Benefits of nano-particles supplementation in feed of livestock and poultry.

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Abstract: Nano-particles, such as zinc oxide, copper oxide, and silver, have been extensively studied for their potential benefits in livestock and poultry nutrition. The unique physical and chemical properties of nano-particles make them attractive candidates for use as feed additives to improve animal health, growth, and productivity. This article aims to review the current literature on the benefits of nano-particle supplementation in feed of livestock and poultry, highlighting their mechanisms of action, efficacy, and potential limitations.

Introduction: Nano-particles are particles with a size of less than 100 nanometres that have unique physical and chemical properties compared to their larger counterparts. Due to their large surface area to volume ratio, nanoparticles have higher reactivity, solubility, and biological activity. Nano-particles have been extensively studied in various fields, including medicine, electronics, and environmental remediation. Recently, they have also gained attention in livestock and poultry nutrition, where they are used as feed additives to improve animal health, growth, and productivity.

Benefits of Nano-particles Supplementation in Feed: Nano-particles have several potential benefits when used as feed additives in livestock and poultry nutrition. Firstly, they can improve animal health by enhancing immune function, reducing the incidence of infectious diseases, and improving gut health. Second, they can increase nutrient uptake and utilisation, decrease feed intake, and increase weight gain and feed conversion efficiency to boost growth and production. Thirdly, they can increase the nutritional content, flavour, and shelf life of animal products including meat, milk, and eggs to raise their quality. Finally, they can reduce environmental pollution by reducing the excretion of harmful substances, such as ammonia and greenhouse gases.

The mechanism of action of nano-particles in livestock and poultry nutrition is complex and not fully understood. However, it is assumed that it has to do with their distinctive physical and chemical characteristics, including such extremely high volume for surface area, reactivity, and volatility. Nano-particles can interact with various biological molecules, such as proteins, enzymes, and cell membranes, and modulate their activity. They can also adsorb and trap harmful substances, such as bacteria, viruses, and mycotoxins, and prevent their absorption into the animal's system.

Silver nanoparticles (Ag NPs) have also been studied for their potential benefits in livestock and poultry nutrition. They have also been shown to have antibacterial and antifungal properties, which can reduce the incidence of bacterial and fungal infections in livestock and poultry.

However, despite the potential benefits of nano-particles in livestock and poultry nutrition, their use is not without controversy. Some concerns have been raised about the potential toxicity of nano-particles and their long-term effects on animal health and the environment., and more research is needed to determine their optimal usage levels and potential risks.

Conclusion: Nano-particles have several potential benefits when used as feed additives in livestock and poultry nutrition, including improving animal health, growth, productivity, and environmental sustainability. Nevertheless, nano-particles hold great promise for improving livestock and poultry nutrition and ensuring a sustainable and healthy food supply.

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