

QUALITY ASSESSMENT OF URINE PRODUCED FROM FEMALE HILL CATTLE OF UTTARAKHAND

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ABSTRACT

Cow urine has a unique place in Ayurveda and is suggested to improve general health of human being. Indigenous and hill cattle have a good quality urine as compared to crossbred cattle. So, present study was conducted utilizing primiparous lactating Hill cattle, Sahiwal and crossbred cattle maintained in Instructional Dairy Farm, GBPUAT, Pantnagar for comparing their urine constituents. Urine samples were collected early morning from four animals of each group at an interval of one month, with three repetitions and were estimated for pH, specific gravity, total solid per cent, ash per cent, total protein, urea and creatinine. There was significant difference ($P < 0.05$) between chemical composition of Hill cattle urine with that of Sahiwal and crossbred cattle urine. Lower pH, specific gravity, total solids, urea, creatinine, total protein, and ash per cent were observed in urine of Hill cattle while as higher values were observed in crossbred cattle urine. There was a non-significant difference ($P > 0.05$) in urea, creatinine, total protein, and ash per cent among Hill cattle and Sahiwal urine but a significant difference ($P < 0.05$) with crossbred cattle urine.

Key words: Hill cattle, Sahiwal, Crossbred, Urine Composition, Uttarakhand

Uttarakhand state is enriched with livestock biodiversity represented by cattle, buffaloes, goats, pigs, equine and poultry. The state possesses 22.35 lacs indigenous and non-descript cattle. Crossbred cattle are less than two per cent (1.03 %) of the total cattle population in Uttarakhand¹⁴, which indicates that majority are non-descriptive or local. A survey revealed that there is a large

number of hill cattle in the state (more than 99% in hill districts) and are reared mainly on extensive system of management i.e. grazing in the hilly terrain. Hill cattle are reared mainly for draught power, milk and manure. Utilization of livestock waste products like dung and urine as manure by their direct application to crop fields is a traditional method^{6, 14, 15}. Ancient literature on Ayurveda is full of versions of vast potentialities of indigenous cow urine as a human medicine^{4, 11, 16, 18}. Cow urine is complex animal excreta containing a variety of minerals, metabolites, phenols and heterocyclic bases along with enzymes and steroids which can be exploited in form of appropriate formulation for pharmaceutical or therapeutic application in man

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and animals and for pest control in agriculture⁶. Indigenous and hill cattle have a good quality urine as compared to crossbred cattle¹². In context of the above mentioned facts present study was conducted to assess the quality of urine of Hill cattle, Sahiwal and crossbred cattle.

Present study was conducted on urine of Hill cattle, Sahiwal and crossbred cattle maintained at Instructional Dairy Farm, GBPUAT, Pantnagar. The place is located in foot hills of Himalayas at 29.5°N latitudes and 79.30°E longitude at an altitude of 243.84 m above mean sea level. Maximum temperature reaches up to 44°C in summers and minimum temperature up to 1°C in winters. Animals were maintained at this farm under loose housing and group management system. Nutritional requirements of animals were met through a balanced combination of dry and green fodder with concentrate mixture supplementation at the time of milking. Urine samples (about 150 ml) were collected early morning in sterile bottles from four lactating animals of 1st parity in each group (Hill cattle, Sahiwal and crossbred cattle) at an interval of one month, with three repetitions. Collected samples were filtered using Whatman's filter paper No. 42 to remove physical dirt. These samples were tested for pH, Specific gravity⁹, total solid per cent, ash per cent², total protein, urea and creatinine¹³. Collected data were analysed statistically as per Snedecor and Cochran¹⁷ and with help of Graph Pad Prism⁸.

There was a significant difference ($P < 0.05$) between chemical composition of Hill cattle urine with that of Sahiwal and crossbred cattle urine (Table No 1). Maximum pH (8.079 ± 0.073) was observed in the urine of crossbred cattle and

minimum (7.616 ± 0.052) in Hill cattle. Maximum (1.031 ± 0.009) specific gravity was observed in crossbred cattle urine while as minimum (1.027 ± 0.007) was observed in Hill cattle. Similarly total solids per cent, ash per cent, total protein, urea and creatinine were highest in crossbred than Hill cattle and intermediate in Sahiwal. Higher urea and creatinine level in urine of crossbred cattle as compare to Hill cattle and Sahiwal might be due to higher metabolic rate. In agreement with the present study Davis⁵ reported that pH of crossbred cattle urine was higher (8.09 ± 0.11) than Sahiwal cattle urine (7.84 ± 0.13). Lactating cows had higher pH (9.19 ± 0.00) than heifers (8.98 ± 0.01) and calves (9.02 ± 0.05) but the differences were non-significant. Similarly Dhiman⁶ reported that pH and specific gravity of urine of crossbred heifers was significantly higher ($P < 0.05$) than pH of urine of Sahiwal heifers. In general specific gravity of cow urine ranges from 1.025 to 1.045 while pH ranges from 7.4 to 8.4¹⁰. Davis⁵ reported that urine of crossbreds had higher urea, creatinine, total protein, total solid and ash contents than Sahiwal, similarly things were reported by Dhiman⁷. pH of Hill cattle was near to neutral value as compare to crossbred cow urine (alkaline) and less inorganic materials, indicating safe useage in pharmaceutical preparation. Total N in the cow urine ranged from 6.8 to 21.6 g N /litre, of which an average of 69% was present as urea³.

Urine of Hill cattle had low pH, specific gravity, total solids, urea, creatinine, total protein, and ash per cent as compare to Sahiwal and crossbred cattle. There was a non-significant difference in urea, creatinine, total protein, and ash per cent among Hill cattle and Sahiwal urine. It was concluded that quality of Hill cattle urine was good from that of Sahiwal and crossbred cattle urine.

Quality assessment of urine from Hill Cattle

Table No. 1 Chemical Composition of Urine in Sahiwal, Crossbred and Hill Cattle.

Parameters	Hill Cattle	Sahiwal Cattle	Crossbred Cattle
pH	7.616± 0.052 ^c	7.771± 0.059 ^b	8.079± 0.073 ^a
Specific Gravity	1.027± 0.007 ^c	1.028± 0.009 ^b	1.031± 0.009 ^a
Total Solid (%)	5.938± 0.037 ^c	5.961± 0.048 ^b	6.186± 0.034 ^a
Ash (%)	1.969± 0.043 ^b	1.979± 0.041 ^b	2.092± 0.041 ^a
Total Protein (mg/dl)	5.686± 0.036 ^b	5.692± 0.037 ^b	6.203± 0.033 ^a
Urea (mg/dl)	256.904± 0.181 ^b	257.029± 0.122 ^b	274.252± 0.157 ^a
Creatinine (mg/dl)	27.020± 0.119 ^b	27.167± 0.114 ^b	28.896± 0.114 ^a

Values bearing different superscripts in the same rows differ significantly (P≤0.05).

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