

MICROPLASTICS AND NANOPLASTICS IN THE FOOD CHAIN OF FARM ANIMALS: IMPACTS ON HEALTH AND PRODUCTIVITY

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Abstract

Pollution from microplastics (MP) and nanoplastics (NP) has emerged as a central concern in environmental and health research. While most studies focus on aquatic ecosystems, recent evidence highlights direct contamination of livestock farms through feed, water, soil, and equipment. Ingested particles disrupt the gut microbiome, inducing dysbiosis, local and systemic inflammation, and reduced digestive efficiency. Chronic exposure is associated with metabolic disorders, oxidative stress, and liver dysfunction, with consequences for growth, reproduction, and overall productivity. Detection of plastics in milk, meat, and eggs suggests direct transfer to consumers, raising significant food safety and public health concerns. Within the One Health framework, these findings emphasize the interdependence of animal, human, and environmental health, underlining the urgent need for monitoring, risk mitigation, and integrated management strategies. This paper provides an integrated review of exposure sources, physiological effects, and broader health implications of MNP in animal production.

Key words: gut microbiome, livestock, microplastics, nanoplastics, one health