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Urininalysis of Red Sokoto Goat Fed Wood Ash Extract (WAE) Treated Nigeria Grass (*Pannicetum Pedicellatum)* Hay

Midau A.[1] Augustine C.[1] and Lawan A.U.[2]
[1]Adamawa State University Mubi, Department of Animal Science, Adamawa State Nigeria
[2]Federal Polytechnic Mubi, Department of Animal Production, Adamawa State
Contact: alexmidau@yahoo.com; 08032160304

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Abstract
The experiment was carried out in the Adamawa State University Poultry Production Unit (PPU) Yola, Adamawa State University Mubi. The study was to determine a complete urinalysis of red Sokoto goat fed wood ash extract (WAE) treated Nigeria grass (*Pannicetum pedicellatum)* hay. The feed stuff (*Pennicetum pedicellatum* hay) and the feed ingredient (maize offal and Wood Ash Extract (WAE) were obtained in Mubi market. Sixteen (16) Bucks within the ages of 9-12 months were kept under intensive system. The goats were then allotted to the following treatments; 100kg of Hay + 0 Wood Ash Extract (H1), 100kg of Hay + 4kg Wood Ash Extract (H2), 100kg of Hay + 5kg Wood Ash Extract (H3), 100kg of Hay + 6kg Wood Ash Extract (H4) in a Randomized Complete Block Design, Each treatment was replicated four (4) times. Free catch/voided method of urine collection were used; in which sixteen (16) goats were housed in a metabolic cages fitted with urine collection trays. The experiment lasted for 12 weeks, while data on urine parameters were recorded. In this research physical and chemical characteristics of urine were determined using urine strip test in (U-RIT 5000) and urinary microbial culture and sensitivity test were done in a laboratory to identify some of the disease-causing organisms found in the urine of Red Sokoto goats. Urine volume, colour, odour, transparency, Specific gravity were found within the normal ranges. Blood, Urobilinogen, Bilirubin, Ketone, Glucose, Leucocytes, pH value and bacterial cells were present in the urine in all the treatments. Protein values obtained were 0.19, 0.30 and 0.20 % for treatment H2, H3 and H4 respectively, treatment H3 was significantly ($P \leq 0.05$) higher in protein than H1, H2, and H4. Urinalysis though being a readily available and an inexpensive tool for the diagnosis and management of numerous urinary tract abnormalities, it is still a much-neglected facet in Animal Science.

Keywords: Goat, Urinalysis, Physical Treatment, Chemical Treatment, Microscopic Examination

Introduction

Urinalysis is the examination of normal and abnormal constituents of urine. Urinalysis, despite being an immensely useful tool, perhaps is the most understood test in Animal Science practices. When performed properly a urinalysis, specifically the measurement of urine specific gravity (SG) can be a measure of tubular function. Detection of casts, WBC's Bacteria and other contaminants in urine is the best way to detect renal diseases before the onset of renal failure (Gerber and Brendler, 2020). Urinalysis can also help to detect metabolic diseases such as diabetes mellitus through measurement of glucose and ketone concentrations, liver disease based on bilirubin content and intravascular haemolysis as indicated by increased haemoglobin values (Gerber and Brendler, 2020). Urinalysis is an easy, cheap, and vital initial diagnostic test for veterinarians. Complete urinalysis includes the examination of color, odor, turbidity, volume, pH, specific gravity, protein, glucose, ketones, blood, erythrocytes, leukocytes, epithelial cells, casts, crystal, and organisms. Semi-quantitative urine analysis with urine dipsticks, as well as an automatic analyzer, provides multiple biochemical data. Contamination is almost entirely avoided if the protocols for ensuring a proper sample collection have been followed. However consideration must be given to the likelihood of contamination, even if the sample is correctly obtained (Delanghe and Speeckaert, 2014). Interpretation of urinalysis will be doubtful if the

knowledge of the interference is limited. Well-standardized urinalysis, when correlated in the context of history, clinical findings, and other diagnostic test results, can identify both renal and non-renal disease. This study was to determine a complete urinalysis of red Sokoto goat fed wood ash extract (WAE) treated Nigeria grass (*Pannicetum pedicellatum)* hay.

Materials and methods

Location of the Study

The experiment was carried out at the Livestock Teaching and Research Farm Yola, Adamawa State University, Nigeria. The area lies between the coordinates latitude 9˚13'48'N and 12˚27'36'E. It has a tropical climate with distrinct dry and wet seasons with mean annual minimum and maximum temperature of 22.3°C and 34.9°C. The amount of rainfall of 872.4mm (34.346 inches) per year, an average rainy days of 72 days per year. The rainfall begins in April and ends October, while the dry season commences late October and ends the following April. It has an average minimum temperature of 20.5˚C and maximum temperature of up to 40°C (Adebayo *et al.*, 2020). At the time of the study mean monthly temperatures were; for January (17.6-34.4°C), February (20.8-37.1°C) March (24.7-39.8°C), April (27.0-39.8°C), May (25.7-36.4°C), June (24.1-33.7°C), July (23.3-31.9°C). The relative humidity for January (16.5%), February (13.5), March (17.5), April (29.8), May (46.0), June (58.0), July (66.8). the monthly sunshine hours was at its highest pick of January (254.2hrs), February (229.6hrs), March (232.5hrs), April (228.0hrs) May (244.9hrs) June (228.0hrs) and July (201.5hrs), (World Meteorological Organization, 2015).

Sampling procedure

Free catch/voided method of urine collection were used; in which sixteen (16) goats were housed in a metabolic cages fitted with urine collection trays. Urine samples were immediately aspirated using syringe into a sterile tube from the collection trays after voided and then taken to laboratory for immediate analysis. Some parts of the samples were then refrigerated for further analysis. A standardized volume 60mls of urine was collected each time to allow comparison of result of the urine sedment examination with subsequent samples. Urine samples were obtained as free catch.Urine samples was collected into an air tight sterile containers with a minimal body contact with the voided urine. Proper hygiene was maintained all through the urine collection processes. The urine samples were immediately taken to laboratory for analysis, using standard laboratory procedure.

Urine analysis: Reagent strip: The urine samples obtained were immediately analyzed by analyzer (URIT-50) and the results were printed, recorded and interpreted.

Statistical analysis

Data obtained were subjected to analysis of variance (ANOVA) using statistical package (SAS, 2002).

Result and Discussion

Physical Examination of Urine

Urine volume, colour, odour and transparency: The urine volume in all the treatments was within the range of 10-40ml/kg for goats as reported by (UCDAVIS, 2010). Colour, odour and transparency; the colour, odour and transparency are within the normal range for goats.

Table 1: Urinalysis of goat fed wood ash extract (WAE) treated (Nigeria grass) *pannicetum pedicellatum* hay. (Free catch/voided method of urine collection).

	Treatments			
Physical Parameters	H1 (0%WAE)	H2 (4%WAE)	H3(5%WAE)	H4 (6%WAE)
Urine volume (ml)	307	344	323	363
Colour	Pale yellow	Pale yellow	Pale yellow	Pale yellow
Odour	Aromatic	Aromatic	Aromatic	Aromatic
Transparency	Clear	Clear	Clear	Clear
Bacteria	Positive	Positive	Positive	Positive

n=16

As recorded table 1, the urine colour obtained in the study was pale yellow which is in agreement with the reference range obtained by the (Kraft and Dürr, 2005; Zanetti, *et al.*, 2008: UCDAVIS, 2010)

for healthy goat. There was no variation in the colour of urine between the treatments. Aromatic odour was a typical character for the urine in all treatments, which was also normal in all the treatments.

Chemical examination of the urine

Specific gravity (SG): Specific gravity which is directly proportional to the ability of the kidney to concentrate or dilute the urine over that of plasma, urine osmolality and measures solute concentration and urine density (Parrah, *et al.,* 2013)**.** The SG obtained in treatment H2, H3 and H4 is numerically higher than treatment 1, but there was no statistical difference between the treatments.

Table 2: Urinalysis of goat fed wood ash extract (WAE) treated (Nigeria grass) *pannicetum pedicellatum* hay. (Free catch/voided method of urine collection)

	Treatments			
Chemical Parameters	H1 (0%WAE)	H2 (4%WAE)	H3(5%WAE)	H4 (6%WAE)
Blood	0.00^{a}	0.00^{a}	0.00^{a}	0.00^{a}
Urobilinogen (mmol/L)	0.00^{a}	0.00^{a}	0.00^{a}	0.00^{a}
Bilirubin	0.00^{a}	0.00^{a}	0.00^{a}	0.01^{ab}
Protein (g/l)	0.00^{a}	0.19^{c}	0.30^{b}	0.20^{c}
Ketones (mmol/L)	0.00^{a}	0.00^{a}	0.00^{a}	0.00^{a}
Glucose (mmol/L)	0.00^{a}	0.00^{a}	0.00^{a}	0.00^{a}
pH value	7.70^{b}	8.00^{b}	8.10^{b}	8.20^{b}
Leucocytes (cell/uL)	0.00^{a}	0.00^{a}	0.00^{a}	0.00^{a}
Specific gravity	1.03	1.04	1.04	1.04

n=16

The values obtained were 1.03, 1.04, 1.04 and 1.04 for treatment H1, H2, H3 and H4 respectively; there was no significant difference between the values obtained in the treatments. The result obtained in this study is within the range previously reported by (Bohnert, *et al.,* 2001; UCDAVIS, 2010]. Specific gravity is a valuable test for evaluating the state of kidneys in both human and animals.

Urine pH: The pH in Table 2 was measured using urinalysis strip (URIT-50) and portable pH meter. The values obtained in the study is 7.7, 8.0, 8.1 and 8.2 for treatments H1, H2, H3 and H4, respectively. The urine pH is the measurement of the kidneys ability to conserve hdrogen ions. The values obtained in the study is comparable to the values reported by (Bohnert *et al.,* 2001), in a similar study. Urine pH does not necessarily reflect the animals body pH, but it highly influenced by diet, bacterial infection, storage time, metabolic, respiratory problems and urinary retention (Mavangira, *et al.,* 2012). The result obtained shows a significant difference ($P \leq 0.05$) between the treatment. Treatment H2, H3 and H4 are significantly higher than treatment H1. There no significant difference between treatment H2, H3 and H4. The differences may be due to the inclusion of urea in the diets in treatment H2, H3 and H4 as reported by (Mavangira, *et al.,* 2012), that diet greatly influences urine pH. The urine pH observed in this study was alkaline which is within the range (UCDAVIS, 2010). The alkalinity may be due to the breakdown of urea in the retained urine which renders it alkaline (Parrah, *et al.,* 2013).

The absence of blood, urobilinogen, bilirubin, glucose and leucocytes: The result obtained in table 2 has shown the absence of these parameters, with the exception of **bilirubin** having the value 0.01 in treatment H4 which is a trace amount (Chew and Schenck, 2013). This result indicates normal urine in healthy goats.

Protein: The result obtained in table 2 for treatment H2, H3 and H4 have shown the presence of protein in the urine, with values 0.19, 0.30 and 0.20 for H2, H3 and H4 respectively. There was a significant difference in the protein value between the treatments. Treatment H3 is significantly ($P \leq 0.05$) higher than the treatments H1, H2 and H4. The presence of protein in urine is an indication of high protein diet or the consequences of renal disease, fever, congestive heart failure (CHF), hypertension, tumors, and others. In regards

to this study the values obtained for protein is less than 1, which has no negative effects as opined by (Parrah, *et al.,* 2013). There was a negative test values for ketones in all the treatment.

Conclusion

The addition of WAE at different levels in the dietary treatment generally did not significantly alter the Physical and the chemical composition of the urine in all the treatments. Urine collection from experimental animals is still a basic requirement in several biochemicals, nutritional, urological, metabolic, toxicological, general behavioral and physiological studies of animals.

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