

## EFFECT OF SELENIUM NANOPARTICLES WITH NEWCASTLE DISEASE VIRUS (NDV) VACCINE VIA *IN-OVO* INJECTION ROUTE ON GROWTH PERFORMANCE AND CELLULAR IMMUNITY IN POST HATCHED BROILERS

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**ABSTRACT :** Due to high toxicity with lower absorption of sodium selenite that continuously added to poultry nutrition, selenium nanoparticles, bring into being of the changes to supplementary feed stuff due to the biological properties as a natural antioxidant, low toxicity, enhanced body weight in addition to its ability to improve the immune response in several species. The current study was conducted to elucidate the influence of *in ovo* injection of Nano-selenium with ND vaccination on growth performance and immunological response of broilers. Selenium nanoparticles identified by transmission electron microscopy (TEM) the morphological size (28nm colloid, amorphous shape with zeta stability -44mV while nano-selenium with NDV vaccine was 174.5nm, colloid, round to spherical-shaped, with zeta sizer-39mV). Eggs were gained from Al-Chaflawey Hatchery, Babylon. About (200) fertile eggs at 18 days of incubation of embryonic development, were remarked, grouped into four groups and given: T<sub>1</sub>: injected with phosphate buffer saline (PBS) as control negative, T<sub>2</sub>: inoculated by selenium nanoparticle in concentration (0.225 µg/ egg) consider positive control, T<sub>3</sub>: immunized by nano-selenium with Newcastle vaccine (NDV) / Lasota strain and T<sub>4</sub>: vaccinated by Newcastle disease virus (NDV) vaccine, Lasota strain. All groups injected with 0.1 ml at amniotic fluid by 23 gauge needle, sealed hole by paraffin wax and brood until hatching. The results of the current study showed that the group Nano-selenium with NDV vaccine (T<sub>3</sub>) increase significantly (p<0.05) in cellular immunity (IL-2 and gamma-interferon) compared with other groups. Also, there is a benefit effect (p<0.05) of nano-selenium with or without (NDV) vaccine via *in-ovo* injection in weight gain and feed conversion ratio (FCR).

**Key words :** *In-ovo* injection, broilers, cellular immunity, nano-selenium, NDV vaccine.

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### INTRODUCTION

Nanotechnology deals with submicroscopic particles with at least one dimension less than 100 nm, so the Nano-selenium have special importance in poultry diets (Zhang *et al*, 2008). The use of natural and synthetic biodegradable and biocompatible polymer-based particulates as immunostimulants and delivery systems for nutrients and vaccines has been studied extensively in recent years (Zhao *et al*, 2014). Selenium-Nanoparticles (SeNPs) was a brand of elemental Se particle at a nano-size scale with a bright light-red color, interested widespread attention in these days, due to unique special properties such as large surface area, high

absorption ability, excellent surface activity, high stimulation efficiency and reduce toxicity (Wang *et al*, 2007; Twegh *et al*, 2020). The nano-particles have a positive vital role when using in the diet as another to traditional minerals material (Dhyaa *et al*, 2020). With regard to the immune modulatory role of selenium nanoparticles that assessed in recent studies, it was shown that treatment with administered selenium nanoparticles in mice tumors bearing could be elevated of avian cytokines IFN- $\alpha$  and IL-12 with significant induction of the Th1 stage of the immune response (Yazdi *et al*, 2012). Cytokines are tiny protein envoys released by the host as immune responses to infection, inflammation, or trauma