



Efficacy of concurrent administration of hyper-immune egg yolk and virus challenge in Newcastle disease infection

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Abstract

Newcastle disease (ND), an infectious illness, affects domestic and wild birds. Poultry production in Mali faces significant obstacles due to this disease. An important cause of loss in Mali's chicken industry, especially in rural areas, is Newcastle disease, with the sole method of prevention being vaccination. Unfortunately, in village poultry farms, this vaccination coverage is very low. This study aims to determine the effectiveness of hyper-immune egg yolk in protecting against Newcastle disease in poultry, as a cheaper and more accessible means of prophylaxis. Forty-five-day-old seronegative chickens (Leghorn strain) were divided into three groups ($n = 5$) housed separately. Groups I and II were inoculated with the virulent Newcastle strain (ML029/07) titrating 10^6 EID₅₀/ml intramuscularly, 100 μ l per chicken; thereafter, group I was treated with hyper-immune egg yolk intramuscularly, 2 ml for 3 days. Group III (the control group) received neither virus nor treatment. All groups were placed under clinical observation for 14 days. All chickens in groups I and III remained healthy and recorded no mortality during the entire period, while group II showed signs of ND and had 100% mortality. The hyper-immune egg yolk was able to protect poultry against the ML029/07 strain isolated in Mali. Further studies are recommended, with interventions to make this method of prevention more accessible in areas with poultry populations as a means of protection against ND mortalities.

Keywords Hyper-immune egg yolk · Newcastle disease virus · Immunoprotection

Introduction

A Sahelian country located in the heart of West Africa, Mali, covers an area of 1,241,238 km² and remains a country where livestock farming constitutes the main source of livelihood for more than 30% of the population and is credited with 12% of the gross domestic product (GDP). Poultry farming, practiced largely by women and especially those in rural areas, is considered an economic activity of great importance with nearly 41 million poultry, 80% being chickens, 18% guinea fowl, and the rest ducks, turkeys, and pigeons. Poultry farming has shown increasing performance in recent years. The workforce

is divided between the modern sector for 16.28% and the traditional sector for 83.72% (Projet de Développement de l'Aviculture au Mali (PDAM) 2004; Direction Nationale des Productions et Industrie Animale (DNPIA) 2016). The average number of poultry per inhabitant would be three birds.

The poultry sector generates direct and indirect jobs and generates a monetary mass estimated at 1 billion USD per year through various commercial transactions (Direction Nationale des Productions et Industrie Animale (DNPIA) 2016). Despite these potentials, the livestock sub-sector in Mali and village poultry farming in particular has not lived up to the ambitions displayed because numerous constraints limit the productivity of the workforce and compromise its development by poultry farmers. Among these constraints is Newcastle disease.

As part of the fight against Newcastle disease, hygiene and prophylaxis measures are applied. Vaccination is widely used in modern poultry farming, but in traditional poultry farming, very few measures are used to prevent this disease. The treatment of this avian viral pathology with veterinary drugs is unsuccessful, and given the devastation it causes (very high mortality), to minimize losses, another strategy to combat this disease is necessary. It consists of experimenting with immunotherapy

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