Heavy Metals Contamination and Their Impact on Dairy Cows

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Pollution by heavy metals from waste water is a serious environmental and health issue due to the potential accumulation of heavy metals in biological ecosystems and their persistence, lasting for decades. The factory, effluents and wastes are discharged randomly from the soil, rivers, lakes and roadsides without any treatment. The effluents are mainly deposited in soils and are mobilized either by leaching or through uptake by plants, where they enter the animal and human food chain. Due to the large-scale production, consumption and lack of regulations, heavy metals are discharged into the environment in large quantities through wastewater irrigation, solid waste disposal, sludge application, vehicular exhaust and atmospheric deposition. The major industries include textile, dyeing, electroplating, motor, pump set, foundry and metal casting. Industrial effluents and municipal wastes contain medium or maximum amounts of heavy metals such as chromium (Cr), iron (Fe), arsenic (As), mercury (Hg), and cadmium (Cd).

Negative effect of heavy metals

Environmental risks are related to the bioavailability of metals and depend on the metal speciation, soil characteristics and complex interactions between metals and the environment. The majority of heavy metalsare toxic to living organisms, thereby affecting biochemical processes, and even those considered essential can be toxic if present in excess (Khanet al., 2012). Food chain contamination by heavy metals has become a major issue in recent years because of the potential accumulation of heavy metals in biological systems through contaminated water and soil. Farm animals, especially ruminants, are very useful bio indicators of environmental pollution. Heavy metal consumption may lead to kidney failure, liver problems and blood-cardiac problems, all of which can ultimately lead to death.It is recommended that frequent monitoring of water should be enforced around the industrial hub, so that appropriate actions can be taken if present in excess (Govind Mawari et al., 2022).

Heavy metals in cow milk: The generally accepted level of lead in forages, according to the World Health Organization (WHO), is 2 ppm (Ogututucu et al., 2021). The heavy metal contamination in soil and water gets transferred to dairy cattle and finally to humans through food chain and thus causes serious health issues. Cow milk from analysis had minimal levels of hazardous heavy metals and a good mineral makeup. The researches highlighted the need for waste management procedures and pollution prevention strategies to protect the overall ecosystem. Therefore, there is a need to develop nano technological and nanomedicine should be developed to treat heavy metal toxicity (Saikat Mitra et al., 2022). The probiotic *Lactobacillus rhamnosus* helps reduce the amount of lead and cadmium in dairy products (Mahmoud Elafify et. al., 2022). The concentration of heavy metals in milk is dependent on the relative level of exposure of cattle to contaminated soil, water and forage. Forage and water play key roles in determining the level of heavy metals in milk. Toxic elements (Pb and Cd) were translocated and magnified more in the biological system of dairy cattle from forages and water.

Conclusion

To prevent health risks to the population through the consumption of milk samples need to be screened regularly. Special attention must be given to the constant assessment and monitoring the quality of soil and water bodies. Plant breeders may be advised to evolve suitable fodder varieties that can nullify the concentration of heavy metals, thereby avvoinding accumulation and translocation into the human food chain. Similarly, highyielding flower crops that can utilize sewage water may also be grown in the study areas as a potential phytoremedial measure. Animal nutritionists may be advised to formulate feeds with low chromium contents, particularly during the summer season.Therefore, it is necessary to monitor and assess aggregate exposure to heavy metals in association with different environmental media and pathways to understand the relationships between the concentrations of trace elements in soils, plants, water and animal systems. Moreover, risk assessment seems to be particularly important because these elements can bioaccumulate and biomagnify in plants and

animals, eventually facilitating human health through the food chain.

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