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Monitoring of heavy metal contamination in fodders, feeds and milk in Gulbarga district of Karnataka

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Introduction

Xenobiotics like heavy metals are increasing in environment due to industrialization, urbanization and agricultural practices which pose threat to animal health and quality animal products. Safe animal feeds are important for health of animals, environment and for the safety of foods of animal origin especially milk (Prasad *et al.*, 2012). To address the issue, monitoring of xenobiotics especially heavy metals in the fodder, feeds and animal products is necessary. The aim of the present study is to find out the status of heavy metals in feeds and milk of Gulbarga district in Karnataka.

Materials and Methods

Gulbarga region with five taluks - Gulbarga, Aland, Javageri, Chittapur and Sedam were selected to collect the feed, and milk samples to assess the heavy metal contamination. Red grams, Bengal gram, Black gram, Jowar, Sugar cane, Cotton are the major crops grown in this area. The feeds and fodders as well as concentrate feed ingredients generally feed their animals. Samples were collected from different villages in different taluks of Gulbarga district and analysed for toxic heavy metals content in the samples. The samples were drying ashed and known amount of acid extract was prepared (AOAC, 2012) and subjected to heavy metal analysis by Inductively Coupled Plasma Optical Emission Spectrometry (ICP-OES) of Perkin-Elmer make (Model Optima 8000).

Results and Discussion

Feeding practices: Indigenous and Cross bred cows as well as buffaloes are maintaining with average 3-4 litres milk yield per day. The farmers of this district mostly follow the stall feeding practices for feeding of their animals. Very few farmers follow the natural grazing for feeding of their animals. Natural grasses and top feeds of agricultural crops available in the region are normally used as green fodders. Very few farmers use the cultivated green fodders for feeding of their animals. Jowar straw and red gram husk are used as major sources of dry fodders. Paddy straw also used in some taluks. Wheat bran, gram chunnies, sunflower oil seed cake, safflower oil seed cakes are used as concentrate feed ingredients. Farmers of some taluks mix Jowar straw and wheat bran for feeding to their animals.

Heavy metal contamination

Arsenic (As): Results indicated that almost all samples of feeds and fodders were positive for arsenic content (Table 1). Arsenic in green fodders was almost similar in all taluks except in Gulbarga in which As content in green fodders was comparatively lower than other taluks. Among fifteen samples of green fodders, all samples (Jowar top feeds and road side grass) had As content. The dry fodder samples in all the taluks contained similar As contamination. The highest As was observed in Jowar stover and lowest was found in maize stover. Among the 48 samples of dry fodders collected and analysed, 46 samples showed positive for As contamination. The gram straw which was the major dry fodders in different taluks of Gulbarga district contained As in Chittapur, Sedum, Aland, Gulbarga and Javargi taluks. The oil seed cakes (sunflower and cotton) also contained As. Ground maize and wheat bran had same concentration of As. The As content in KMF compound feed was also found. The As content out of 27 milk samples 24 samples showed positive. The water samples collected from different areas showed non detectable levels for As contamination.

Lead (Pb): The lead (Pb) content in feeds and fodders samples collected from different areas of Gulbarga district was found very negligible except in few samples. The lead content in green fodders, only in samples of Chittapur and Aland taluk contained Pb whereas Gulbarga and Jevargi taluk did not show any Pb contamination in green fodders. The Pb content in dry fodders varied and highest Pb was found in paddy straw sample of Jevargi taluk. Gram husk contained very low level of Pb in different taluks. Oil seed cake of different areas did not contain Pb except in Chittapur taluk where sunflower cake contained. Among the 15 green fodders and 48 dry fodders, 3 green fodder and 8 dry fodder samples showed positive for Pb contamination. Among the 27 milk samples collected, 6 milk samples showed positive Pb contamination. The water samples collected from different areas were not detected for Pb contamination.

Cadmium (Cd): The cadmium (Cd) content in feeds and fodders of animals of different areas of Gulbarga district was very negligible. Among 27 milk samples, only one milk sample showed the Cd contamination. The water samples collected from different areas were not detected for Cd contamination.

Table 1: Heavy metal contamination in animal feeds and milk samples in Gulbarga district

Type of Sample	No of Samples	As		Pb		Cd	
		Positive	Negative	Positive	Negative	Positive	Negative
Green Fodder	15	15	0	3	12	0	15
Dry Fodder	48	46	2	8	40	2	46
Oil cakes, Grains, Chunnis	16	14	2	4	12	4	12
Total	79	75	4	15	64	6	73
Milk	27	24	3	6	21	1	26

Conclusion

It appears that heavy metals lead and cadmium contamination is not much evident in feed stuffs and reported values are below MRL.

References

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