Effect of Supplementary Vit- D3 On Hatchability of Sonali breeder

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Effect of Supplementary Vit-D3 On Hatchability of Sonali breeder

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List of contents

List of Figures

Summary

A Study was carried out to evaluate the effects of supplementary vit-D3 on sonali breeder chickens in Pahartali thana, Chittagong district. Data were collected from one sonali breeder flock with a total 1500 chickens. There I found, before supplementation of vit-D3 the hatchability and mortality rate was 74.8% and 25.2% respectively (Figure:2 and 3). After providing supplementary vit-D3 the hatchability rate increased and the mortality rate reduced to 75.7% and 24.3% respectively (Figure:2 and 3). As hatchability depends on various other factors including fertility, genetic, disease, egg selection and management practices. So, by maintaining proper balanced nutrients, control of maternal diseases along with supplementation of vit -D3 the hatchability of Sonali breeder chickens can be improved. This study summarized that vit-D3 had a protective effect on the developing embryo from 0 to 7 days of incubation and had positive influence over the hatchability with no consistent long- lasting effects on layer performance were observed.

Keywords: Hatchability rate, Mortality rate, Management Practices, Incubation

Chapter 1

Introduction

Poultry production is gaining popularity in the developing countries like Bangladesh due to its role in bridging the protein malnutrition, economic empowerment of the resource poor segment of the society and also fits well in the farming systems commonly practiced. Poultry production is practiced at levels ranging from subsistence to the large scale commercial operations. The supply of day old chicks is very important for the success of the poultry production chain. Hatchability is defined as the number of chicks hatched out of a number of eggs set for incubation. In true sense of the word hatchability is the capability of the growing embryo to survive and successfully escape from the shell. Hatchability is commonly used to evaluate hatchery performance. Fertility and hatchability are major parameters of reproductive performance which are most sensitive to environmental and genetic influences (Stromberg,1975). Hatchability is a trait of major economic importance on the poultry industry, because it has a strong effect on chick output (Khalid *et al,*2015*)*. In the early days, eggs were hatched by placing them under broody hens. This method of hatching is highly unsatisfactory for large scale production of baby chicks. Therefore incubators which provide similar environments as those of the broody hens, but more effectively are used at present for hatching of eggs. A good nutritional status of the parent birds and supplementation of vit-D3 required for normal development of embryo. The consequences to the embryo may be lethal if the eggs contain either inadequate, excessive, or imbalanced levels of vit-D3. Maternal supplementation of vit-D3 has protective effect on the growing embryo reducing early embryonic mortality and increasing hatchability. The importance of vitamin D to hatchability and its role in calcium metabolism and transfer of calcium from the shell to the embryo was reviewed by Landauer (1967).A vitamin D3 deficiency results late embryonic mortality mostly on Days 18 and 19 and low hatchability rate in the chicken. An increase in egg production and hatchability and decrease of embryonic mortality can be achieved by providing supplementary vit-D3 level. The innate immune system is the first line of defense of the bird. The cells of the innate immune system

work to recognize, phagocytes, and (using nonspecific properties) kill the invading pathogen as well as working to signal the acquired immune response (Zekarias et al.,2002).The young, newly hatched chick has an immature immune system that could leave them more susceptible to infection and disease than more mature birds (Lowenthal et al., 1994; Wellset al., 1998).The maternal diet could have significant effects on the immuno competence of the chick at hatch, as it is the nutrients from the egg that will enable the chick to develop. The abundant number of studies indicating a regulatory role for vitamin D3 and its metabolites within the immune system of various other species (Manolagas et al., 1985; Provvedini et al., 1986; Rockett et al.,1998; Binder et al., 1999; Waters et al., 2001) suggests the possibility of similar roles in chickens, although limited research has been done to support this. Vitamin D deficient chicks have decreased cellular immune responses, with decreased cutaneous basophil response, as well as decreased macrophagocytic capability (Aslam et al., 1998). In addition, maternal supplementation of vit-D3 increases deposition of vit-D3 into the egg (Mattilaetal.,2011),and therefore may result in increased egg hatchability and improved chick quality, which could in turn result in better growth and feed efficiency of the Sonali chick. Therefore the objectives of the current research was to investigate the effects of supplementary vitamin D3 on hatchability of Sonali breeder.

Chapter 2

Materials and methods.

Study area:

The study was conducted in‘Anchalik hash-murgi khamar’, Pahartali thana, Chattogram from 10th March to 30th April, 2023 for a period of total 50 days.

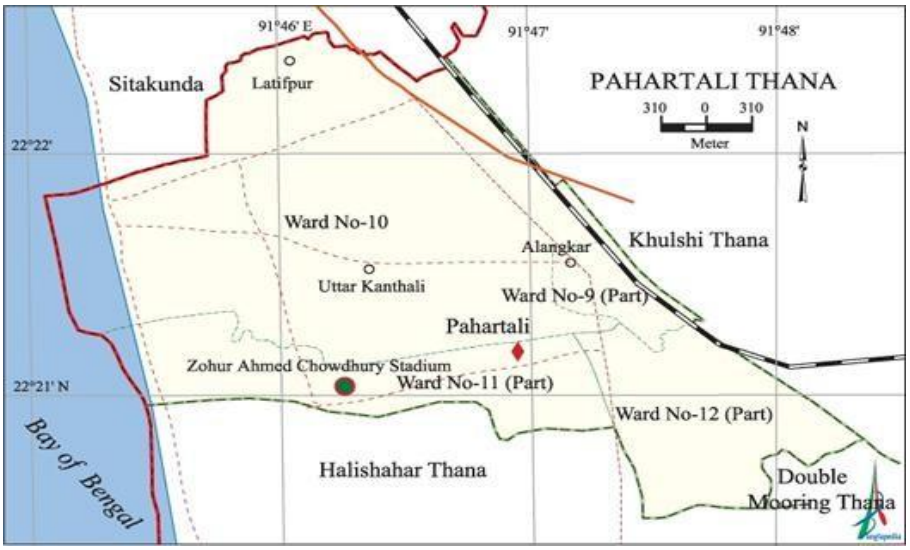

Figure 1: Study area (Pahartali thana)

Experimental Design and Conditions

The experimental protocols were conducted on Sonali breeder (n = 1,500) were obtained from commercial breeder flock on the same production complex at 29 wk of age. Total of the fertile eggs (n = 1,200) came from the flock that received 10,000 IU of dietary vitamin D3 (Animal and poultry formula) / 2 litters of drinking water during the breeder phase.10,000 IU vit- D3 is equivalent to 2 ml solution . A total 200 ml of the solutions were required as the total daily requirement of water of the flock was 200 litters.

Figure 2: Supplementary Vit-D3 (Liquid form)

Eggs were collected and then stored for 7 days in a cool room at approximately 17°C and 75 relative humidity. The eggs were then fumigated with potassium permanganate and Formalin before set. Eggs were incubated for 18 days at 37.5°C and 65% relative humidity. Eggs were turned 90° hourly up to day 15. Eggs were candled on the 7th and 14th days of incubation to identify and remove infertile and eggs with dead embryos (dead in germ).The eggs which failed to develop embryo were regarded as infertile eggs. The rest of the eggs were transferred to a hatcher at 18 days of age in 36°C and 85% relative humidity. These eggs were placed in hatch baskets that held 18 eggs per basket (n=67). Early (0to7days) and late (8 to 18 d) total embryonic mortality was 24.3%. Before supplying the supplementary vit-D3 the hatchability of the flock was measured in the same manner. But that time a total 898 chicks were hatched among 1200 eggs set and the mortality rate was 25.2%.

Chapter 3
Result and Discussion

Hatchability is measured by the percentage of chicks hatched out of total number of eggs set for incubation = Number of chick hatched/ Number of total eggs set x 100. Before supplementation of vit-D3, total 898 chicks were hatched out of 1200 eggs set and the average hatchability rate was 74.8%. The mortality rate was nearly 25.2%. After providing supplementary vit-D3 in that flock 908 chicks became hatched out of 1200 eggs set and the average hatchability rate became 75.7%,at the same time the mortality rate reduced to 24.3%.

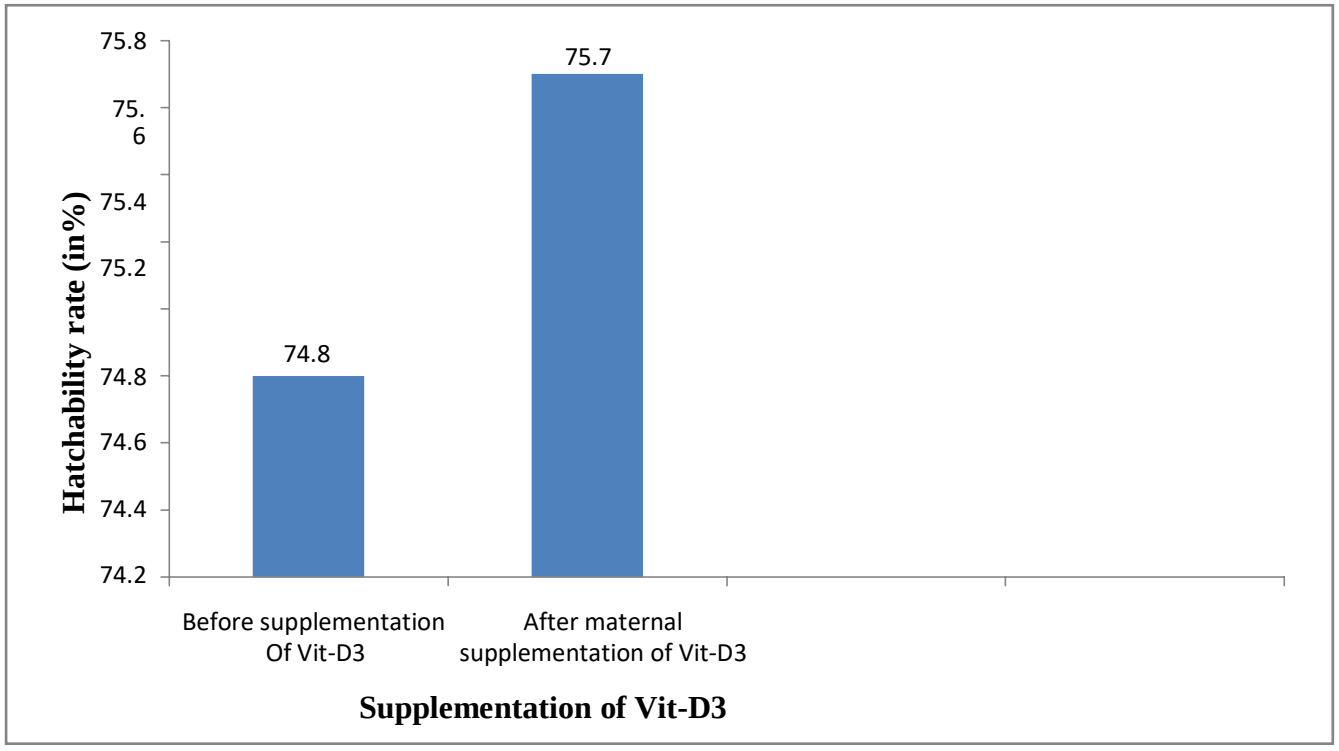

Figure 3: Comparative analysis of hatchability before and after supplementation of vit-D3

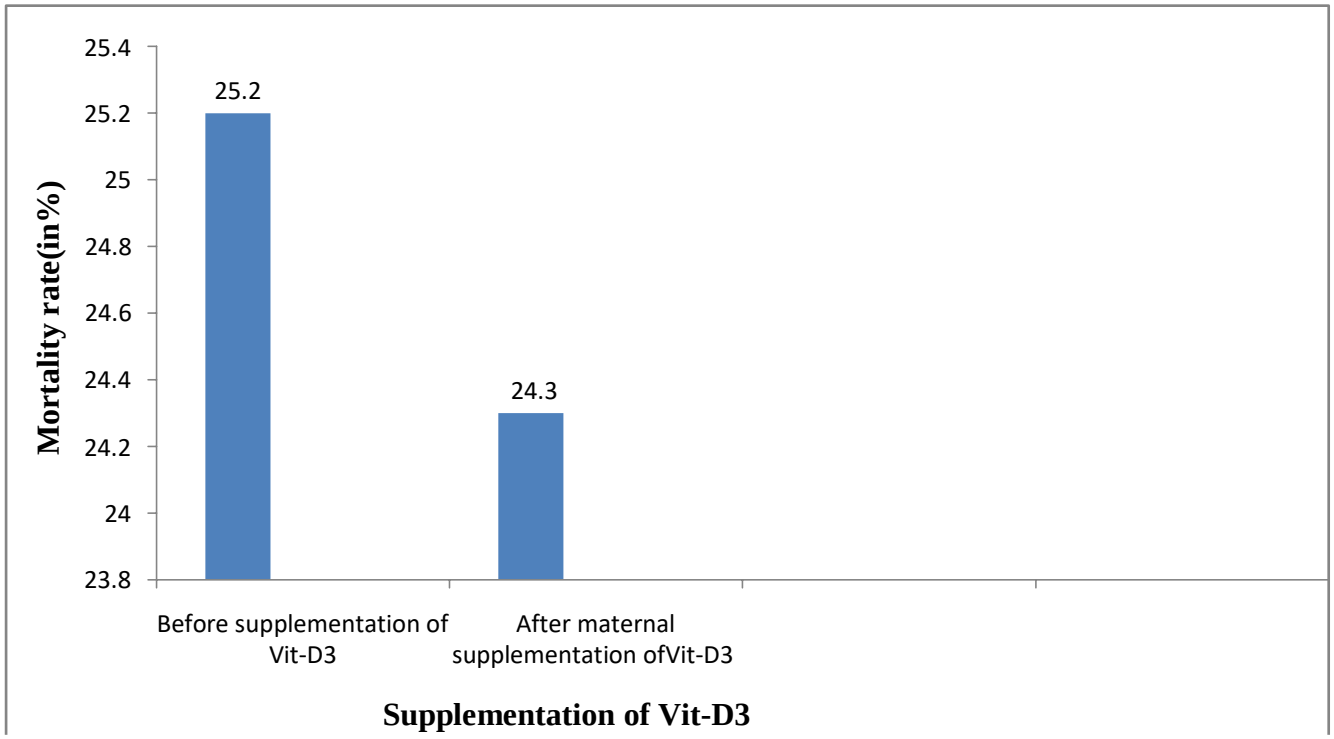

Figure 4: Comparative analysis of Mortality rate before and after supplementation of vit-D3

A hatchability rate of 80-90% (of eggs set) from artificial incubator is normal, but a range of 75 to 80 percent is considered satisfactory. The obtained hatchability rate of our study flock is somewhat lower because hatchability depends on various factors. These factors include; egg age (Turongog et al., 1990), storage condition (Brahand Sandhu, 1989), age of flock (Buhr,1995) system of husbandry and rearing technology (Weis, 1991). Mating system (Gebberdt –Henrichand Mark,1991) incubation, relative humidity and egg turning (Permsack1996).

The hatching potential of an egg is totally dependent on the developing embryo and on the amount of micro and macronutrients that the hen puts in the egg (Englandetal.,2012).

These nutrients are supplied from the different components, shell, yolk and albumen.

Chapter 4

Conclusion

Supplementing breeder hens with vit-D3 had a protective effect on the developing embryo from 0 to 7 days of incubation. This reduction in early embryonic mortality could increase hatchability and productivity of Sonali breeder flocks. Although maternal vit- D3 supplementation had positive influence over the hatchability, no consistent long-lasting effects on layer performance were observed. However, further investigation is required on genotype x vit-D3 interaction on hatchability.

Limitations

The study was conducted on small number of breeder chickens. The maternal disease and infection were not valued.

Recommendations

1) Provide balanced nutrients along with supplementation of vit-D3
2) The appropriate relative humidity, temperature and egg turning during incubation should be maintain strictly.

Chapter5

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Biography

The author Hamida Akter, daughter of Md. Jamal Uddin and Firoja Begum passed her Secondary School Certificate (SSC) examination from Muchapur B.Z High School, Sandwip, Chittagong in 2015 and Higher School Certificate (HSC) examination from Agrabad Mohila college, Chittagong in 2017. There after she enrolled for Doctor of Veterinary Medicine (DVM) degree in Chattrogram Veterinary and Animal Sciences University (CVASU), Bangladesh and Now, She is an Intern Student in this University.