



NANOTECHNOLOGY
HEALTHY ANIMALS
HEALTHY FOOD

Microminerals and Vitamin E are critical nutrients for productivity of animals and fish. Routine supplementation of these nutrients optimise immune functions, promotes production indices, and enriches animal products for human consumption.

Key roles of Microminerals in Animal & Fish Nutrition

Zinc in Dairy & Beef Nutrition

- Improves feed intake, promotes growth hormone functions resulting in enhanced ADG & feed efficiency
- Improves immunity by promoting catalytic, structural and regulatory process of keratinisation which (keratin) forms protective barrier in teats preventing entry of mastitis causing pathogens. Besides, Zinc is a cofactor of superoxide dismutase (SOD), facilitates reduction of free radicals, improving antioxidant system and in turn promoting immune functions, especially during heat stress in dairy cows
- Zinc lowers cortisol level during oxidative stress and improves secretion of reproduction hormones like GnRH, FSH and LH, especially during stress (e.g. heat stress).

Zinc in Poultry Nutrition

- Zinc is essential for growth, maintenance and other functions such as bone and feather development, fertility, enzyme structure and functions, and appetite control in poultry.
- Zinc is critical for boosting cell mediated immunity in poultry and hence, increase resistance towards viral infection.
- Carbonic anhydrase, a zinc-dependent enzyme essential for supplying carbonate ions to convert calcium into calcium carbonate needed for eggshell formation in laying hens. Zinc concentration in birds is directly related to the activity of this carbonic anhydrase enzyme.

Zinc in Aqua Nutrition

- Zinc is activator of more than 100 enzymes in fish/shrimp and thus affects, growth, skeletal development and immunity.
- Zinc inhibits oxidative damage to cells and tissues induced by free radicals and participates in the function of the immune system by interacting with minerals like copper and selenium.
- Zinc can't be stored in the body of fish/shrimp and hence, daily dietary requirement is critical. In addition, higher dosing of Zinc is likely to lead to adverse effect on physiological conditions.
- Zinc improves appetite and feed efficiency in fish/shrimp.

Copper in Dairy & Beef Nutrition

- Copper is an essential trace element that is required for the function of over 300 different proteins that influence dairy cow fertility, health and performance
- There is a small margin between Copper deficiency and toxicity and because the high susceptibility of latter to bind antagonists in the rumen. Therefore, accurate dosing is critical.

Copper in Poultry Nutrition

- Copper plays a critical role in supporting immune function, antioxidant defense, bone strength, iron metabolism, hemoglobin synthesis, erythropoiesis etc, subsequently leading to optimal growth and productive performance in poultry.

Copper in Aqua Nutrition

- Copper is crucial for element for growth promotion, formation of bone, metabolism, immunomodulation and maintaining anti-oxidant system in fish
- Copper plays essential role in iron metabolism, as a component of ceruloplasmin, circulating in blood plasma and bound to copper.

Manganese in Dairy & Beef Nutrition

- Manganese is essential for growth, anti-oxidant metabolism and reproduction fish/shrimp
- Manganese plays a crucial role in physiological and biochemical processes including lipid, protein and carbohydrate metabolism..

Manganese in Poultry Nutrition

- Manganese is a key trace element on poultry for the normal formation of bone, metabolism of amino acid as well enzyme function.
- Manganese is cofactor of metalloenzymes which are responsible for carbonate and mucopolysaccharides synthesis and are important in eggshell formation..

Manganese in Aqua Nutrition

- Manganese is essential for growth, anti-oxidant metabolism and reproduction fish/shrimp
- Manganese plays a crucial role in physiological and biochemical processes including lipid, protein and carbohydrate metabolism..

Key roles of Vitamin E & Selenium in Animal & Fish Nutrition

Vitamin E & Selenium on growth



Vit E & Selenium improves weight gain in dairy cows and calves, indirectly, through its involvement in thyroid hormone metabolism (higher expression of T3). It is evident that selenium deficient diets cause drastic reduction of T3, increase in T4 and reduction of T3/T4 ratio in blood.

Vitamin E & Selenium on reproduction & immunity



It is evident that Vit E & Selenium deficiency causes perinatal metritis, retention of placenta in dairy cows and malfunction of the testosterone and spermatozoon synthesis, which causes infertility in males. It is believed that selenium, primary component of glutathione peroxidase (GPx) system, prevents oxidative stress and thereby improves reproductive functions. The same mechanism is involved in promotion of immune functions in dairy cows.

Vitamin E & Selenium on new born calf health



Vit E & Selenium deficiency in diets of dairy cows has severe consequences on the new born calf in terms of immune function and growth. It is evident that dietary supplementation of Vit E & selenium before parturition ensure birth of healthy calves. Furthermore, it has been recorded that the transfer of dietary selenium from dairy cows to calves are mediated through placenta and not via milk (milk has low level of selenium) after birth

Vitamin E & Selenium play critical role in combination in promoting anti-oxidant system in fish. the actions are mediated through following means :

➔ Inhibits increased lipid peroxidation, antioxidant transcript levels and glutathione levels in the blood.

Inhibits lipid peroxidation in gills, increases non-protein thiol levels, participates in fish excretion.

Inhibits hepatopancreas lipid peroxide production and enhances Glutathione peroxidase (GPX) activity.

Catalyzes the dismutation of superoxide radicals into H_2O_2 and oxygen, and the conversion of H_2O_2 into water, protecting cell membranes from oxidative damage, participating in polyunsaturated fatty acid metabolism

Regulates hepatic lipid metabolism and enhances hepatic GPX activity.

Vitamin E & Selenium have following key functions in poultry:

Promotes antioxidant system, maintains redox balance and signalling in poultry. It in turns ensure optimum physiological functions in stress.

Promotes maturation of spermatozoa and fertility.

Ensures optimum lipid metabolism.

Ensures optimum thyroid hormone metabolism.

NanoMinE™ is a proprietary liquid formulation featuring highly bioavailable nanoscaled and zerovalent Zinc (Zn), Copper (Cu), Manganese (Mn). In addition, it features, first ever, nano-emulsion of selenium (Se) nanoparticles (NPs) and Vitamin E.



Each ml contains:

- Nano Zn — 10 mg
- Nano Mn — 10 mg
- Nano Cu — 5 mg
- Nano Se — 150 mcg
- Vitamin E – 50 IU

2X

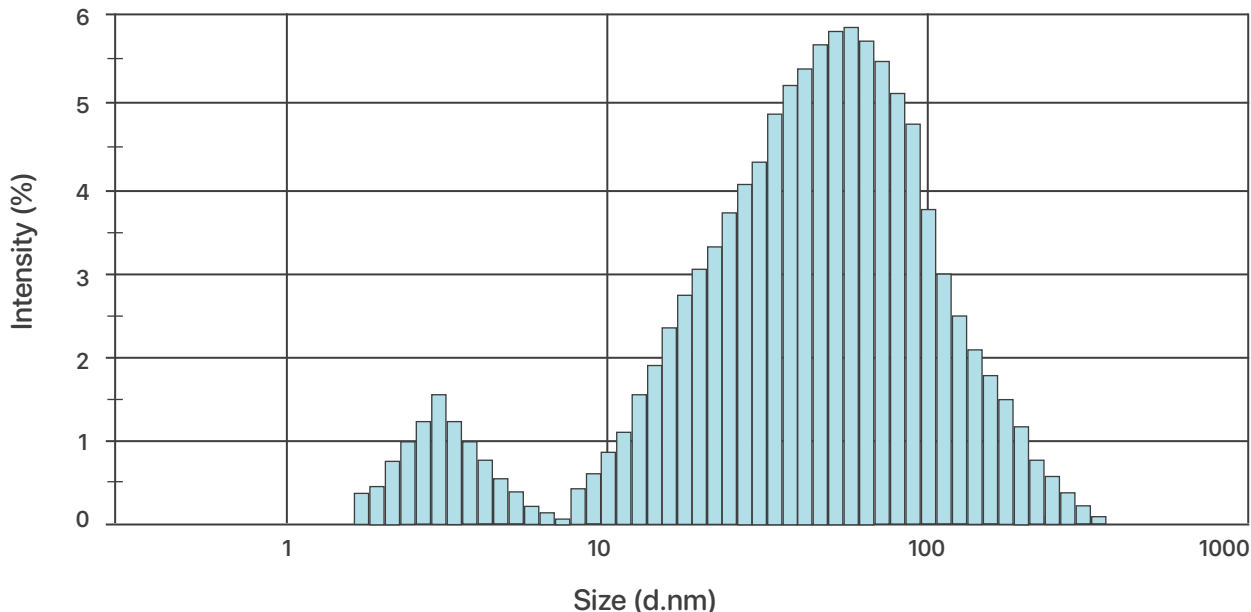
Bioavailability

3X

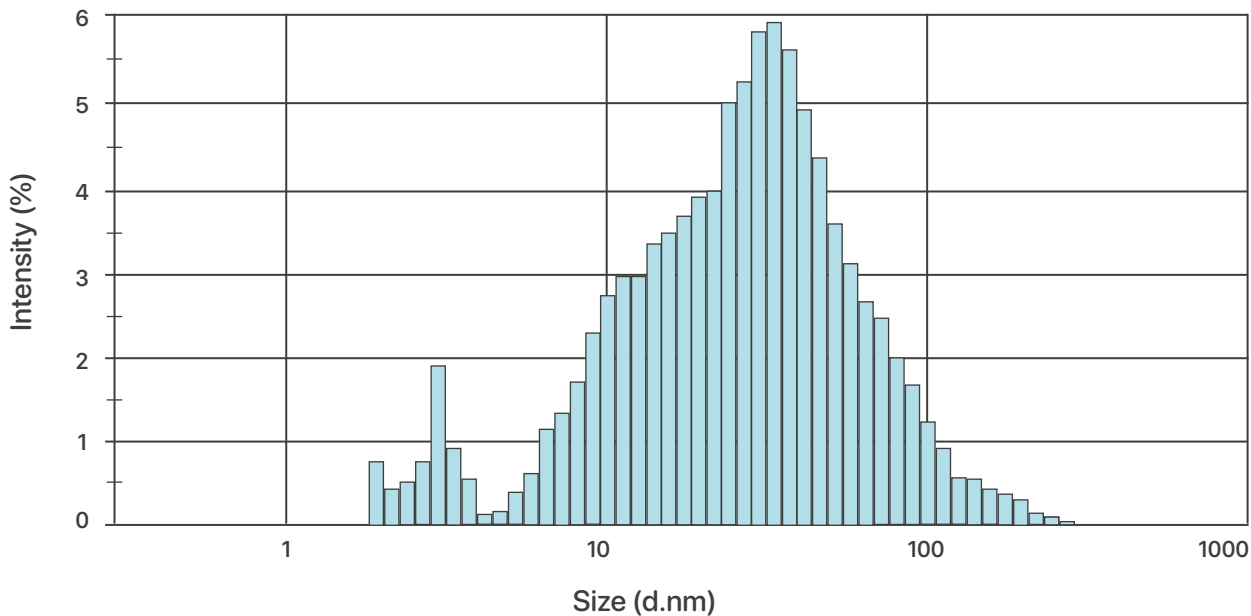
Biological activity

Zero-valent Zn, Mn, Cu, and Se are present in particle size < 100 nm as detected by dynamic light scattering (DLS). This results in unmatched efficacy of NanoMinE™ in comparison to the commercially available products.

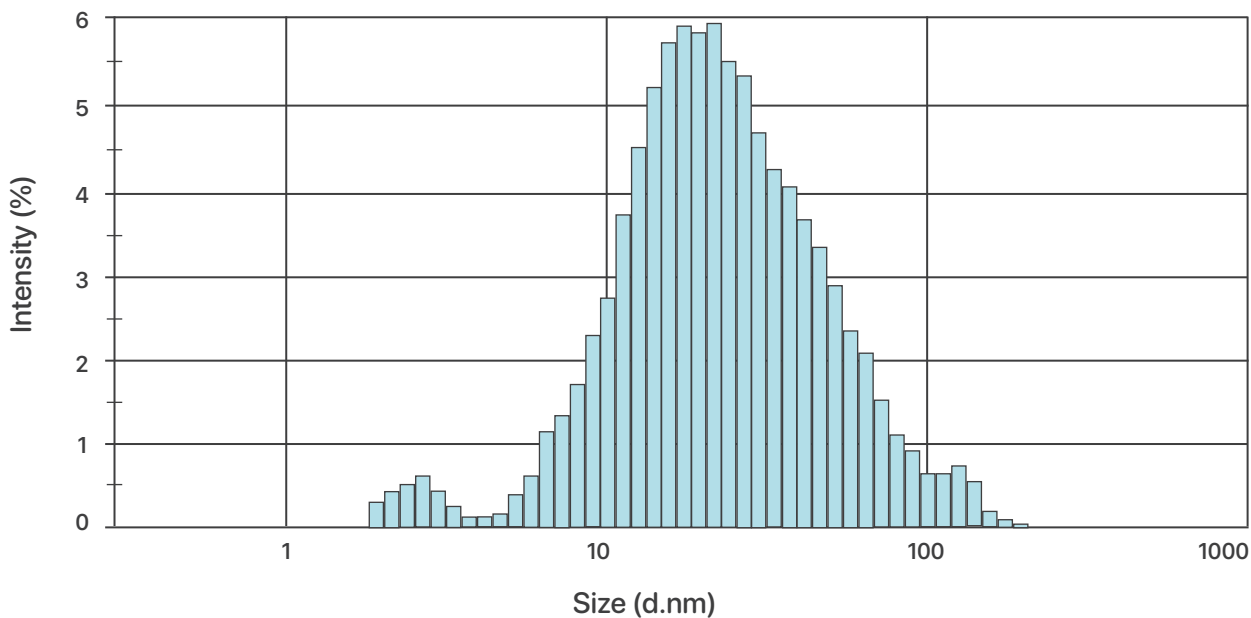
Zero valent Zinc (zZn)



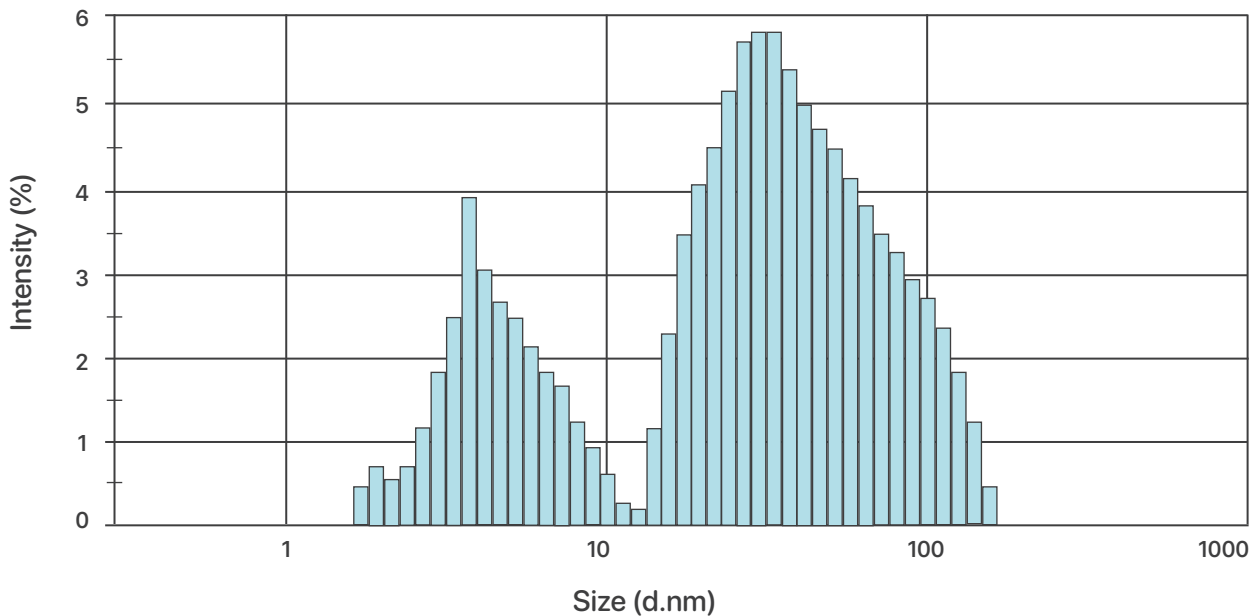
Zero valent Manganese (zMn)



Zero valent Copper (zCu)



Zero valent Selenium (zSe)



Key benefits

- Highly bioavailable zerovalent nanoscaled minerals with no unwanted interactions
- Superior biological activity than native form owing to the nano architecture of minerals
- First-ever novel nano emulsion of Vitamin & Nano Selenium resulting uniformity in dispersion and higher bioavailability.
- Nanoscaling ensures no toxicity of minerals even at higher dosing vis-a-vis inorganic minerals used in commercially available formulations.

Supplementation rate

→ **Dairy/Beef cattle:** 10 ml NanoMinE™ per animal per day or as recommended by veterinarian.

- **Poultry:**
- *Chicks/Growers:* 1 ml NanoMinE™ per 40 birds per day
 - *Layers/Parents/Adult Broilers:* 1 ml NanoMinE™ per 20 birds per day

→ **Aqua:**

Conditions	Dosage	Frequency
General	4 litres per acre or 10 litres per hectare	Once in every 15 days
Problems (loose shell, soft shell, poor moulting, poor growth, less plankton etc)	8 – 10 litres per acre or 20 – 25 litres per hectare	Once in every week

Available in 1 ltr pack



NANOTECHNOLOGY



HEALTHY ANIMALS



HEALTHY FOOD



Envizon Biosciences

Sky Adobe, IVth Floor, PAMPA Extension
Kempapura, Hebbal
Bengaluru – 560024 Karnataka
Contact us: cs@envizon.co.in
Contact no: +91 9600013710