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ORGANIC AND MINERAL COMPOSITION OF *GOMEYA* (COW DUNG) FROM *DESI* AND CROSSBRED COWS - A COMPARATIVE STUDY

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ABSTRACT

Gomeya (cow dung) from *desi* (non-descript Indian) and crossbred cows was compared for their organic and mineral composition. For this purpose, samples of the cow dung were collected from a herd of healthy crossbred and *desi* cows from a private dairy of Bareilly (India). These animals were fed a common basal diet comprised of concentrate mixture (CM) and wheat straw (WS) in 30:70 ratio. Concentrate mixture contained wheat bran (800 g/kg) and mustard cake (200 g/kg). Collection of cow dung samples was done continuously for 6 days after 21 days of controlled experimental feeding. Chemical composition of the cow dung revealed that while there was no difference in the organic matter (OM), nitrogen (N) and manganese (Mn) contents in the two types of cow dung, contents of calcium (Ca), phosphorus (P), zinc (Zn) and copper (Cu) were higher by 10.8, 8.0, 84.1 and 21.7 percent in the dung of *desi* cows as compared to that of crossbred cows.

Key words: Cow dung, *Desi* and crossbred cows, organic and mineral composition

In India, cows were given very high importance in the past. They were symbol of pride and status. The larger the cow herd a person possessed, higher was the status of that person. But now situation has changed. Cows are treated just like any other milk producing animal. Even for that matter buffaloes are given more importance because buffalo milk fetches more price than cow milk as former contains more fat (6-9%) than later (3-5%) and presently milk is priced on the basis of its fat content by the dairy industry. Further these animals are valued as long as they produce the milk. As the level of milk production goes down with the stage of lactation/ aging, the value of the cow is also diminished and ultimately when milk production goes below the expectation of the owner, the cow is disposed off.

Even amongst different breeds of cows, higher milk producers are considered more valuable and preferred. Since exotic breeds such as Holstein Friesian, Jersey, Brown Swiss have higher milk production; they or their crosses with the indigenous breeds are given more importance than our indigenous breeds. This has lead to indiscriminate cross-breeding of even our well established indigenous breeds with these exotic breeds.

However, these crossbred cows have comparatively low immunity and are highly prone to several diseases. Moreover, the cost of milk production per unit of milk from crossbred cows is much higher than our indigenous breeds because of high inputs. On the other hand Indian breeds of cattle are well known for their endurance for disease resistance (Prabhu, 2007). Solanki (2007) has stated that Kankrej cows, which is a native breed of Gujrat, are resistant to tick infestation and mastitis. Similarly, Indian breeds of cows are sturdier and have greater adaptability to different kinds of stresses. In an experiment, Kellaway and Colditz (1975) studied the effect of heat stress on feed intake, growth rate and nitrogen metabolism in Friesian and Brahman × Friesian (F_1) heifers kept at 20, 30 or 38°C (68, 52 and 46% relative humidity, respectively). It was observed that under heat stress, Brahman X Friesian (F_1) heifers were superior to pure Friesian animals, as feed intake and live weight gain were significantly reduced and water intake, respiration rate and rectal temperature were significantly increased in Friesian animals with each successive increase in the environmental temperature. The loss of nitrogen was also significantly higher in the Friesians due to heat stress compared to Brahman crosses. The reduction in N retention in Friesians was associated with a decrease in RNA concentration in the muscle tissues and an increase in the excretion rate of creatinine. Moreover, in our country, we have different kinds of breeds for different purposes such as for milk and for draught purposes. Not

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only in the past but even today many of the agricultural operations and transport in India, are dependent upon bullock power.

Further in India cow milk enjoyed a different value as compared to milk from other species of animals. The medicinal properties of cow milk have been well documented (Mishra and Dwivedi, 2002).

Similarly, cow dung and cow urine have a different value and status in this country. There is vast description of the importance of cow's urine and dung being the components of *Panchagavya* in the ancient Indian literature (Garg, 2004). Cow urine has been narrated to posses several medicinal and therapeutical properties (Chauhan *et al.*, 2005). Even recent studies in different laboratories of India have also confirmed many of these properties of cow urine. It has been shown that 'cow urine distillate' (*Kamdhenu ark*) has antioxidant properties (Dutta, 2001), enhanced humoral immunity in rats (Garg and Chauhan, 2003) and also improved the production and quality traits of eggs in laying birds (Garg *et al.*, 2004). The cow urine has been given two US patents (no. 6896907 and 6410059) for its bio-enhancer properties especially for early cure of tuberculosis and cancer in human beings (Chauhan *et al.*, 2005). Particularly urine from *desi* cows has been found to be more effective and useful. In an experiment Banga *et al.* (2005) compared the immunomodulatory effect of urine obtained from different species/ breeds of animals i.e. red hill (*Badri*) cows. *Sahiwal* cows, *Sahiwal* X Red Sindhi Cows, *Murrah* buffaloes and goats and reported highest immunomodulatory activity in the urine of red hill (*Badri*) cows, followed by urine obtained from *Sahiwal* cows; but there was no immunomodulatory activity in the urine obtained from crossbred (*Sahiwal* X Red Sindhi) cows, *Murrah* buffaloes and goats.

Similarly, cow dung has also been narrated as an important component of the *Panchagavya*. There are reports that dung from *desi* cows protects houses from ultraviolet radiations. Many bacteria and microorganisms present in the dung acts as probiotics. Moreover, now a days lot of emphasis is being given on organic farming, which is impossible without the use of organic manure. Cow dung is one of the most suitable sources of organic manure. There are 209 million cattle in India, contributing about 560 million tones of dung and almost similar amounts of urine every year. Thus cows make a big potential of organic manure needed for organic farming; and in the very near future these indigenous (*desi*) cows would be the backbone of organic farming and agricultural economy in India. In the present investigation, nutritional properties of cow dung from *desi* and crossbred cows has been compared.

MATERIALS AND METHODS

Animals, their management and feeding

For this purpose samples of cow dung were collected from a herd of healthy cows of crossbred and *desi* (non-descript) breeds from a local private dairy of Bareilly (India). These animals were maintained in a well-ventilated shed with the provision of individual feeding and watering. Clean drinking water was provided *ad libitum*. All the animals were fed a common basal diet comprised of 30 parts of concentrate mixture (CM) and 70 parts of wheat straw (WS). Concentrate mixture contained wheat bran (800 g/kg) and mustard cake (200 g/kg). Animals were daily offered about 2 kg of the available green fodder. Collection of the feacal samples was done after 21 days of controlled experimental feeding continuously for 6 days and brought to the laboratory for further analysis.

Analytical techniques

A suitable aliquot of the dung samples was dried over night in the hot air oven at 100±1^{0}C and dried samples were pooled for 6 days. The pooled dried feacal samples were ground in a Willey mill and analysed for organic matter (OM), acid insoluble ash (AIA) and phosphorus (P) as per the methods given by Association of Official Analytical Chemists [(AOAC), 2000]. Estimation of calcium (Ca) was done by the method of Talapatra *et al.* (1940). Trace minerals viz. zinc (Zn), copper (Cu), iron (Fe) and manganese (Mn) were analysed from the mineral extracts of these samples by atomic absorption spectrophotometer (Model No 4141, Electronic Corporation of India, Hyderabad, India). To determine the nitrogen content in the dung samples, a suitable aliquot was immediate preserved in dilute (1:4) suphuric acid and pooled for 6 days. Nitrogen in the dung samples was estimated after digesting them with sulphuric acid by Kjeldhal method.

RESULTS AND DISCUSSION

The chemical composition of the dung of *desi* and crossbred cows has been presented in Table 1. It showed that the organic matter and nitrogen contents of the dung between two breeds were comparable. Concentration of the manganese was also similar in the dung in the two groups. But the concentration of iron was slightly (4.7 percent) lower in the *desi* cow dung as compared to crossbred cow dung. However, calcium, phosphorus, zinc and copper contents were higher by 10.8, 8.0, 84.1 and 21.7 percent in the *desi* cow dung as compared to crossbred cow dung.

Table 1: Chemical Composition of *Gomeya* from *Desi* and Crossbred Cows

Nutrients (on dry matter basis)	*Desi* Cow	Crossbred Cow
Organic matter (%)	85.38	85.54
Ash (%)	14.62	14.46
Acid insoluble ash (%)	10.49	10.43
Nitrogen (%)	1.848	1.826
Calcium (%)	0.72	0.65
Phoshorus (%)	0.52	0.48
Zinc (ppm)	27.8	15.1
Copper (ppm)	7.15	5.60
Iron (ppm)	1288	1352
Manganese (ppm)	112	111

Similar to the present observations, Upadhyay *et al.* (2004) also reported higher values of copper (2.99 vs. 2.41) and calcium (1277 vs. 833) in the feaces of *Sahiwal* cows compared to crossbred cattle and suggested its role in increasing soil fertility and further utilization of these elements by plants that will lead to enhanced production. They also reported lower level of iron in the feaces of *Sahiwal* cows but similar zinc level in the dung of both these breeds. Similarly, Parihar *et al.* (2004) also reported higher levels of zinc, magnesium, potassium and calcium and lower level of iron in non-descript cow's urine compared to crossbred cows. The status of manganese was also recorded similar in the serum of indigenous and crossbred cattle of arid tract of Bikaner (Singh *et al.*, 2004).

On the basis of these preliminary findings it may be deduced that dung from *desi* cows may prove better manure to the soil, particularly as a source of trace minerals like zinc and copper as compared to dung from crossbred cows.

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