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Evaluation of physico-chemical and antioxidant properties of urine of Haryana, Sahiwal and crossbred cows at district dairy farm

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Abstract

Cow urine or Gomutra is considered good for health. It is recommended to people when suffering from several kinds of health problem. The present study was conducted to investigate the urine parameters in between and within the groups have several therapeutic potential due to its content have uric acid, enzymes, antioxidative and many biochemical properties that help in boosts immunity and act as disinfectant. It removes the toxic substance from body by their scavenging properties of free radical. If people drink daily the cow urine become young and energetic.

Keywords: Cow, urine, therapeutic potential

Introduction

Cow urine has a unique place in Ayurveda and has been described in 'Sushruta Samhita' and 'Astanga Sangraha' to be the most effective substance of animal origin with innumerable therapeutic values. It has been recognized as water of life or "Amrita" (beverage of immortality), the nector of the God. In India, drinking of cow urine has been practiced for thousands of years [1]. It is an important content of Panchgavya Chikitsa. Panchgavya is a formulation consisting cow's urine (Gomutra), milk (Godugdha), curd (Godadhi), ghee (Goghrit) and dung (Gomaya). These five cow products are used for treatment and known as Panchgavya Chikitsa. It is not only used for human health but also for animal health and plant growth [2].

Cow urine is a liquid by-product of metabolism in cows. Cow urine is also used in medicine in India, Myanmar, Nepal and Nigeria. While cow urine and cow dung has benefits as fertilizers, the proponents' claims about curing diseases and cancer have no scientific backing [3, 4, 5, 6, 7].

Cow urine is basically an excellent germicide and has been reported to destroy all the pathogenic organisms if it is taken on a daily basis and also boosts immunity [8]. Presence of urea, creatinine, swarnkshar (aurum hydroxide), carbolic acid, phenols, calcium and manganese have strongly explained for exhibition of antimicrobial and germicidal properties of cow urine [9, 10, 11]. On the other hand uric acid's antioxidant property and allantoin correlates with its anticancer effect. Urine consumption improves immunity is due to presence of swarnkshar and fastens wound healing process which is due to allantoin [12].

Some of the diseases that are proven to be cured by Cow Urine Treatment and Research Centre, Indore over the past few years and it has been reported that gomutra is capable of curing blood pressure, blockage in arteries, arthritis, diabetes, heart attack, cancer, thyroid, asthma, psoriasis, eczema, prostate, fits, AIDS, piles, migraine, ulcer, acidity, constipation, gynaecological problems and several other diseases [12].

Composition and therapeutic use of cow urine

The biochemical estimation of cow urine has shown that it contains sodium, nitrogen, sulphur, Vitamin A, B, C, D, E, minerals, manganese, iron, silicon, chlorine, magnesium, citric, succinic, calcium salts, phosphate, lactose, carbolic acid, enzymes, creatinine and hormones [13].

Several Therapeutic uses have been reported, and it includes: Skin disease [14]. Stomach, kidney, heart diseases and stone, liver problem, jaundice, athletes feet, immunostimulants,

anticonvulsant agent, anti cancer properties ^[15], Wound healing property ^[16], antioxidative properties ^[17] and antidiabetic effect ^[18].

Materials and Methods

This study was designed to evaluate different physico-chemical parameters of cow urine and was collected from Instructional Livestock Farm Complex of College of Veterinary Science and Animal Husbandry, DUVASU Mathura. Fresh cow urine was collected in a sterile container

from a different bred of cattle Haryana, Sahiwal and cross bred. The was filtered through Whatman No. 1 filter paper to get rid of debris and precipitated material and was stored in airtight container at 4 °C before use.

Experimental design

The proposed study was consisting of a total number of 120 animals' urine of Haryana, Sahiwal and Crossbred cow. The, animals were grouped as per given in Table-1 and each group consist of ten (10) animals.

Table 1: Different groups of animals used in present study.

Group	Breeds		
	Sahiwal	Haryana	Crossbred
Calf < 1 Year	10	10	10
Heifer	10	10	10
Lactating	10	10	10
Adult dry	10	10	10

Statistical study

In this study statistically, analysis of variance was applied. Completely randomized design was used and significant differences was analysed at 5% level of significant. Comparative study among the group and between the group in Haryana, Sahiwal and cross bred was done by Das ^[19].

Result

1. Biochemical indices of urine using commercially available kit with semi-auto analyzer

a. Comparative study within the breeds

Table 2: Biochemical parameters studies in urine sample of different stages of Haryana breed.

Group	Creatinine (mg/dl)	Uric acid (mg/dl)	Glucose (mg/dl)	Protein (mg/dl)	Urea Nitrogen (mg/dl)
Calf	15.96±0.38 ^a	3.39±0.26 ^a	0.25±0.25 ^a	25.55±1.94 ^a	206.00±17.63 ^a
Heifer	15.56±0.49 ^a	3.36±0.38 ^a	0.29±0.29 ^a	41.00±10.02 ^c	290.58±24.54 ^{bc}
Lactating	16.11±0.61 ^a	3.56±0.13 ^a	1.22±0.84 ^a	22.50±2.50 ^a	229.83±23.77 ^{ab}
Adult Dry	16.07±0.58 ^a	3.48±0.31 ^a	0.35±0.35 ^a	12.00±4.35 ^a	332.17±17.33 ^c

Value (Mean ± SEM, n=10) bearing different superscripts in the same column differ significantly ($p<0.05$) in Tukey's ^{s-b} multiple comparison Post-hoc test

Table 3: Biochemical indices determined in urine sample of different stages of Sahiwal breed.

Group	Creatinine (mg/dl)	Uric acid (mg/dl)	Glucose (mg/dl)	Protein (mg/dl)	Urea Nitrogen (mg/dl)
Calf	17.51±0.51 ^a	4.32±0.49 ^a	0.48±0.34 ^a	12.00±3.00 ^a	276.12±19.37 ^a
Heifer	17.59±0.51 ^a	4.00±0.29 ^a	0.00±0.00 ^a	22.00±9.34 ^a	283.99±30.98 ^a
Lactating	17.26±0.54 ^a	4.31±0.31 ^a	0.89±0.68 ^a	38.00±10.80 ^a	261.99±26.24 ^a
Adult Dry	17.92±1.54 ^a	4.49±0.34 ^a	0.20±0.20 ^a	16.35±1.50 ^a	373.33±8.96 ^b

Value (Mean ± SEM, n=10) bearing different superscripts in the same column differ significantly ($p<0.05$) in Tukey's ^{s-b} multiple comparison Post-hoc test

Table 4: Biochemical indices determined in urine sample of different stages of Crossbred animals.

Group	Creatinine (mg/dl)	Uric acid (mg/dl)	Glucose (mg/dl)	Protein (mg/dl)	Urea Nitrogen (mg/dl)
Calf	35.50±8.13 ^a	4.81±0.41 ^a	0.33±0.33 ^a	32.50±8.13 ^a	374.02±10.25 ^a
Heifer	14.80±35.57 ^b	4.45±0.34 ^a	0.00±0.00 ^a	14.80±35.57 ^b	389.60±8.94 ^{ab}
Lactating	25.00±8.75 ^a	4.98±0.31 ^a	0.80±0.80 ^a	25.00±8.75 ^a	388.77±12.25 ^{ab}
Adult Dry	26.50±8.97 ^a	4.86±0.32 ^a	2.16±1.45 ^a	26.50±8.97 ^a	418.56±11.31 ^b

Value (Mean ± SEM, n=10) bearing different superscripts in the same column differ significantly ($p<0.05$) in Tukey's ^{s-b} multiple comparison Post-hoc test

b. Comparative study between the breeds

Table 5- Biochemical indices determined in urine sample of calves of different breed.

Parameter	Haryana	Sahiwal	Crossbred
Creatinine (mg/dl)	15.96±0.38 ^a	17.51±0.51 ^{ab}	18±0.61 ^b
Uric acid (mg/dl)	3.39±0.26 ^a	4.32±0.49 ^{ab}	4.81±0.41 ^b
Glucose (mg/dl)	0.25±0.25 ^a	0.48±0.34 ^a	0.33±0.33 ^a
Protein (mg/dl)	25.50±19.44 ^a	12.00±3.00 ^a	32.50±8.13 ^a
Urea Nitrogen (mg/dl)	206.00±17.63 ^a	276.12±19.37 ^b	374.02±10.25 ^c

Value (Mean ± SEM, n=10) bearing different superscripts in the same row differ significantly ($p<0.05$) in Tukey's ^{s-b} multiple comparison Post-hoc test

Table 6: Biochemical indices determined in urine sample of Heifers of different breed.

Parameter	Haryana	Sahiwal	Cross bred
Creatinine (mg/dl)	15.96±0.49 ^a	17.59±0.51 ^b	18.60±0.67 ^b
Uric acid (mg/dl)	3.36±0.38 ^a	4.00±0.29 ^{ab}	4.45±0.34 ^b
Glucose (mg/dl)	0.29±0.29 ^a	0.00±0.00 ^a	0.00±0.00 ^a
Protein (mg/dl)	41.00±10.02 ^a	22.00±9.34 ^a	148.00±35.57 ^b
Urea Nitrogen (mg/dl)	290.58±24.54 ^a	283.99±30.98 ^a	389.60±8.94 ^a

Value (Mean ± SEM, n=10) bearing different superscripts in the same row differ significantly ($p < 0.05$) in Tukey's ^s-b multiple comparison Post-hoc test

Table 7- Biochemical indices determined in urine sample of Lactating cows of different breed.

Parameters	Haryana	Sahiwal	Crossbred
Creatinine (mg/dl)	16.11±0.61 ^a	17.26±0.54 ^{ab}	18.79±0.72 ^b
Uric acid (mg/dl)	3.56±0.13 ^a	4.31±0.13 ^{ab}	4.98±0.31 ^b
Glucose (mg/dl)	1.22±0.84 ^a	0.89±0.68 ^a	0.80±0.80 ^a
Protein (mg/dl)	22.50±2.50 ^a	38.00±10.80 ^a	25.00±8.75 ^a
Urea Nitrogen (mg/dl)	229.83±23.77 ^a	261.39±26.24 ^a	388.77±12.25 ^b

Value (Mean ± SEM, n=10) bearing different superscripts in the same row differ significantly ($p < 0.05$) in Tukey's ^s-b multiple comparison Post-hoc test

Table 8: Biochemical indices determined in urine sample of dry animals of different breed.

Parameter	Haryana	Sahiwal	Crossbred
Creatinine (mg/dl)	16.07±0.58 ^a	17.92±0.48 ^b	18.94±0.57 ^b
Uric acid (mg/dl)	3.60±0.31 ^a	4.49±0.34 ^{ab}	4.86±0.32 ^b
Glucose (mg/dl)	0.35±0.35 ^a	0.20±0.20 ^a	2.16±1.45 ^a
Protein (mg/dl)	12.00±4.35 ^a	163.50±15.02 ^a	26.50±8.97 ^a
Urea Nitrogen (mg/dl)	3.32±17.33 ^a	373.33±8.96 ^a	418.56±11.31 ^b

Value (Mean ± SEM, n=10) bearing different superscripts in the same row differ significantly ($p < 0.05$) in Tukey's ^s-b multiple comparison Post-hoc test

2. Enzyme analysis

a. Comparative study within the breeds

Table 9: Alkaline phosphatase and Alpha amylase activities in urine sample at different stages of Haryana breed.

Group	Alkaline Phosphatase (IU/ml)	Alpha Amylase (IU/ml)
Calf	32.20±1.34 ^{bc}	24.98±2.81 ^a
Heifer	26.51±1.15 ^a	43.75±3.67 ^b
Lactating	32.26±1.97 ^{ab}	40.08±2.85 ^b
Adult Dry	45.31±4.87 ^c	33.62±1.73 ^{ab}

Value (Mean ± SEM, n=10) bearing different superscripts in the same column differ significantly ($p < 0.05$) in Tukey's ^s-b multiple comparison Post-hoc test

Table 10: Alkaline phosphatase and Alpha amylase activities in urine sample at different stages of Sahiwal breed.

Group	Alkaline Phosphatase (IU/ml)	Alpha Amylase (IU/ml)
Calf	31.28±1.74 ^a	21.78±1.38 ^a
Heifer	36.8±1.38 ^a	27.53±1.86 ^a
Lactating	65±7.5 ^b	50.0±1.77 ^b
Adult Dry	52.11±3.8 ^b	46.0±2.03 ^b

Value (Mean ± SEM, n=10) bearing different superscripts in the same column differ significantly ($p < 0.05$) in Tukey's ^s-b multiple comparison Post-hoc test

Table 11: Alkaline phosphatase and Alpha amylase activities in urine sample at different stages of Crossbred.

Group	Alkaline Phosphatase (IU/ml)	Alpha Amylase (IU/ml)
Calf	58.53±2.3 ^b	20.42±1.39 ^a
Heifer	81.56±2.74 ^c	27.43±1.83 ^b
Lactating	82.27±2.08 ^c	39.82±1.06 ^c
Adult Dry	46.49±1.94 ^a	38.09±1.89 ^c

Value (Mean ± SEM, n=10) bearing different superscripts in the same column differ significantly ($p < 0.05$) in Tukey's ^s-b multiple comparison Post-hoc test

b. Comparative study between the breeds.

Table 12: Alkaline phosphatase and Alpha amylase activities in urine sample of calves of different breed.

Parameter	Haryana	Sahiwal	Crossbred
Alkaline phosphatase (IU/ml)	39.20±1.34 ^a	31.28±1.74 ^b	58.53±2.36 ^c
Alpha amylase (IU/ml)	24.98±2.81 ^a	21.78±1.38 ^a	20.42±1.39 ^a

Value (Mean ± SEM, n=10) bearing different superscripts in the same row differ significantly ($p < 0.05$) in Tukey's ^s-b multiple comparison Post-hoc test

Table 13: Alkaline phosphatase and Alpha amylase activities in urine sample of Heifer of different breed.

Parameter	Haryana	Sahiwal	Crossbred
Alkaline phosphatase (IU/ml)	26.51±1.15 ^a	36.80±1.38 ^b	81.56±2.74 ^c
Alpha amylase (IU/ml)	43.75±3.67 ^a	27.53±1.86 ^b	27.43±1.83 ^b

Value (Mean ± SEM, n=10) bearing different superscripts in the same row differ significantly ($p < 0.05$) in Tukey's ^s-b multiple comparison Post-hoc test

Table 14: Alkaline phosphatase and Alpha amylase activities in urine sample of Lactating cows of different breed.

Parameter	Haryana	Sahiwal	Crossbred
Alkaline phosphatase (IU/ml)	32.26±1.97 ^a	65.00±7.50 ^b	82.27±2.08 ^c
Alpha amylase (IU/ml)	40.08±2.85 ^a	50.01±1.77 ^b	39.82±1.06 ^a

Value (Mean ± SEM, n=10) bearing different superscripts in the same row differ significantly ($p < 0.05$) in Tukey's ^s-b multiple comparison Post-hoc test

Table 15: Alkaline phosphatase and Alpha amylase activities in urine sample of dry animals of different breed.

Parameter	Haryana	Sahiwal	Crossbred
Alkaline phosphatase (IU/ml)	45.31±4.87 ^a	52.11±3.8 ^a	46.49±1.94 ^a
Alpha amylase (IU/ml)	33.62±1.73 ^a	46.94±2.03 ^b	38.09±1.89 ^a

Value (Mean ± SEM, n=10) bearing different superscripts in the same row differ significantly ($p < 0.05$) in Tukey's ^s-b multiple comparison Post-hoc test

3. Antioxidant activity- Graphs (1-12) shows antioxidant activity of different stages Haryana, Sahiwal and Crossbred cows.

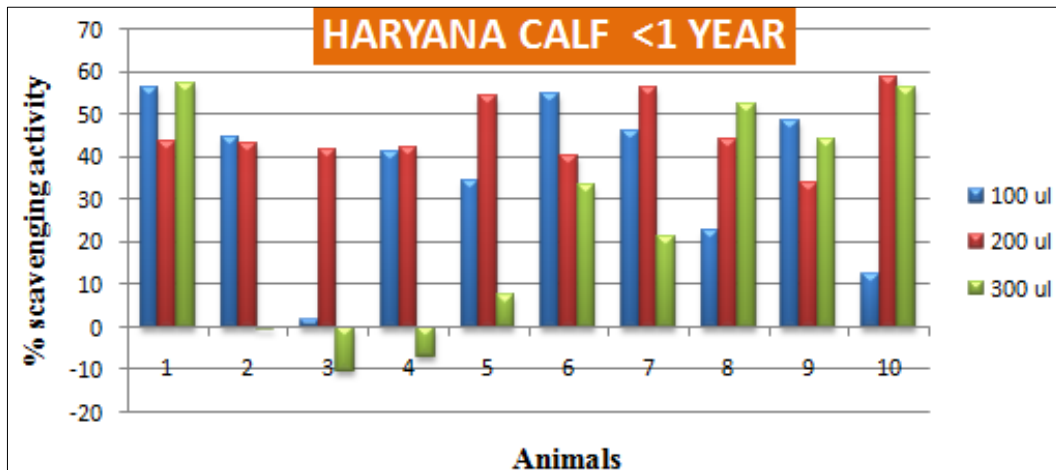


Fig 1: Haryana calf<1 year

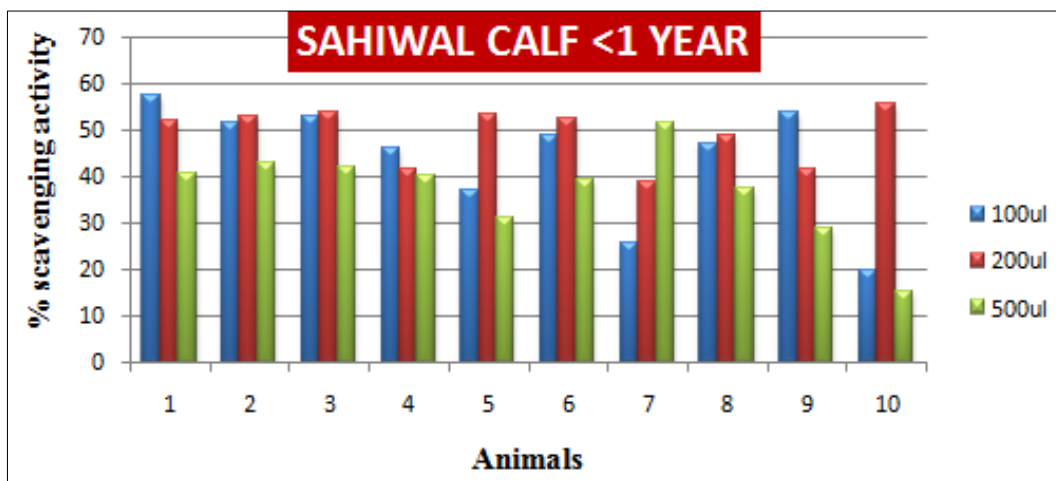


Fig 2: Sahiwal calf<1 year

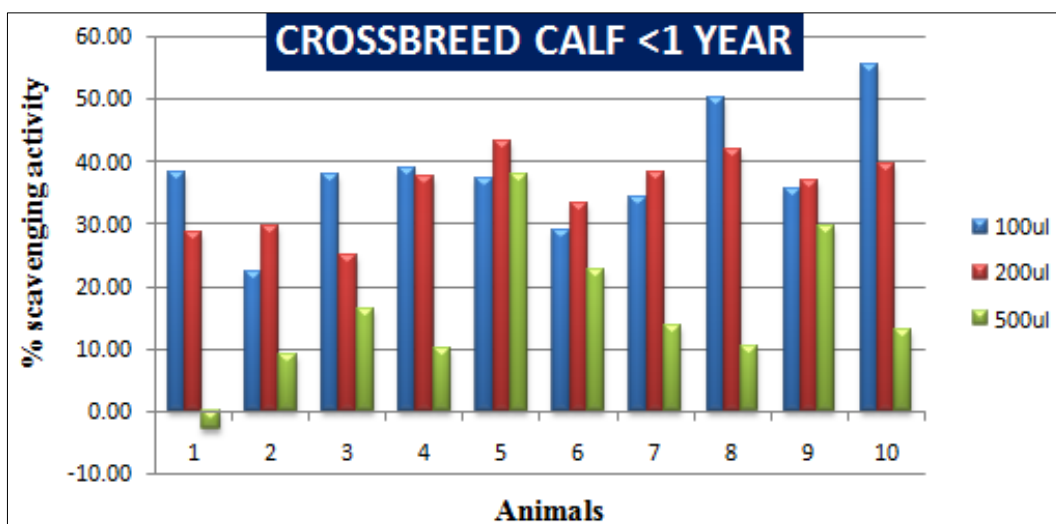


Fig 3: Crossbreed calf<1 year

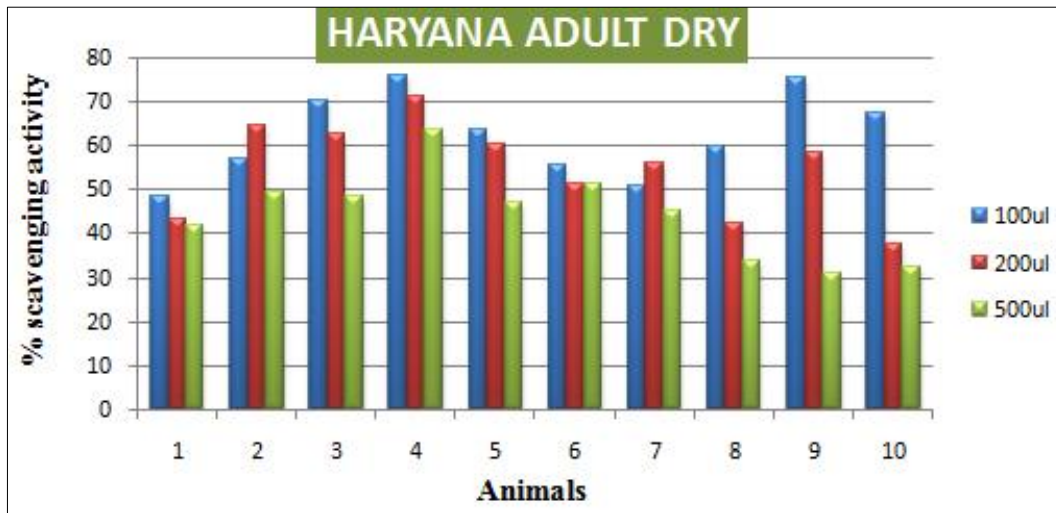


Fig 4: Haryana adult dry

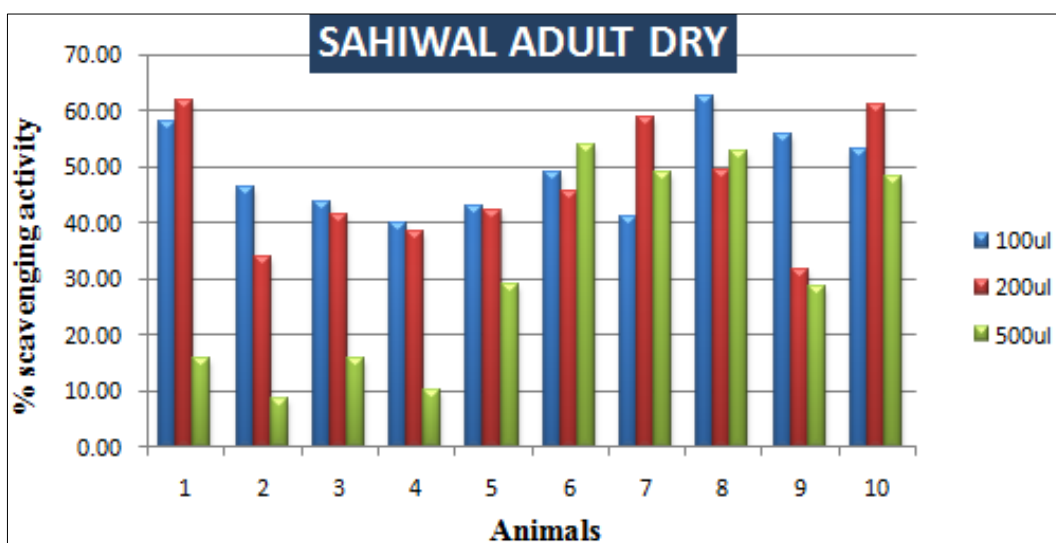


Fig 5: Sahiwal adult dry

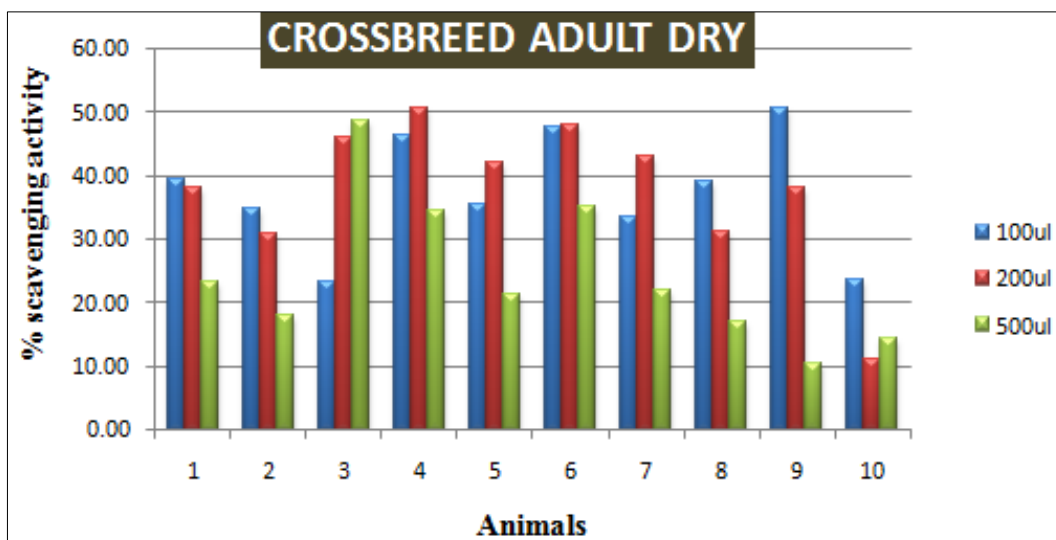


Fig 5: Crossbreed adult dry

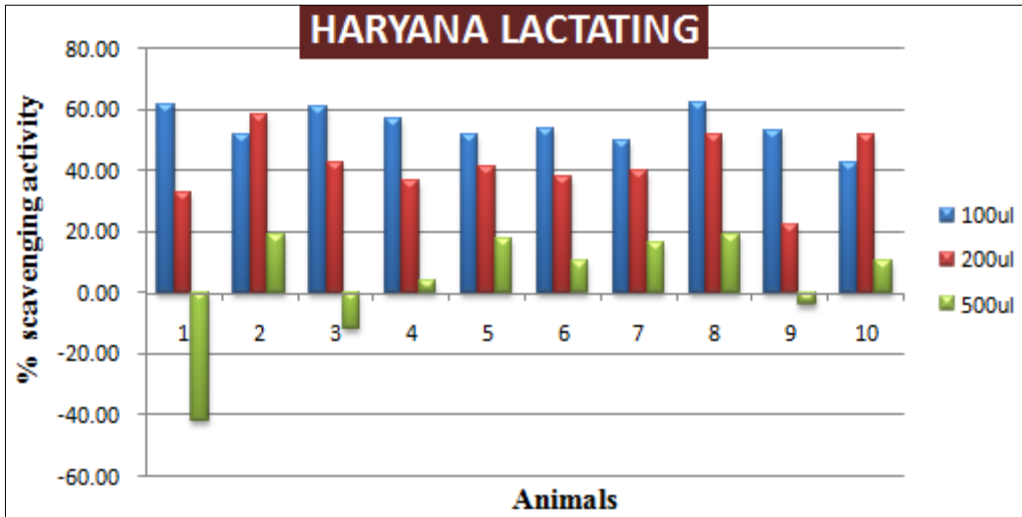


Fig 6: Haryana Lactating

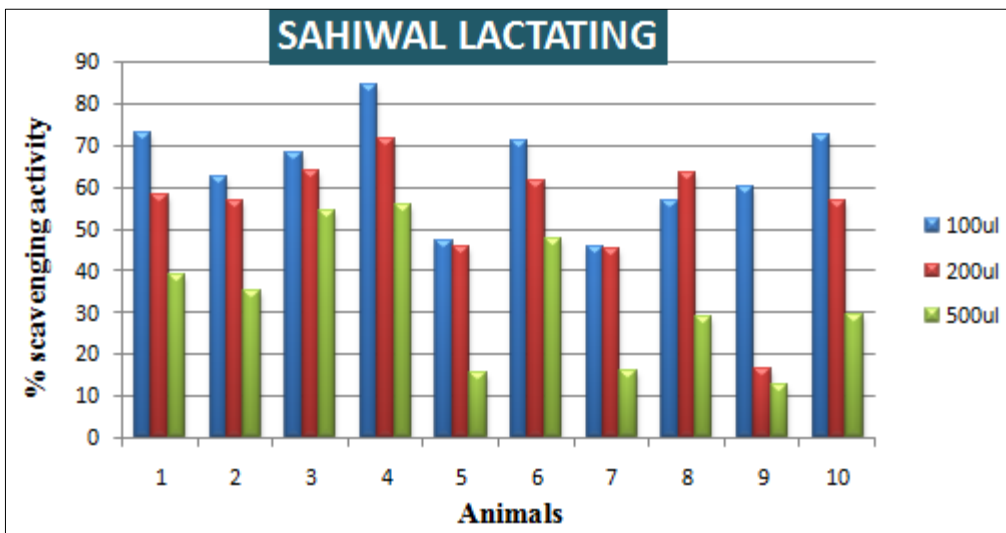


Fig 7: Sahiwal Lactating

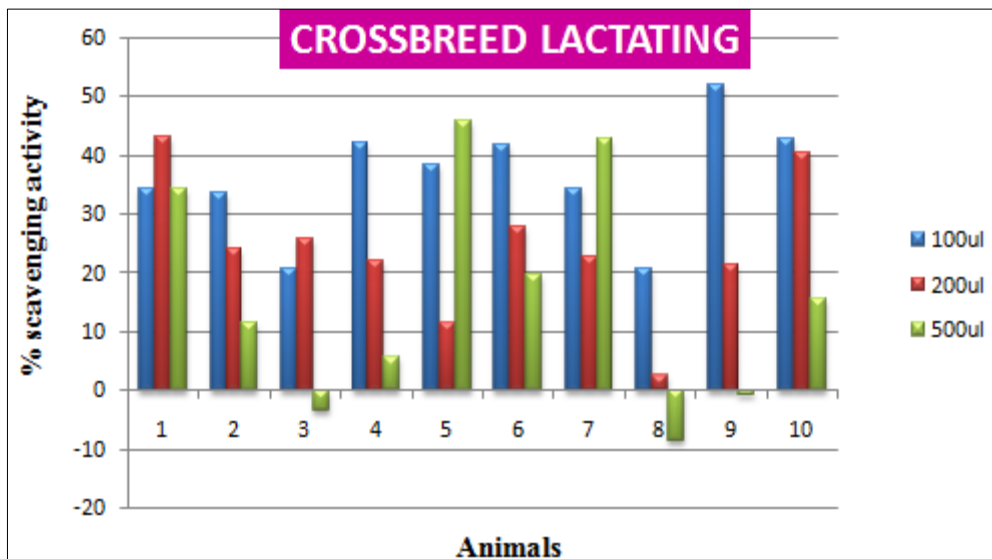


Fig 8: Crossbreed Lactating

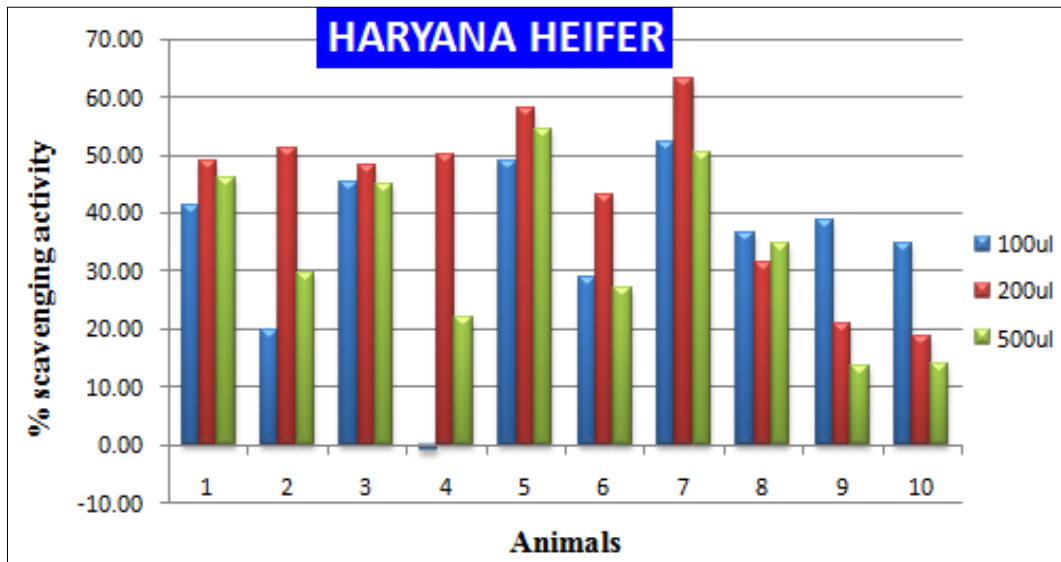


Fig 9: Haryana Heifer

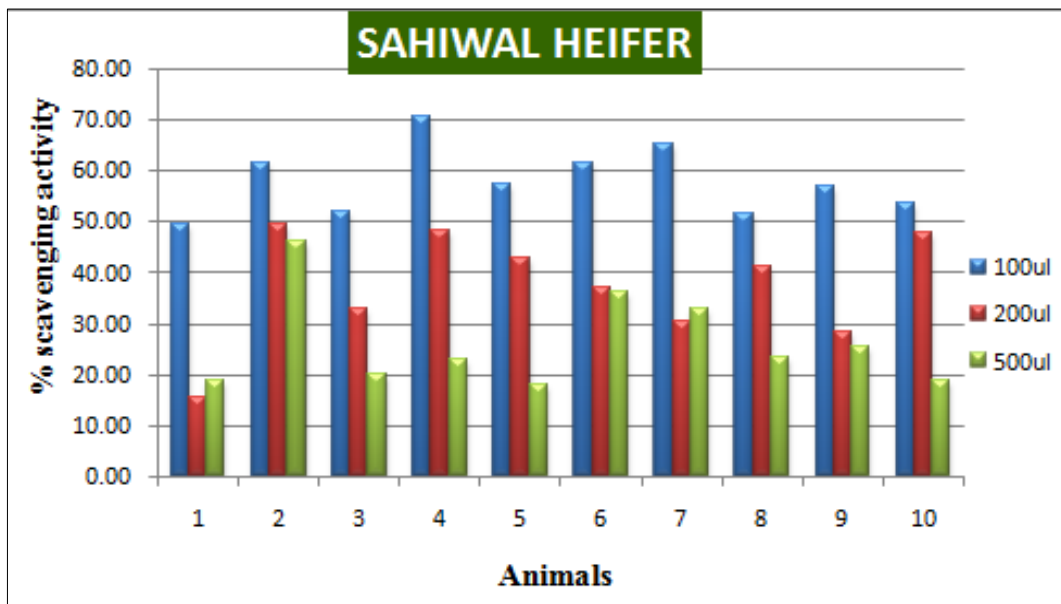


Fig 10: Sahiwal Heifer

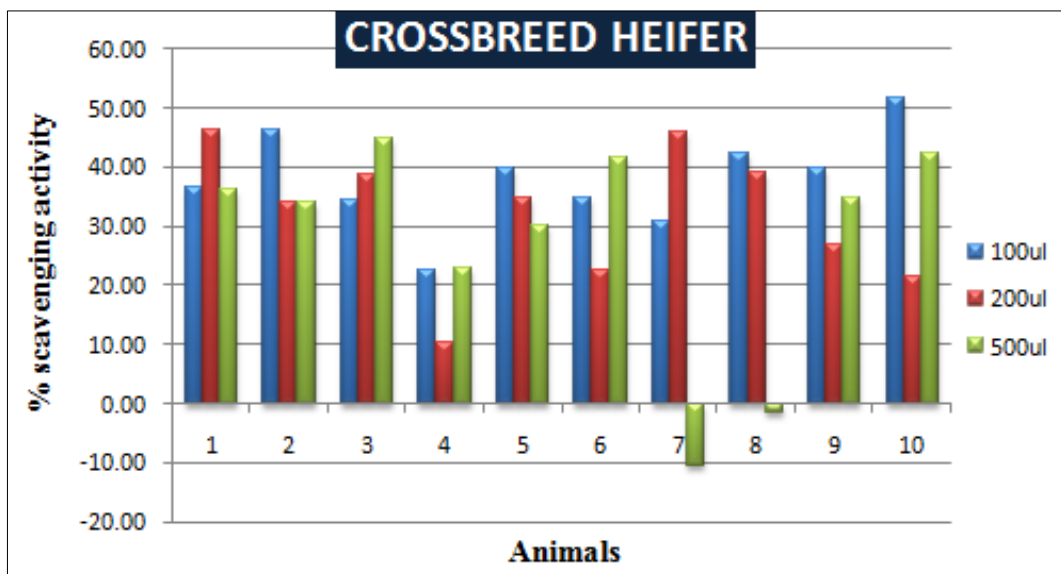


Fig 10: Sahiwal Heifer

Discussion

Creatinine, uric acid and urea nitrogen level is significantly high in the urine of cross bred while Haryana heifer cow showed high significant in protein level but glucose level high and non significant in Haryana, Sahiwal and dry Cross bred cow. Alkaline phosphatase significantly high in cross bred in comparison to indigenous cow bred but while alpha amylase is high and non significant. Antioxidative properties is high in indigenous (Haryana & Sahiwal) in comparison to cross bred cow but low in lactating animal of all bred of cow.

Conclusions

On examination of urine we can say that urine of cow contains high level of glucose, protein, uric acid, enzymes and antioxidant activity. If human drink daily cow urine become young and free from disease.

Acknowledgements

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