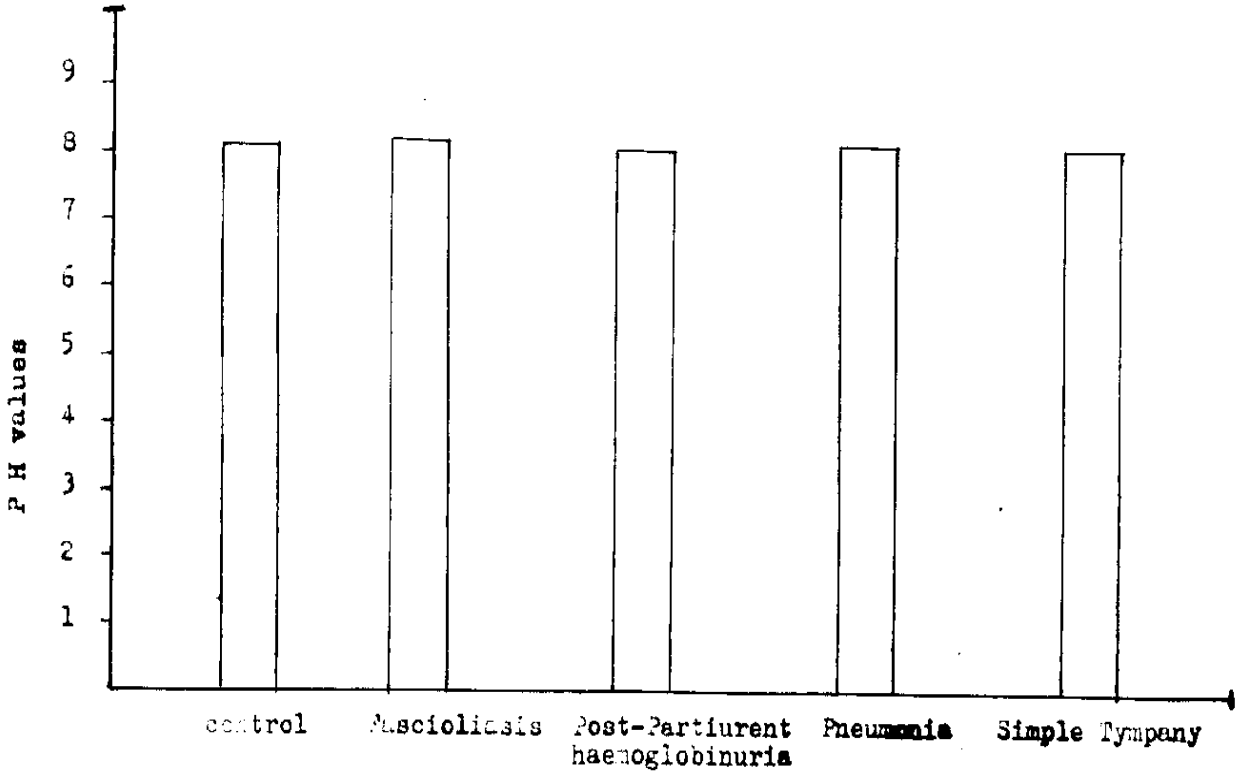
Variable	Units	Number of examined animals	Clinically healthy cattle			Number of examined animal	Diseased cattle			"t" test	
			Max.	Min.	Mean ± S.E.		Max.	Min.	Mean ± S.E.	"t" cal.	"t" tab.
Total protein	gm %	50	0.199	0.000	0.062±0.005	4	0.083	0.033	0.058 ± 0.011	0.176	1.67
Urobilinogen	Ehrlich's units per 100 ml urine	50	2.57	0.000	0.09 ±0.074	4	3.920	1.009	2.329 ± 0.560	1.09	1.67
Creatinine	g./L.	50	7.02	0.57	2.26 ±0.027	4	3.44	1.26	2.23 ± 0.452	0.031	1.67
Urea	g./L.	50	32.4	5.29	18.28 ±2.58	4	24	12	18.29 ± 2.478	0.023	1.67
Glucose	g./L.	50	0.06	0.00	0.03 ±0.002	4	0.410	0.013	0.235 ± 0.0006	0.13	1.67
Calcium	g./L.	50	0.080	0.001	0.021±0.002	4	0.28	0.16	0.23 ± 0.002	0.02	1.67
Inorganic phosph.	g./L.	50	2.02	0.00	0.79 ±0.09	4	1.20	0.38	0.82 ± 0.170	0.096	1.67
Magnesium	g./L.	50	0.80	0.00	0.21 ±0.02	4	0.29	0.13	0.23 ± 0.060	0.25	1.67

Max. = Maximum Min. = Minimum gm % = gramms percent g/L. = gramms per liter

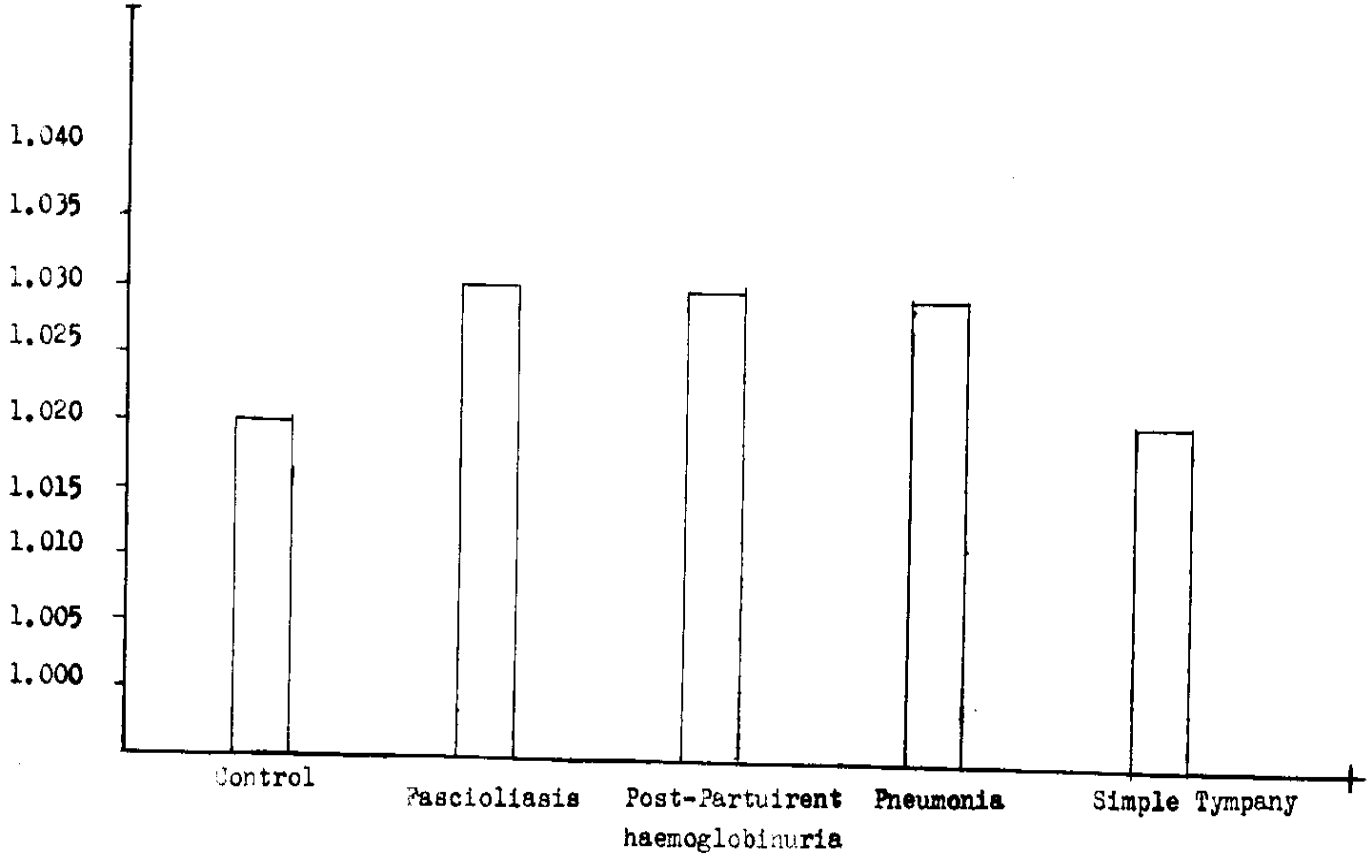
S.E. = Standard error of the mean Cal. = Calculated Tab. = Tabulated

** Significant with ($P < 0.005$).

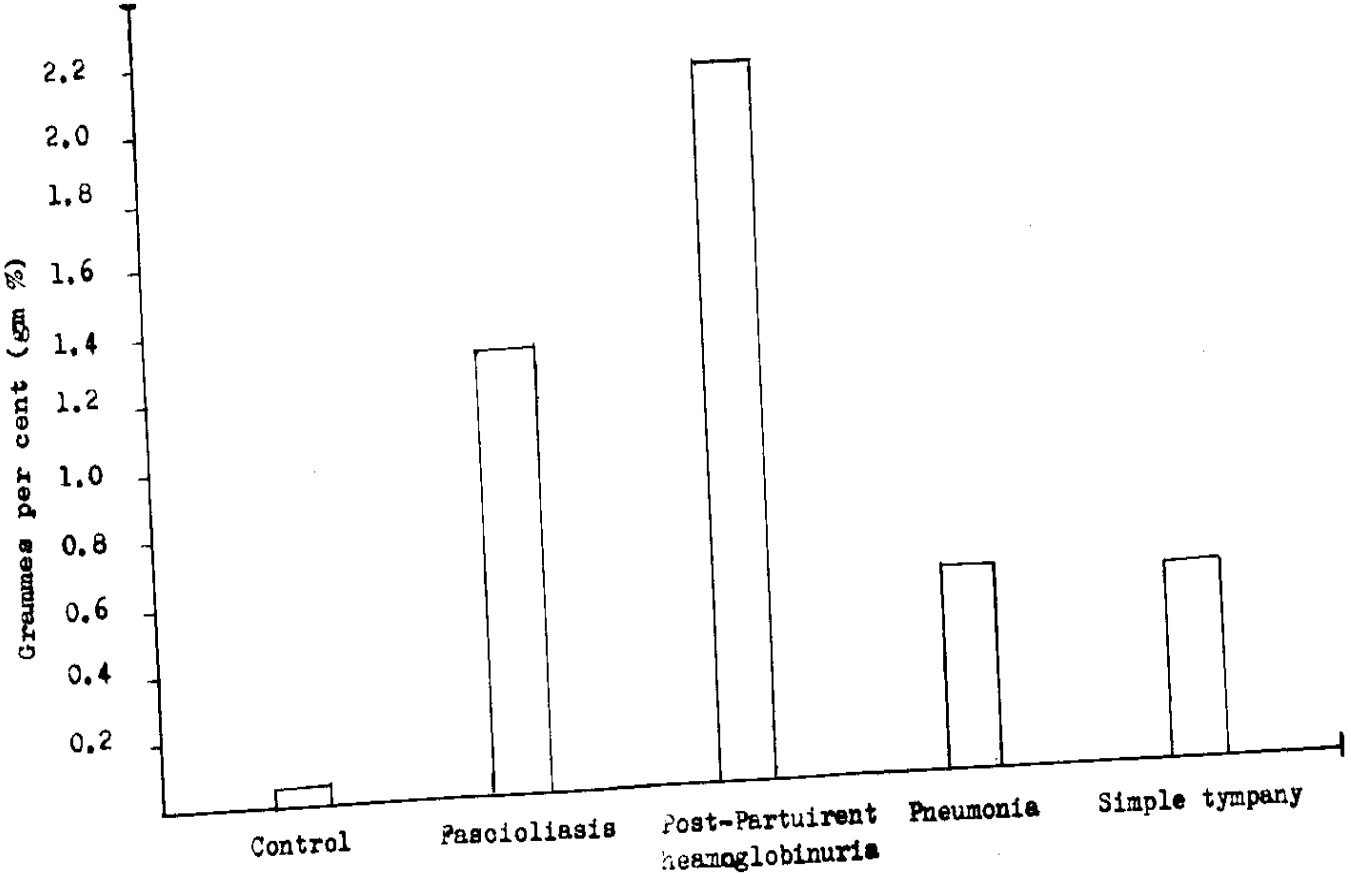
Graph (I) Shows (P H values of urine in control and diseased cattle



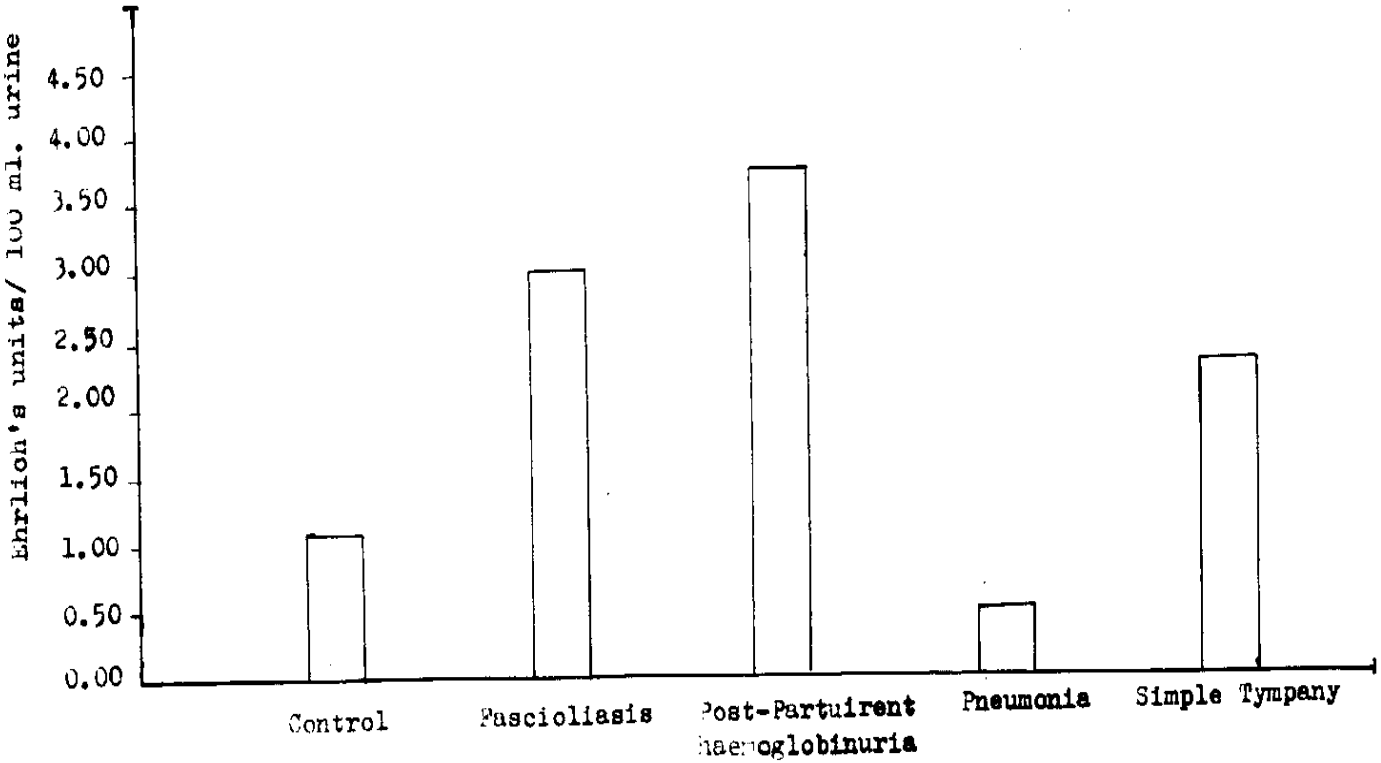
Graph (II) Shows specific gravity of urine in control and diseased cattle



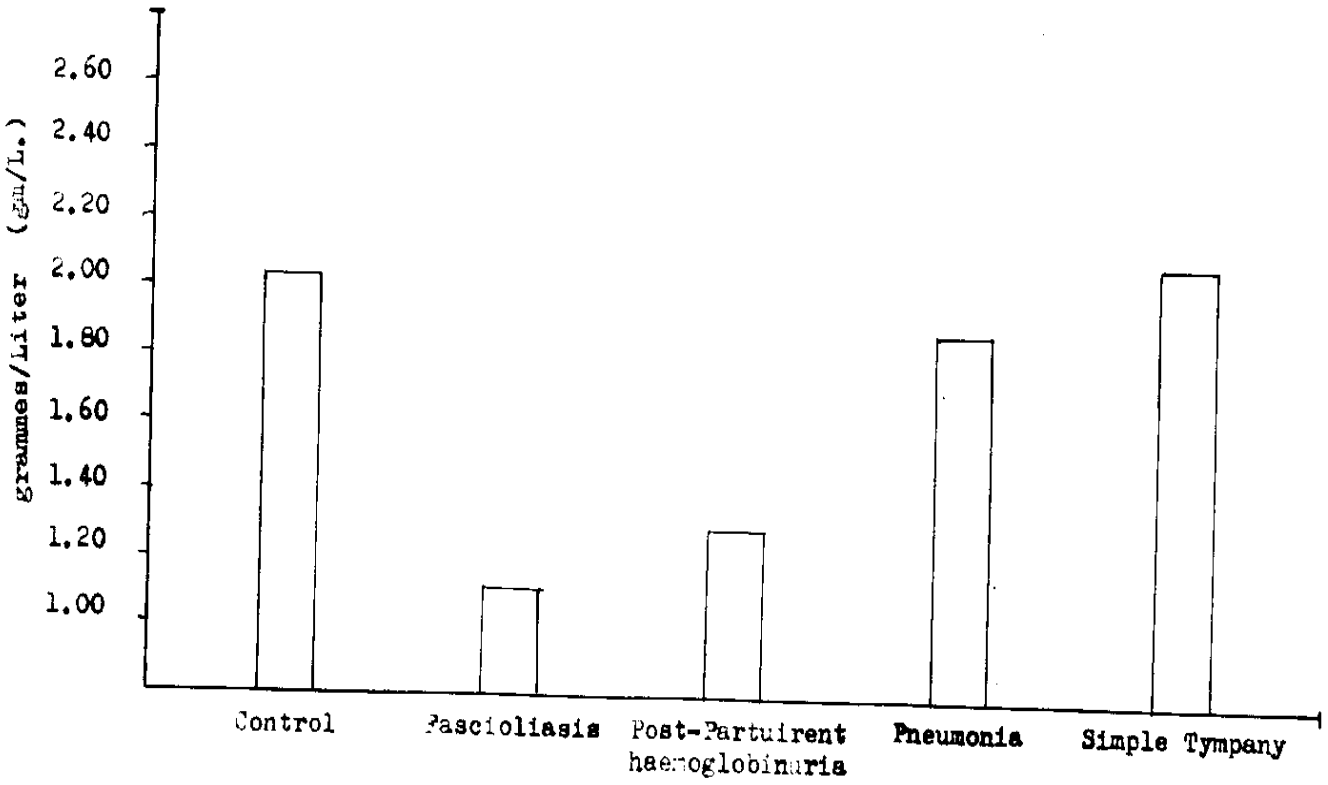
Graph (III) Shows total protein of urine in control and diseased cattle



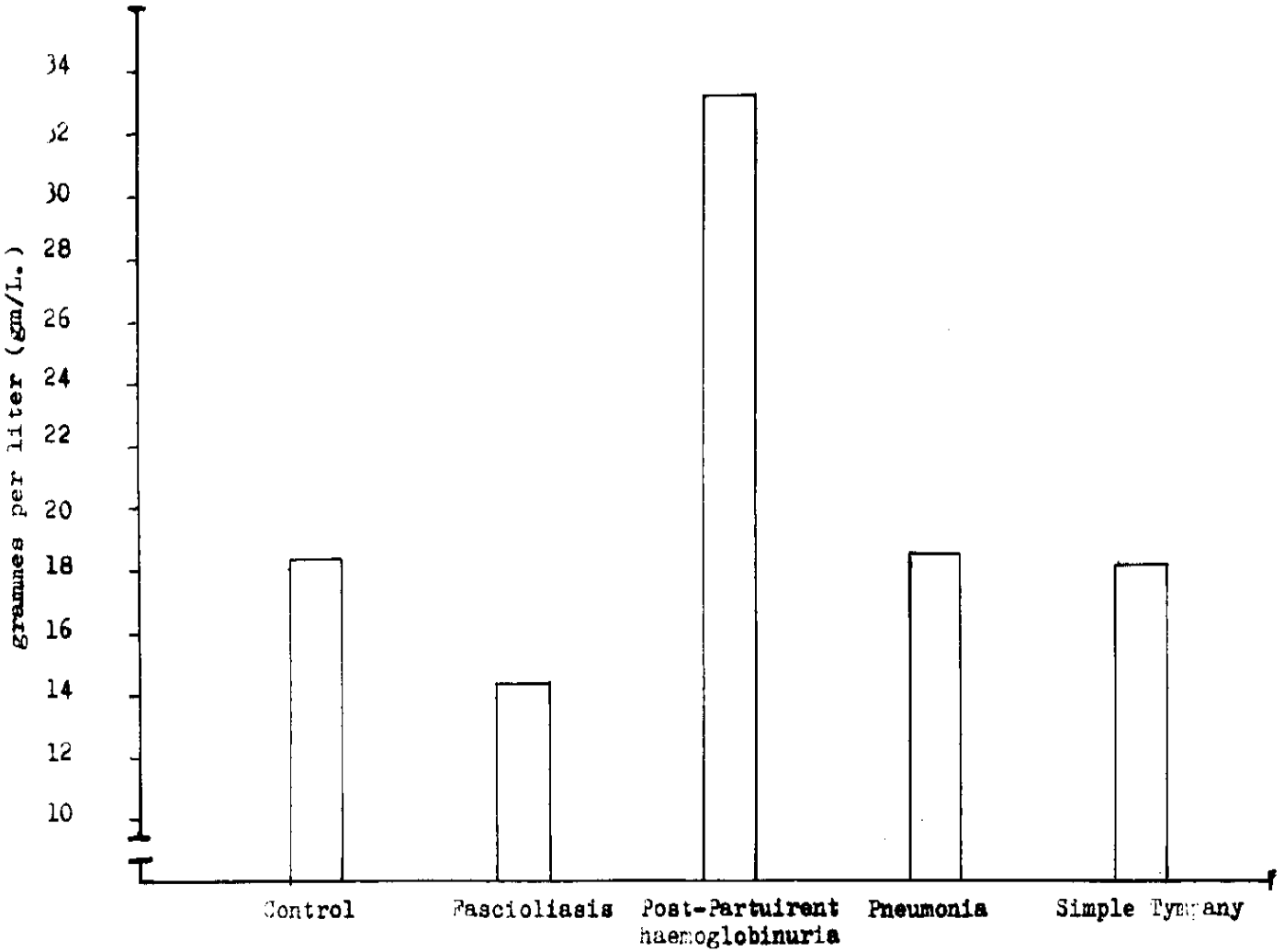
Graph (IV) Shows robilinogen of urine in control and diseased cattle



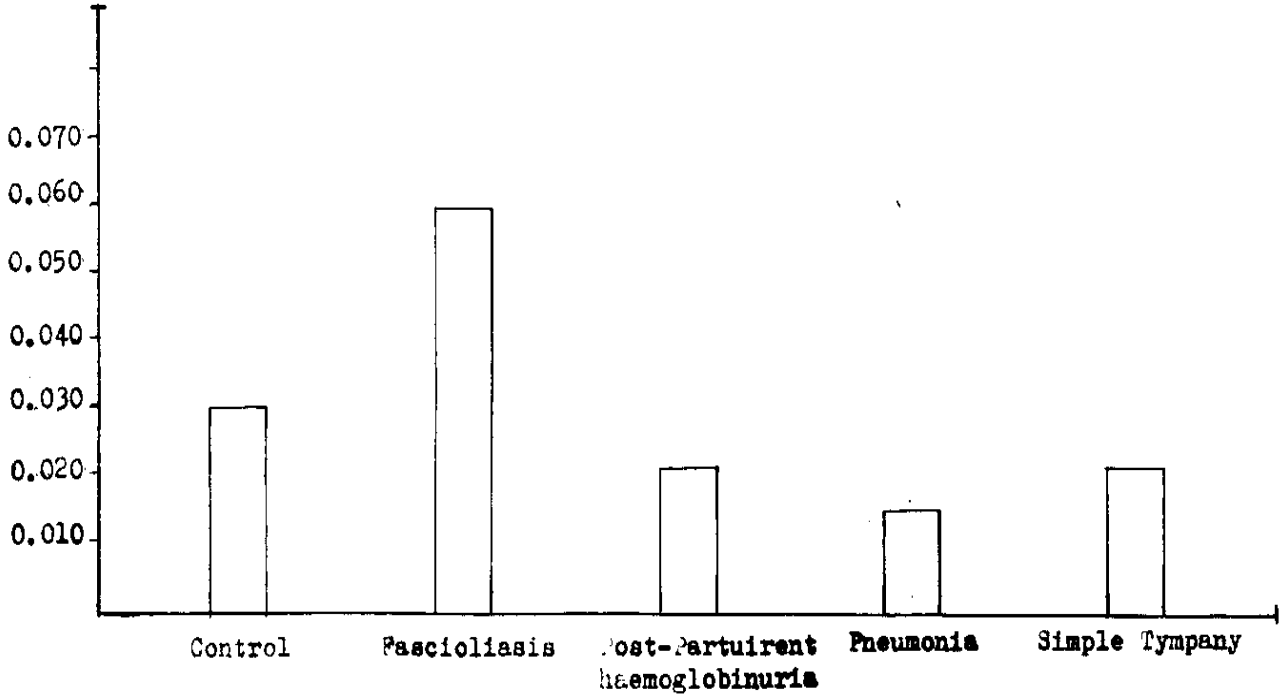
Graph (V) Shows urine creatinine in control and diseased cattle



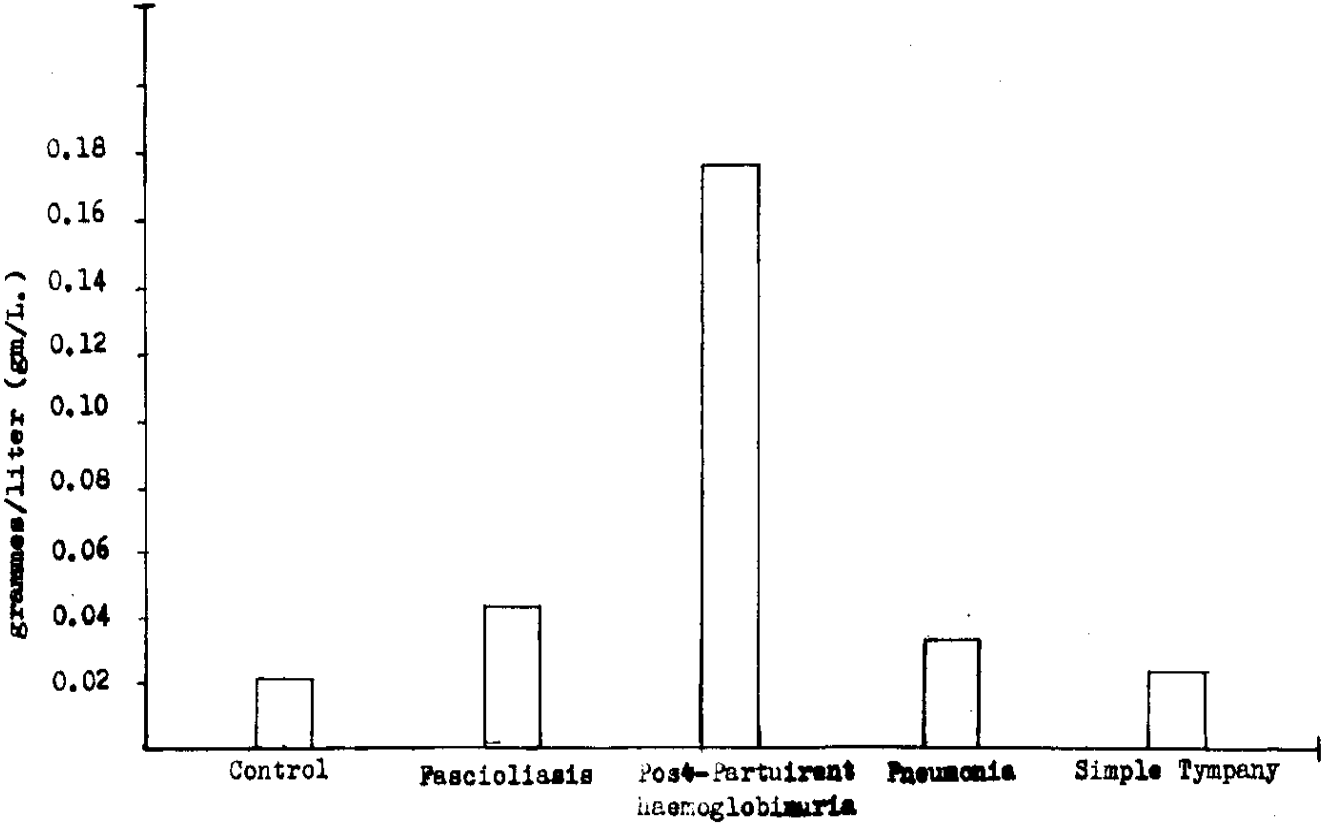
Graph (VI) shows : urea in urine in control and diseased cattle



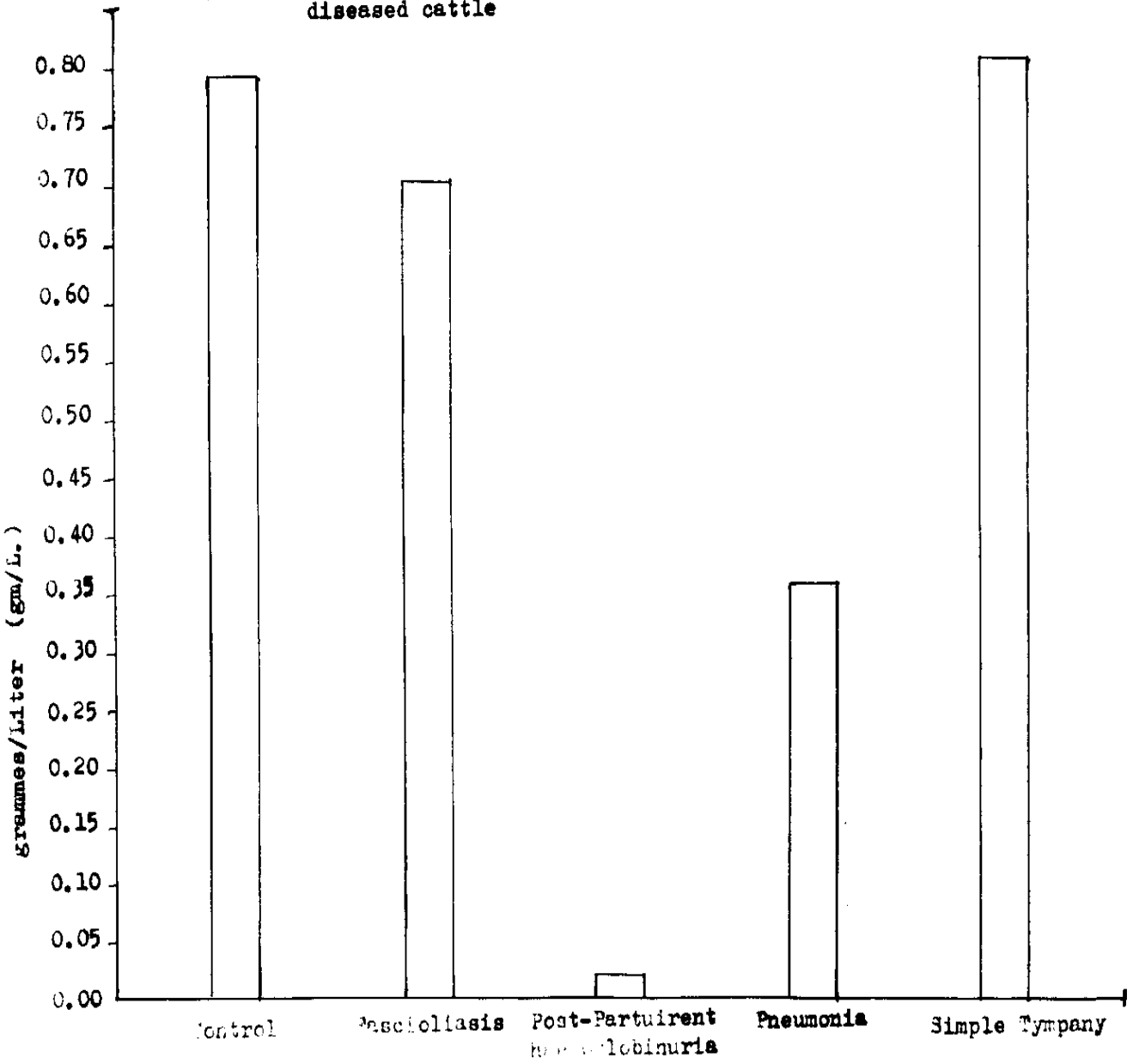
Graph (VII) Shows Glucose levels of urine in control and diseased cattle



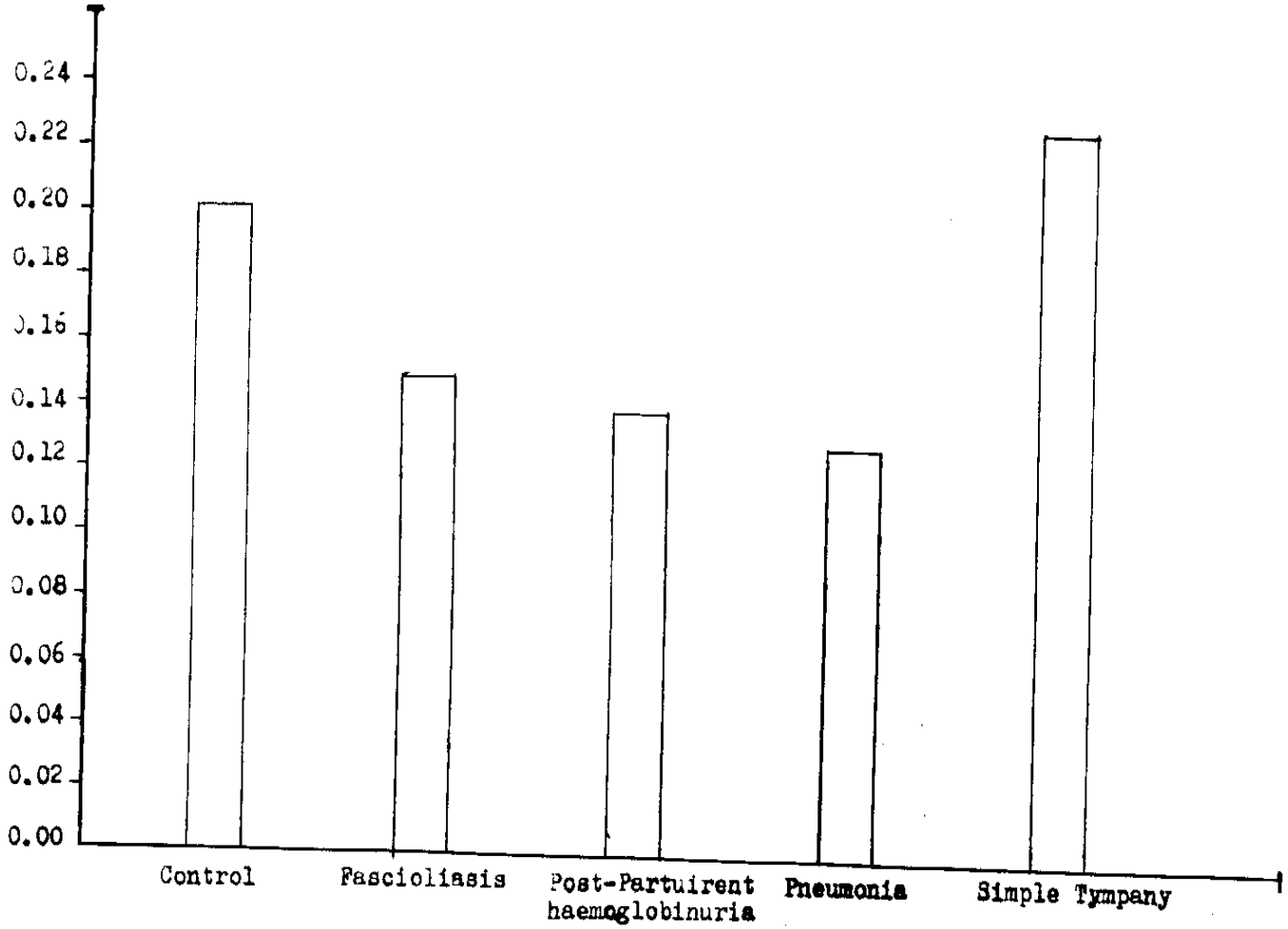
Graph (VIII) Shows calcium level in urine of control and diseased cattle



Graph (IX) Shows inorganic phosphorous level in urine of control and diseased cattle



Graph (X) Shows Magnesium level in urine of control and diseased cattle



Discussion

Urine analysis provides avaluable aid in cattle in the process of diagnosis within no time which gives a great help in early treatment to be applied by the veterinarian.

(A) Physical character qualitative and semi-quantitative analysis of urine:

The urine of 50 clinically apparently healthy cows was initially examined for its physical characters. The colour was straw yellow, transparent, with a urineferous odour, alkaline with pH ranged from 7.00 - 8.50 (mean 8.09 ± 0.06). The specific gravity ranged from 1.040 to 1.010 with mean 1.020 ± 0.010. This is in agreement with the results reported by Du kes (1955). and Cornelius & Kaneko (1963).

The urine is yellowish in colour. However wide variation may occur. In most animals the urine was clear when voided. In ruminant become turbid upon standing because of the precipitation of suspended crystals of calcium carbonate. Specific gravity of urine varies with the relative proportional of dissolved materials and water. In general, the greater the volume, the lower the specific gravity (Swenson, 1977).

Neither blood or haemoglobin were found in urine under normal physiological conditions. In the present investigation, 18 animals out of 50 were positive for bilirubin and urobilinogen. However, cornelius and Kaneko (1963) found a low concentration of urobilinogen in the urine of the examined animals. Protein was detected in the urine samples of all clinically appearently normal animals. These results are in accordance with those reported by Cornelius and Kaneko (1963), Sparacino (1958) and Erlen & Kolb (1962).

The nitrite was absent in the urine samples. and also negative for Ketonebodies. These results were similar to those reported by Robertson and Thin (1953), Morgan (1967); Kelly (1974) and Horber, et al.,(1980).

Their was no ascorbic acid nor glucose in the examined urine samples.

The triple phosphate; urates; calcium phosphates, pus cells; erythrocyte (5-7 per field) and some epithelial cells were detected in all samples of urine in clinically appearently normal animals. Similar results were reported by Cornelius and Kaneko (1963) and Coles (1974).

(B) Quantitative analysis of urine in clinically appearently cattle:

The levels of total protein in urine was 0.062 ± 0.005 gm % . This was nearly similar to that reported by Weeth et al., (1969). However, Sparacino (1958), Romagnoli (1959); Witton et al.,(1969) and Erlen & Kolb (1972) reported different levels of total protein in urine was ranging from 3 mg/100 ml - 62.6 ± 4.87 mg./100 ml.

The mean level of urobilinogen was 1.09 ± 0.74 Ehrlich's units per 100 ml urine.

A small amount of intestinal urobilinogen is absorbed and secreted into the bile or excreted in the urine (Swenson,1977).

Creatinine mean level in the urine of cows was 2.26 ± 0.027 gm./liter, while that of urea was 18.28 ± 2.58 gm./ liter. These results were nearly similar to those reported by Abdulla (1955) and the creatinine is excreted in the urine at levels which are independent of diet and are remarkably constant in the individual animals. Moreover, the daily excretion of creatinine is little influenced by ordinary exercise or by urine volume (Swenson, 1977).

It is known that in man and animals, other than ruminants, the amount of creatinine excreted per unit of time is practically constant for any individual and depends chiefly on the quantity of muscles in the body (Brody, G. and Ashworth, 1934; Borsook and Dubnoff, 1947). Butcher & Harris (1957) stated that they found the creatinine excretion to be independent of the protein ingestion in ruminants.

The rate of elimination of urea in the urine is not only related to the glomerular filteration rate but also to the urine flow, and its rate of production is profoundly affected by the dietary protein content and endogenous protein metabolism. The results of urea in urine (32.00 to 12.00 gm./liter) were nearly Similar to Abdulla (1955).

The mean glucose level in urine of all examined Samples was 0.03 ± 0.002 gm./liter. This result is in agreement with that reported by Morgan (1967); Kelly (1974) and Schilinger (1979).

The average mean levels of calcium, inorganic phosphorous and magnesium in the examined urine samples were 0.020 ± 0.002 ; 0.79 ± 0.09 and 0.21 ± 0.02 gm./ liter respectively. The above mentioned results are

in accordance with those of Abdulla (1955) who found that the calcium was ranging from 0.01 to 0.09 gm./ liter and the level of inorganic phosphorous varied from 1.11 to 2.0 gm./liter. However, Blosser and Smith (1950) found that the magnesium level was 1.82 gm daily in urine. Maynard (1947) has pointed out that the herbivorous excrete very small amount of phosphorous through urinary channels.

Urine analysis in diseased cattle:

(I) Fascioliasis:

A. Physical characters, qualitative and semiquantitative analysis of urine of fascioliated cattle:

The physical characters and qualitative test of urine in 110 cows infested with fasciola revealed that the colour of urine was strow yellow, transparent with a urineferous odour, alkaline pH ranging from 7.50 - 8.50 with mean 8.11 $\pm$ 0.03.

The specific gravity was ranging from 1.035 - 1.009 with mean 1.030 $\pm$ 0.004 . This results was supported by Wolf (1962); Coles (1967) and Kelly (1974).

By using the semi-quantitative analysis, the urine samples were negative for blood, nitrite ascorbic acid and glucose. However protein was present (30 - 100 mg) in the urine of fascioliated cows. These results are in agreement with those of El-Gindy (1966).

The urine samples of cows infested with fasciola were positive for urobilinogen (+++) and bilirubin (++) . These results were supported by El-Gindy (1966); Coles (1974) and Freeman & Beeler (1974).

Ketone-bodies was also found in 5 out of 100 cows infested with fasciola. This result agrees with those reported by Coles (1974).

B. Quantitative analysis of urine in case of fasciolated animals:

In the present investigation, it revealed that the total protein in the urine of fascioliated animals was significantly increased (mean 0.137 ± 0.006 gm %) This is in accordance with El-Gindy (1966).

The urobilinogen in the urine was also significantly increased (mean 3.04 ± 0.40 Ehrlich's units/ 100 ml urine). Medway et al., (1969) and Freeman & Beeler (1974) supported our results.

Concerning the estimation of creatinine and urea in infested animals, it revealed that there was no change in their levels in the urine (mean 1.34 ± 0.008 and 14.34 ± 0.83 gm./liter respectively).

In the present investigation there was no glucose in the urine of 110 fascioliated cows (the mean was 0.030 ± 0.002 gm./liter). However, unfortunately the available literature are lacking similar results.

In the present work, the calcium was significantly increased in the urine of fascioliated animals (mean 0.043 ± 0.003 gm./liter). These results were supported by El-Gindy (1966) who estimated the level of calcium in the urine of fascioliated buffaloes.

In the meantine the level of the magnesium was significantly decreased in the examined urine samples of these animals (mean 0.13 ± 0.006 gm./liter). Magnesium urine test is described to provide the practitioner

with a tool which makes it possible in the field to confirm suspected hypomagnesaemia and this take the immediate steps to prevent a tetanic attack, therefore magnesium concentration in the urine is very senstive measure of the magnesium status of the animal (Kemp 1968).

There is no significant change in the level of the inorganic phosphorous in the urine of the animals infested with fasciola (mean 0.71 ± 0.05 gm./liter).

No change was noticed in the sediment of centrifugated urine samples of these animals.

(III) Post-partuvient haemoglobinuria:

A. The physical character qualitative and semi-quantitative analysis of urine:

The urine was brown to dark coffee-coloured depending upon the severity of illness, with urine-ferrous odour alkaline with PH value varied from 7.50 to 8.50 with mean 7.78 ± 0.17 Kelly (1974) Sharma et al., (1976) and Samed (1979) have reported similar results.

The specific gravity of urine in post-parturient haemoglobinuria ranged from 1.045 to 1.019 with mean 1.030 ± 0.002. This may be attributed to the increasing amount of olid in urine (Coles 1974 and Kelly 1974). On the other hand, the semi-quantitative analysis of urine of affected cows revealed a negative results with nitrite; ascorbic acid and glucose. In the mean time the samples were positive for blood, urobilinogen, bilirubin and protein. Ketone-bodies was also present in 3 out of 12 urine samples of affected cows with post-parturient haemoglobinuria. This result is the same as reported by Kurundkar et al.,(1981).

B. Quantitative analysis of urine in case of post-parturient haemoglobinuria:

In the present work, it was demonstrated that the total protein in the urine of the animals with post-partuirent haemoglobinuria was significantly increased with mean 2.13 ± 0.17 gm % . Kelly (1974) and Kurundkar et al., (1981) reported similar results.

The present data also shows that the urobilinogen was also significantly increased with mean 3.57 ± 0.26 Ehrlich's units/100 ml urine. This has been noted by Freeman and Beeler (1974).

It is quite evident that in these animals the urea was significantly increased with mean 32.8 ± 5.72 gm./liter. However, there is no changes in the levels of creatinine and glucose.

Calcium level was also highly increased in the urine with mean 0.178 ± 0.020 gm./liter in the animals with post-partuirent haemoglobinuria. This may be attributed to insufficiency of the repermeability of the kidney which lead to the execretion of calcium.

Inorganic phosphorous mean was 0.002 ± 0.001 gm./ liter in the urine of the affected cows. There was a significant decrease in the level of inorganic phosphorous in the urine samples. Similar findingswere concluded by Sharma et al., (1976) and Kurundkar et al., (1981).

There was no remarkable changes concerning level of magnesium in urine. The mean was 0.14 ± 0.02 gm./ liter. However, the urinary excretion of magnesium was quite constant between 7 and 3 days prepartum, following which there was a considerable drop on the second day prepartum. There was a still further decline in magnesium excretion on the first day prepartum (Blosser, 1950).

Centrifugation of urine samples from the cows with post-partuirent haemoglobinuria yielded slight sediment.

(IV) Pneumonia:

A. The physical character, qualitative and semi-quantitative analysis of urine in cases of pneumonia:

The physical characters and qualitative test of urine in 10 cows suffering from pneumonia revealed that the alkaline pH was ranging from 7.5 - 8.5 with mean 8.1 ±

The specific gravity was ranging from 1.010 to 1.038 with mean 1.029 ± 0.003. This results were reported by Coles (1967) and Kelly (1974).

By using the semi-quantitative analysis, the urine samples were negative for glucose, blood, nitrite, ketone-bodies and ascorbic acid. However protein (30-100mg) was detected in those infected with pneumonia. These results were supported by Cornelius and Kaneko (1963).

The urine samples of cow suffering from pneumonia were positive for urobilinogen 8 cases (++) out of 10 cases

and for bilirubin 3 out of 10 cases were positive (+) these results were in agreement with Coles (1974).

B. Quantitative analysis of urine in case of pneumonia:

In the present investigation, revealed that the total protein in the cow urine suffering from pneumonia was significantly increased (mean 0.566 ± 0.09 gm %). This is in accordance with those of Cornelius and Kaneko (1963).

The level of urobilinogen in the urine of these animals (mean 0.480 ± Ehrlich's units/100 ml urine. This is result was supported by those of Freeman & Beeler (1974).

Concerning the estimation of creatinine; urea and glucose in pneumonic animals, it appeared that there was no change in their levels (mean 2.006 ± 0.48; 18.6 ± 2.79 and 0.016 ± 0.003 gm /liter respectively).

There was no significant changes concerning the calcium, magnesium, and inorganic phosphorous in the urine of pneumonic animals.(mean were 0.038 ± 0.64 ;

0.36 ± 0.13 and 0.13 ± 0.028 gm/liter respectively). These results are supported by Cornelius and Kaneko (1963) and Coles (1974).

There was no remarkable changes in the sediment of centrifugated urine samples of the animals suffering from pneumonia.

(V) Simple tympany:

A. Physical characters qualitative and semi-quantitative analysis of urine in case of simple tympany.

The physical characters and qualitative test of urine in 4 cow suffering from simple tympany revealed that the pH ranged from 8.5 -- 7.5 with mean 8.12. The specific gravity was (mean 1.021) . These result has been noted by Galambos et. al., (1964) and Coles (1967).

The qualitative tests of urine in case of simple tympany were negative for glucose, blood, protein, and ketone-bodies,however, the bilirubin was positive.

The semi-quantitative analysis was negative for glucose blood, ketone bodies, nitrite, and ascorbic acid while positive for protein (30 mg); bilirubin (++)

and uribilinogen (+). These results are in accordance with those of El-Gindy (1966) and Cornelius and Kaneko (1963).

B. Quantitative analysis of urine in case of simple tympany:

No significantly changes in the levels of total protein were observed in urine of cows with simple tympany (mean 0.058 ± 0.011 gm%). These results agree with those reported by El-Gindy (1966) and Coles (1974). However, there were no significant changes in the levels of urobilinogen has not be (mean was 2.329 ± 0.560 Ehrlich's units per 100 ml urine). In the mean time, there were no changes in the level of creatinine, urea, glucose in the urine of the same investigated animals.

The level of calcium in urine of cows with simple tympany did not significantly changes, with mean (0.23± 0.002 gm/liter). However, there was no remarkable changes concerining the levels of inorganic phosphorous and magnesium in the urine of cows with simple tympany.

It was noticed that there was no changes in the sediment of centrifugated urine samples of the diseased animals.

(VI) Rabies:

Quantitative analysis of urine:

Unfortunately, the urine of only one rabied cow was analysed in the present study. It was found that the total protein, urobilinogen and creatinine were increased (2.8 gm% ; 2.55 Ehrlich's units/100 ml urine; 7.21 gm./liter respectively), however, there was no change in the levels of urea, calcium inorganic phosphorous and magnesium. It is of great interest to mention that the level of glucose in urine was greatly increased (5.5 gm./liter).

Normally only a trace of glucose is lost in the urine, even when a high-carbohydrate diet is fed. However, several diseases results in a significant excretion of glucose in the urine (glucosuria). Diseased conditions resulting in glucosuria often result from hormone imbalance (Swenson 1977).

In addition, the following conditions have been associated with glycosuria: violent excercise, fear, excitement, shock, hypothyrodism, general asphyxia, convulsions, rabies, entorotoxaemia of sheep, chronic liver disease and tubular toxicity (Morgan et al.,1967).

The present work seems therefore to fulfill its aim in throwing a light on the role of urine analysis in certain diseases, providing informations of the greatest importance in the field of diagnosis of different diseases conditions.

SUMMARY

(1) Urine samples were collected from appearently normal cattle as well as from different diseased conditions (Fascioliasis, Post-parturient-haemoglobinuria, Pneumonia, Simple tympany and Rabies.

(2) A total of 187 the urine samples were collected from different locations (private farm in Shabas Al-Melh, Mahallet Malek, Dussoq Center in Kafr-El-Sheik Governorate; the Veterinary Hospital of the Faculty of Veterinary Medicine. Edfina, Alexandria Universty, The army Ranch in Sekelam and from the Veterinary Clinic in Damanhour (Behera Governorate).

(3) The urine samples were analysed and statistic analysis were also carried out in appearentlyclinically healthy as well as diseased cows.

(4) The physical characters of urine (colour odour, reaction, foam, specific gravity and pH) in both app arently healthy and diseased cows were carried out.

(5) The semi-quantitative tests for normal and abnormal urine constituents (blood, urobilinogen, bilirubin, protein, nitrite, acetone, ascorbic acid, glucose and pH) were also carried out.

6. The quantitative test of the physiological constituents of urine (protein, creatinine, urea, glucose, urobilinogen, calcium, inorganic phosphorous and magnesium) were carried out. There was no significant changes among the above mentioned physiological constituents in the urine of appearently healthy cattle.

7. There was a significant increase in the protein urobilinogen and calcium in the urine of 110 cows infested with Fasciola. However, there was a significant decrease of creatinine and magnesium, while there was no significant changes in the levels of urea, glucose and inorganic phosphorous.

8. In case of post-parturient haemoglobinurea (12 cows) the animals were accompanied by a significant increase in protein, urobilinogen, urea and calcium and significant decrease in inorganic phosphorous. However, there were no changes in creatinine, glucose, and magnesium.

9 . Changes in urine constituents in cases of pneumonia. Urine samples were examined in 10 cows suffering pneumonia. Results showed a significant increase in total proteins in urine. No alterations were observed in creatinine, urea, glucose, calcium, inorganic phosphorus & magnesium.

10. Changes in urine constituents in cases of simple tympany. Urine examination was conducted in 4 cows affected with simple tympany. No appreciable changes were observed as compared with normal.

11. Investigating the constituents of urine of rabied cow revealed the presence of glucose, protein and urobilinogen in a high concentration.

REFERENCES

Aafjes, J.H. and De-Groot, T. (1961)
Creatinine and creatine in the cows urine
Tijdschr. Diergeneesk., 86: 1436.

Abdulla, A.A. (1955)
Thesis in analysis of normal sheep urine.
Faculty of Vet. Med. Cairo University Giza,Egypt.

Albin, R.C. and Clanton D.C. (1966)
Factors contributing to the variation in urinary creatinine and creatinine-nitrogen ratios in beefcattle.
J. Animal Sci. 25: 107

Axford, R.E.F. and L'Estrange, J.L. (1964)
A study of magnesium and calcium metabolism in lactating ewes fed a semipurified diet low in magnesium.
J. agric. sci. 62: 353 - 363.

Ballard F.A., Wattanson, R. and Kronfield D.S. (1969)
J. Fed. Proc., 28: 218-231.

Berger H.J. (1956)
Quantitative Bestimmung des "direkten" and des "indirekten" bilirubin in serum der Haustiere
Zbl. Vet. Med. 3: 273.

Bloom, F. (1960)
The urine of the dog and cat
Gamma publication, New York.

Blosser, T.H., and Smith, V.R. (1950)
Partuirent parasis. V. blood serum levels of citric acid and calcium in normal partuirent cows and cows with partuirent paresis .
J. Dairy Sci. 33: 81 - 86.

Benbrook, E.A. and Sloss, M.W. (1955)
The veterinary clinical pathology.
2Ed. Lowa state press. U.S.A.

Benjamin, M.M. (1961)
Out line of veterinary clinical pathology.
2nd Ed Lowa state univ. press. Ames, Lowa.

Biancardi, G. (1969)
Diagnostic and prognostic value of chemical examination of urine in traumatic reticulo-peritonitis in cattle.
Nuova vet. 45, 37 - 44.

Boddie, G.F. (1959)
Diagnostic methods in veterinary medicine
6th Ed. Oliver & Boyd, Edinburgh, London.

Boddie, G.F. (1969)
Diagnostic methods in veterinary medicine
6th Ed. Oliver & Boyd, Edinburgh, London.

Boddie, G.F. (1970)
Diagnostic methods in veterinary medicine
6th Ed. Oliver & Boyd, Edinburgh, London.

Borsook, H. and Dubnoff, J.W. (1947)
J. Biol. chem. 168, 493.

Brod, J. and Sirota, J.H. (1948)
A microcolorimeteric method for the determination of creatinine.
J. clin. invest. 27, 645 - 654.

Brody, S. Proctor, R.C., and Ashworth, U.S. (1934)
Excretion of creatinine in urine.
Res. Bull. Mo. agric. exp. sta. 220.

Bullis, D.D., Bush, L.J. and Barto, P.B. (1965)
Effect of highly purified and Commercial grade growth hormone preparations on milk production of dairy cows.
J. Dairy Sci. 48: 338.

Butcher, J. and Harris, L.E. (1957)
Creatinine as an index material for evaluating ruminant nutrition.
J. animal Sci. 16: 1020.

Campbell, J.B. and Watts, C. (1970)
Blood urea in the bovine animals
Vet. Rec., 87: 127 - 133.

Chaney, A.L. and Marbach, E.P. (1962)
A microcolormetric method for the determination of urea.
Clini. chem. 8: 130 - 132.

Clark, E.P. and Collip, J.B. (1925)
Determination of calcium.
J. Biol. chem. 66 : 375. (fide Howk's phsiological chemistry. 14th. McGraw-Hill Book Co., New York).

Coles, E.H. (1967)
Veterinary clinical pathology.
W.B. Saunders, Co. Philadelphia.

Cornelius, C.E. and Kaneko, J.J. (1963)
Clinical biochemistry of domestic animals
Academic press, New York, London.

Dawas, G.S. (1968)
Fetal and neonatal physiology.
Chicago Year book Med. publisher.

Doxey, D.L. (1971)
Veterinary clinical pathology.
Published in the U.S. by Williams and Wilkins.

Dukes, H.H. (1955)
The physiology of domestic animals
7th Ed. Comstock Publ. Assoc. I thaca, N.Y.

El-Gindy (1957)
Cited in cornelius, C. E. and Kaneko, J.J. (1963)
Clinical biochomistry of domestic animals
Academic Press, New York. London.

El-Gindy (1966)
Some studies on the urine of buffaloes in health and diseases.
J. Egypt Vet. Med. Ass. 26; 137.

Field, A.C. (1970)
Studies on magnesium in ruminant nutrition 10 effect of lactation on the excretion of magnesium and feecal dry matter by grazing nonozygotic twin cows.
Br. J. Nutr. 24: 71-82.

Fisk, C.H. and Subbarowi, V. (1925)
The colorimetric determination of phosphorus
J. Biol. Chem. 66: 375.

Freeman, M.D. and Beeler, M.D. (1974)
Laboratory medicine clinical microscopy .
Lea and Febiger.

Galambos, J.T.; Herndon, E.G. and Reynolds, G.H. (1964)
Specific gravity determination factor fancy.
N. England J. Med. 270 : 506.

De-Groot, T. and Aafjes, J.H. (1960)
On the constancy of creatinine execretion in the urine of the dairy cow.
British. Vet. J. 116: 409.

De-Groot, T. and Martin, M.A. (1967)
A simple control of the magnesium supply of the cow.
T. Diergeneesk. 92:452 - 456.

Gindler, E.M. and Heth, D.A. (1971)
Colorimetric determination of magnesium in serum with polyvinyl pyrolidone-lound colmagaite
Chicago clinical chemist. 3 : 37.

Gonas, K. (1971)
Determination of minerals in urine methods and diagnostic importance in the detection of male nutrition in dairy cow.
Monat sheft fur veterinarimedizin 26 heft 12, 441-445.

Habson, W. (1936)
Urinary out put of creatine and creatinine associated with physical exercise and its relationship to carbohydrate metabolism.
Biochemical J. 32: 1425.

Halse, K. (1976)
Semi-quantitative estimation of magnesium in the urine of cows.
Norsk Vet. T. 88: 668-671.

Hawk, P.B., Oser, B.L. and Summerson, W.H. (1951)
Practical physiological chemistry.
Blakiston, Co. New York.

Heidrich, K.M. (1954)
Die Methylen blauprobe Zumbilirubin nachwies im Rinderm und ihre verwerlbarkeit fur die Diagnose der Lebererkran Kungen.
Diss. Hannover.

Henry, R. (1964)
Clinical chemistry principles and Techniques
New York, Hoeber Medical Division, Harper & Row Publ.

Henson, J. B. Dollahite, J.W.; Bridges, C.H. and Rao, R.R. (1965)
Myodegeneration in cattle Grazing cassia species.
J.A.V.M.A. 147, No 2: 142 - 145.

Hobson, W. (1939)
Urinary out put of creatine and creatinine associated with physical exercise and its relationship to carbohydrate metabolism .
Biochem. J. 33:1425

Horber, H.; Mader, F. and Jucker, H. (1980)
Ketone body concentration in the blood, milk and urine of healthy dairy cows and in cows with primary ketosis.
Schweizer Archiv fur Tierheilk unde
122 (10): 553 - 564.

Hunter, A. (1922)
The physiology of creatine and creatinine
physiol. rev. 2: 586.

Kelly, W.R. (1974)
Veterinary clinical diagnosis (2nd. Ed.)
Bailliere Tindall. London.

Kemp, A. (1968)
Mineral supplies of dairy cow on pasture.
Z. Tierphysiol. Tierenahr. Futtermittek.
23:267-278.

Kronfeld (1965)
Cited by Habbitt, K.G. and Baird, G.D. (1967)
An induced ketosis.
Vet. Record November 11th (1967).

Kuhle, E. (1926)
Versuche uber den Na chweis von Gallenfor-
bstoffen im Harm beil ebergesuden und
Leborkranken Schlachtrinden.
Inaugural Dissertation, Univ. of Berlin.

Kurundkar, V.D.; Deshpande, B.D.; Singh, B. and
Anantwar, L.G. (1981)
Biochemical and pathological changes in
clinical cases of haemoglobin uria in buffaloes.
Indian J. anim. Sci. 51 (1): 35-38.

L'Estrange, J.L. and Axford, R.E.R. (1964)
A study of magnesium and calcium metabolism
in lactating ewes fed a semi-purified diet low
in magnesium.
J. Agric. Sc. 62: 353 - 368.

Martinovich, E. and Wood house (1971)
Cited in Doxey, D.L.
Veterinary clinical pathology.

Marshall, E.K., Jr. (1921)
J. Pharm. Exp. Therap., 16: 141.

Maynard, L.A. (1947)
Animal Nutrition (2nd.Ed.)
Mc Graw - Hill book Co. New York.

Medway, D.V.M., Prier, E. and Wilkinson, S. (1969)
The williams & Wilkins Company.
Baltimore, U.S.A.

Meyer, H. (1963)
Magnesium metabolism, magnesium requirement and magnesium supply in demostic animals.
Thesis, Hannover, 264 PP.

Mitchell, H.H. and Kruger, J.H. (1928)
The effect of muscular work upon the endogenous catabolism of the tissues.
J. Biol. Chem. 76: 55.

Montamagno, E. (1954)
Cited by veterinary clinical pathology.
Published in the U.S. by Williams and Wilkins.

Morgan, H.C. (1967)
Urine chemistry. I (PH, protein, glucose, ketone occult blood) II (Bilirubin and urobilinogen).
Vet. Med./small animal clinican 62, No (1) :
637 - 640 & 737 - 742.

Race, G.J. and White, M.G. (1979)
Basic urinalysis
Hagerstown, Maryland New York,London.

Reiss, D.; Muraine, J. and Dainciarta, (1965)
A microcolormetric method for determination of urea.
Bull. Soc. Pharm. Bordeaux. 104, 173.

Richards, R. and Wolton, K. Margaret. (1976)
A note on the properties of urine exeeted by Grazing cattle.
J. Sci. Food. 27: 426 - 428.

Richards, M.A. and Hoe, C.M. (1967)
A long term study of renal disease in dogs
Vet. Rec. 8: 640 - 646.

Robert, C. A. and Clanton, D.C. (1966)
Factors contributing to the variation in urinary creatinine and creatinine nitrogen ratio in Beef. Cattle.
J. animal. Sci. 25: 107 - 112.

Robertson, A. and Thin, C.A. (1953)
Br. J. Nutr. 7: 181

Romagnoli, A. (1959)
Electrophoretic study of urinary proteins in mineral cows with protein uria (16th)
International Veterinary Congress Hardrid .
Bd. II, S. 261.

Rook, J. A.F.; Balch, C.C. and Line, C. (1958)
Magnesium metabolism on stall rations.
J. Agric. Sci. 51: 189 - 198.

Rook, J. A.F. and Storry, J.E. (1962)
Magnesium in the nutrition of farm animals
Nutr. Abstr. Rew. 32: 1055 - 1077.

Samed, A.; Singh, B. and Qureshi, M.T. (1979)
Some biochemical and clinical aspects of
haemoglobinuria in buffaloes.
Indian, J. vet. 56: 133, 230 - 232.

Schilinger, D. (1979)
Investigation of spontaneous and glucocorticoid
induced glucosuria in cattle.
Tierarztliche umschau, 34 (7): 489, 492-496.

Sharma, S.P.; Malik, K. S. and Gautam, O.P. (1976)
Studies on biochemical and Pathological aspects
of haemoglobinuria in buffaloes.
Indian J. afan. Sci. 46 (7) 336.

Simesen, M.G. (1968)
Milk fever and grasstetany .
Medlemsbl. danske Dyrlaegeform. 51, 848-841.

Snedcor, Q.W. (1956)
Statistical methods.
4th, Ed., the Lowa State Collage Press,
Ames, Lowa.

Sparacino, E. (1958)
Studio electrophoretic delle protein urinearie
in bovini Sani
Attisoc. ital. Sci. Vet. 12: 718.

Swenson, J.M. (1977)
Duke's physiology of demostic animal.
9th Ed. Cornell Univ. Press.

Toussky, H.H; Shorr, E. and Hertha H. (1952)
A microcolorimetric method for the determination
of inorganic phosphorus.

Trinderp, P. (1969)
Determination of glucose.
Ann. Clin. Biochem. 6: 24.

Tolgyesi, G. (1979)
Cation concentration in the urine of grazing housed cattle.
Magyar. Allator Vosok Lapja. 31, (12): 773 - 783.

Wallace, G.B. and Diamond, J.S. (1925)
Significance of urobilinogen in the urine as a test for liver function.
Arch. int. Med., 35: 698.

Watson, C.; Schwartz, S.; Sborov, V. and Bertiei, E.(1964)
Am. J. Clin. Path. 14: 605.
Cited in Laboratory Medicine Clinical.microscopy (1974) By Freeman, M.D. and Beeler, M.D.

Weaver, A.D. (1966)
Urolithiasis in the ruminant.
Vet. Rec. 78: 824.

Weeth, H. J.; Witton, C.F.; Septh. and Blincoe, C.R.(1969)
Urine and plasma protein profiles of hereford cattle.
J. An. Sc. 28: 866.

Weeth, H.J.; Witton, R. and Speeth, C.F. (1969)
Prediction of bovine urine specific gravity and total solids by refractometry.
J. animal Sci. 28, 66-69.

Weeth. H.J.; Witton, C.F.; Speth and Blincoe, C.R.(1970)
Renal protein execretion by cattle deprived of water.
J. An. Soi. 30: 219.

Wilson, A.A. (1960)
Magnesium homeostasis and hypomagnesumia in ruminant.
Vet. Res. Ann. 6: 39 - 52.

Wolf, A.V. (1962)
Urinary concentrative properties.
Am. J. Med. 32: 329.

Wootton, I.D.P. (1969)
Microanalysis in Medical Biochemistry.
4th. Edn. Churchill Livingstone, U.K.

Wootton, I.D.P. (1974)
Microanalysis in Medical Biochemistry.
4th. Edn. Churchill Livingstone, U.K.

ARABIC SUMMARY

الملخص العربي

تحليل البول في بعض أمراض المواشي

(١) جمعت عينات من البول من أبقار سليمة ظاهريا وكذلك من أبقار مريضة لبعض الامراض المختلفة (الديدان الكبدية ، نقص الفوسفور في الجسم ، انتفاخ الكرش ، التهاب رئوى ، بقره مصابه بمرض الكلب) .

(٢) تناول البحث عدد من العينات تبلغ مجموعها (١٨٧ عينة من البول منها ٥٠ عينه من الأبقار السليمة ظاهريا و (١١٠) عينة من أبقار مصابة بالديدان الكبدية و ١٠ عينات من أبقار مصابة بالتهاب رئوى) ٤ عينات من أبقار مصابه بانتفاخ في الكرش و ١٢ عينة من أبقار مصابه بنقص الفوسفور في الجسم وبقرة واحدة مصابه بمرض الكلب وقد جمعت العينات من مزارع قطاع خاص بناحية شباس الملح وبناحية محلة مالك مركز دسوق محافظة كفر الشيخ ومن مستشفى كلية الطب البيطرى بأدفينا ومن الوحدة البيطرية بدمنهور ومن سلخانة دسوق ومن مزرعة الجيش بالرأس السوداء بالاسكندرية .

(٣) تناول هذا البحث الطرق القياسية المعروفة والمشهود لها بالدقة كما تضمن هذا البحث الطرق الاحصائية التحليلية لنتائج فحص البول الطبيعى والبول الغير طبيعى للأبقار السليمة والأبقار المريضة بالأمراض المختلفة المذكورة عاليه .

(٤) تناول البحث دراسة المميزات العامة للبول للأبقار السليمة والمريضة شاملا اللون ، الرائحة ، التفاعل ، الرغوى ، الثقل النوعى كما تناول البحث تقييم قوة التركيز الهيدروجينى .

(٥) تناول البحث القيام بتقدير السبه كمى لبعض المكونات الطبيعية والمرضية (الدم) — اليوروبيلينوجن ، الصفراء ، البروتين ، النيترين ، الاستيون ، حمض الاسكوربيك ، الجلوكوز وقوة التركيز الهيدروجينى للأبقار السليمة ظاهريا والأبقار المريضة المذكورة مسبقا .

(٦) تناول البحث القيام بالتقدير الكمى لبعض المكونات الفسيولوجية التى يستفاد منها فى أغراض العلاج وهى البروتين ، الكرياتينين ، اليوريا ، الجلوكوز ، اليوريلنيوجن ، الكالسيوم ، الفوسفور الغير العضوى ، والماغنسيوم فى الأبقار السليمة ظاهريا ، والأبقار المريضة وكانت نتائج هذه الدراسة كالآتى :

(٧) أولا : تحليل البول فى الأبقار السليمة ظاهريا :

تناول البحث التقدير الكمى لبعض المكونات الفسيولوجية مثل البروتين ، اليوريا ، اليوريلينوجن ، الكرياتينين ، الجلوكوز ، الكالسيوم ، الفوسفور الغير العضوى ، والماغنسيوم فى خمسون حيوان سليم ظاهريا وكانت النتائج موافقة تماما للمعدل الفسيولوجى الطبيعى للأبقار .

(٨) ثانيا : تأثير الأمراض المختلفة على المكونات الطبيعية للبول :

أ ـ التغيرات التى تحدث عند الاصابة بالديدان الكبدية :

تناول البحث دراسة البول فى عدد (١١٠) من الأبقار المصابة بالديدان الكبدية ومقارنة النتائج مع مكونات البول للحيوانات الغير مصابة (السليمة ظاهريا) وقد صاحب الاصابة التغييرات الآتية :

١ ـ زيادة معنوية من البروتين ، اليوريلنيوجن والكالسيوم فى البول .

٢ ـ انخفاض معنوى فى معدل الماغنسيوم فى البول بينما لم يتأثر كل من اليوريا والجلوكوز والفوسفور الغير العضوى .

ب ـ التغييرات التى تحدث فى مكونات البول نتيجة الاصابة بنقص الفوسفور فى الجسم :

تناول البحث دراسة التغيرات فى أثنا عشر حيوان مصاب بنقص الفوسفور فى جسم الحيوان التى تم تشخيصها اكلينيكيا ومعمليا واوضحت الدراسة النتائج التالية :

١ ــ لوحظ زيادة كبيرة جدا من البروتين ، اليوروبيلينوجن واليوريا وكذلك الكالسيوم فى البول .

٢ ــ نقص معنوى فى كمية الفوسفور الغير عضوى فى البول للحيوانات المصابة .

٣ ــ لم يحدث تغير معنوى لكل الكرياتينين ، الجلوكوز والماغنسيوم فى البول عند الحيوانات المصابة .

جـ ــ التغيرات التى تحدث فى مكونات البول نتيجة الاصابة بالالتهاب الرئوى :

تم دراسة هذه التغيرات فى عشرة أبقار مصابة بالتهاب رئوى والتى تم تشخيصها اكلينيكيا وكانت النتائج على النحو التالى :

١ ــ زيادة معنوية فى البروتين .

٢ ــ لم يحدث أى تغير على مستوى كل من الكرياتينين ، اليوريا ، الجلوكوز ، الكالسيوم ، الفوسفور الغير عضوى والماغنسيوم .

د ــ التغيرات التى تحدث فى مكونات البول نتيجة الاصابة بانتفاخ الكرش بالغازات :

تناول البحث دراسة البول فى عدد (٤) من الأبقار المصابة بانتفاخ فى الكرش نتيجة لزيادة الغازات ومقارنة النتائج مع نتائج مكونات البول للحيوانات الغير مصابة (السليمة ظاهريا) ولم يصاحبها أى تغيرات فى مستوى مكونات البول التى تم دراستها .

هـ ــ التغيرات التى تحدث فى مكونات البول فى حالة الاصابة بمرض الكلب :

تم دراسة بقرة مصابة بمرض الكلب من مستشفى كلية الطب البيطرى بأدفينا وقد قامت معامل وزارة الصحة بتأكيد ايجابية العينة لمرض الكلب وكذلك قسم الباثولوجى بكلية الطب البيطرى جامعة الزقازيق بايجابية العينة باثولوجيا ايضا وقد وجد الحيوان المصاب زيادة فى نسبة البروتين ، اليوروبيلينوجن ، والكرياتينين ووجود الجلوكوز بنسبة عالية جدا .

دراسة عن تحليل البول في بعض أمراض المواشي

رسالة مقدمة من

ط.ب/ محمد حسين فاهر

للحصول على درجة الماجستير

في العلوم الطبية البيطرية

" طب عام وعلاجي "

تحت إشراف

الأستاذ الدكتور/ أحمد حسني محمود
أستاذ الأمراض الباطنية والمعدية المتفرغ
كلية الطب البيطري
جامعة الزقازيق

الأستاذ الدكتور/ مولى محمد الشناوي
أستاذ ورئيس قسم طب الحيوان والطب الشرعي
كلية الطب البيطري
جامعة الإسكندرية

كلية الطب البيطري
جامعة الإسكندرية

" ١٩٨٤م "