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Opinion Article

Scenario of Chronic Hydroarsenicism in Arid Zones and Toxic Risk in Goats

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Opinion

There is really a strong environmental problem with hydroarsenicism in different countries of the world, mainly in Asia and Latin America; there are reports of chronic poisoning from exposure to high concentrations of arsenic in Bangladesh, India, Taiwan, Thailand, China, Hungary, Serbia, United States, Chile, Brazil, Argentina and Mexico [1]. In 1993 the World Health Organization (WHO) set 10µg L-1 as the guideline value for arsenic in drinking water [2]. However, the maximum allowable limits for animal consumption are not yet well established, and therefore different reference values have been considered, including 25 and 200µg L-1 [3,4]. In many parts of the world, both the problem of arsenic in groundwater and goat farming coincide in arid zones, together with agriculture and cattle breeding activities. These activities require large volumes of water for their performance and generate an increase in water stress, through the over-exploitation of aquifers as occurs in the North of Mexico, specifically in the region of the Comarca Lagunera (Coahuila-Durango), where hydroarsenicism has transcended 58% of its aquifers, and continues to increase.

Goat farming in Mexico occupies the first place in possession of these animals in Latin America and the 12th worldwide with more than 10 million animals [5]; 70% is developed in extensive systems of arid and semi-arid zones. Managed mostly by producers in conditions of poverty. Significant arsenic toxicity research has been conducted in goats and cattle mainly in India, Bangladesh, and Pakistan. Most research has reported effects such as damage to the epididymis and vas deferens [6], damage to sperm quality, and body condition [7]. Coinciding that the main effect of arsenic is oxidative stress [8]. The toxic effects of chronic arsenic exposure will be a function of dose and time of exposure. In terms of antioxidants, selenium is an essential component of selenoproteins, which play a critical role in the body's antioxidant defense against ROS in the oxidation-reduction processes [9]. This effect can be attributed to the antagonism between arsenic and selenium together with vitamin E [10,11].

Therefore, in my opinion, it is important to study the conceptualization of all the elements and factors mentioned above (environment, social environment, economic activities, resource management) that constitute the problem of hydroarsenicism in arid zones with a systems thinking approach, and an integral and global vision, to provide solutions to the problem derived to the bad quality of the water and chronic toxicity in exposed human beings and animals. To mitigate hydroarsenicism it is important to develop sustainable projects for the good management of water resources through technical assistance in the agricultural sector.

Conclusion

Reducing the rate of water extraction, optimizing irrigation systems, through the transfer of technologies such as iron oxide nanoparticle filters. Besides, the improvement of good practices in

local goat farming, such as the supplementation with selenium and vitamin E, which help to cushion oxidative stress and counteract the effect of chronic exposure in goats [12].

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Conflict of Interest

There is no conflict of interest.

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