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The Effect Of Early Feeding On Grade B Broiler Chicks On The Surface Lesion Area Of The Gizzard (*Gizzard Erosion*)

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ABSTRACT

Reducing the number of Inport Grand Parents stock and efforts to early abandon Parents Stock becomes a problem for breeding farm company who do not have Grand Parents Stock, because they cannot replace Parent Stock normally. This right causes the age of the parent stock to be cut back to 85 weeks or even 90 weeks. This will reduce the quality of the DOC and some of its follow-up cases. The purpose of this study was to: compare several early feed ingredients in DOC Grade B on the Gizzard wound area. The research method is an experiment with the treatment of sprouts, instant noodles and nutrijell. Research using RAL with 3 treatments 1 control and 4 replications. The results showed that at the 95% confidence level, the F hit number was 3.63 which was smaller than the F table 3.49 which means that the use of some of these materials had a significant effect on the width of the wound on the Gizzard surface. The initial feeding of sprouts wound area: 7.43 mm, instant noodles: 7.63 mm, nutrijel: 6.78 mm, and without treatment (control): 8.7 mm. The difference in the surface area of the gizzard is possible due to: the presence of enzymes or acids in the gizzard, while the feed is not yet available.

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1. Introduction

Based on data from the Directorate General of Livestock and Animal Health Services (Ditjen PKH), the projected availability of broiler day-old chicks (DOC) for 2021 reached 3.6 billion birds against a demand of 2.9 billion, indicating a potential overproduction of 758 million birds; meanwhile, the projected availability of broiler carcasses for the year was 4 million tons compared to a demand of 3.1 million tons. Consequently, several measures were implemented: the early culling of 55-week-old parent stock and the disposal (abortion) of 19-day-old hatching eggs at the hatchery (Bahri, 2005)

Regulation of the Minister of Agriculture of the Republic of Indonesia Number 61/Permentan/Pk.230/12/2016 concerning the Provision, Distribution, and Supervision of Commercial Chickens strictly limits the importation of Grand Parent Stock (GPS) day-old chicks (DOCs) to curb Final Stock production and prevent an oversupply of live birds. However, this creates significant difficulties for small-scale breeders in obtaining Parent Stock DOCs, forcing them to retain breeder hens until they are 75 or even 85 weeks old, depending on market prices. This poses a major problem for companies lacking their own Grand Parent Stock, as they must rely on Parent Stock DOCs from large companies that hold a monopoly on Grand Parent Stock. Conversely, large companies tend to retain their Parent Stock DOCs for internal use, selling only a small fraction outside their corporate groups. The difficulty small companies face in flock replacement inevitably leads to a decline in Final Stock DOC production. To maximize the volume of Final Stock DOCs available for sale, small companies extend the culling age of their Parent Stock. However, as Parent Stock ages, DOC quality declines; this results in a higher number of Grade B DOCs—which may be upgraded to Grade A despite failing to meet standard weight requirements. Grade B DOCs are often plagued by secondary issues that hinder subsequent growth—such as omphalitis, black navel, and gizzard erosion—particularly when early handling is inadequate (Bahri, 2005)

Long-distance transport exacerbates the condition of day-old chicks (DOCs) upon arrival, leading to issues such as dehydration and injuries to the surface of the gizzard (ventriculus). Injury to the ventriculus significantly impairs the function of the gizzard, which is primarily responsible for grinding and reducing the particle size of feed entering the intestine. Coarse particles hinder nutrient absorption, resulting in poor growth in the chickens. Based on the foregoing, the author investigated several materials commonly used in the field when Day-Old Chicks (DOC) are being transported to the rearing house—particularly for long-distance shipments requiring more than 24 hours of transit time. The objective of the study was to compare the extent of gizzard damage associated with various types of early feed materials administered during transport. Common early feed options include noodles or fine crumbles, watermelon, sprouts, and specialized gels—either commercially available or homemade (e.g., using Nutrijell)—especially for long-distance DOC shipments (Bahri, 2005).

The muscular stomach, or gizzard, is located immediately after the proventriculus in poultry. Unlike the proventriculus—which produces juices or enzymes used to digest or break down food into its constituent nutrients—the gizzard serves a more mechanical function, aiding digestion by reducing particle size and regulating the flow of feed. The gizzard consists of several tissue layers, some of which contain straight, tubular glands. Its innermost layer is a tough, pliable lining capable of withstanding the potentially damaging effects of the muscular grinding action—often involving stones or other insoluble materials. The gizzard's glands secrete a keratinous fluid that hardens upon reaching the surface, replacing tissue worn away by the organ's grinding movements.

Although the gizzard is a robust organ, field veterinarians frequently report gizzard erosion—or lesions on the gizzard's mucosal lining (koilin)—in commercial broiler and layer operations. In some instances, these lesions have been observed in day-old chicks prior to placement in broiler houses and before any feed consumption. Research suggests that post-hatch stress or the presence of mycotoxins in breeder feed (which are subsequently transferred to the egg) are possible factors in young chicks. For older birds, a wide range of potential causes should be considered. The gizzard surface is covered by a dense carbohydrate-protein complex layer known as the koilin layer—also referred to as the keratinoid layer, cuticle, or gizzard lining. The surface of the koilin layer and the underlying cellular mucosa are arranged in rows of ridge-like folds, except in the lateral and medial tendon regions, which have smooth surfaces. The koilin layer consists of hard koilin rodlets secreted by tubular glandular epithelial cells and soft koilin secreted by surface epithelial cells (Eriksen, 2013).

Factors contributing to gizzard erosion or Gizzard Erosion and Ulceration Syndrome (GEU) in chickens likely include hereditary factors, starvation, feed structure and fiber content, nutritional deficiencies, toxic substances, and microbial infections or colonization (Anne Gerd et al., 2013). GE cases have significant economic consequences, as they lead to growth impairment, increased disease

susceptibility, flock non-uniformity, and an elevated Feed Conversion Ratio (FCR). Chickens often fail to thrive, resulting in stunted growth—although stunting can also be caused by Adenovirus, which damages the digestive tract, particularly the gizzard (Palmer, 2006).

2. Method

The research was conducted from March 20 to 28, 2026, at the PT Panca Patriot Prima hatchery in Lawang, Malang. An experimental method was employed at the facility. The research subjects consisted of 48 Grade B day-old chicks (DOC) sourced from a single incubator, with a body weight range of 34–36 grams. The study design involved four treatments, each with four replicates. The treatments were as follows: Control; Treatment 1 (DOC fed sprouts as initial feed); Treatment 2 (DOC fed artificial *Nutrijel* as initial feed); and Treatment 3 (DOC fed instant noodles as initial feed).

The wound surface area is measured using the formula :

$$\text{Area (mm}^2\text{)} = \text{length (mm)} \times \text{width (mm)} \times$$

Grade B day-old chicks (DOCs) were given different starter feeds and held for 48 hours after removal from the incubator. The research variable was the surface area of lesions on the gizzards of Grade B DOCs across the various treatments. Gizzard damage area was measured using calipers. The study employed a Completely Randomized Design (CRD) using 80 Grade B broiler DOCs obtained from PT Panca Patriot Prima. Data were collected by dissecting the DOCs after 48 hours; the gizzards were removed and opened, and the surface area of the lesions was measured using digital calipers. The data recorded included lesion length (mm) and lesion width (mm). Data analysis was performed using ANOVA (Foltynski Piotr et al., 2016).

3. Results and Discussion

Based on the wound area measurements, the wound sizes were as follows: sprout feed (7.43 mm), instant noodles (7.63 mm), Nutrijell (6.78 mm), and no treatment/control (8.7 mm), as shown in the table below :

Table 1. Surface area of Grade B broiler DOC gizzards with various early feeds (mm²).

Test	Control (mm ²)	Sprouts (mm ²)	Mie Instant (mm ²)	Nutrijel (mm ²)
U.1	8.60	7.50	7.70	6.80
U.2	9.00	7.70	7.90	6.30
U.3	8.50	7.30	7.40	7.10
U.4	8.70	7.20	7.50	6.90
Jumlah	34.80	29.70	30.50	27.10
X ²	302.76	220.52	232.56	183.60

Average	8.70	7.43	7.63	6.78
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The research results indicate that at a 95% confidence level, the calculated F-value is 3.63—which exceeds the F-table value of 3.49—meaning that the use of the tested substances significantly influenced the width of lesions on the gizzard surface. The most extensive lesions resulting from delayed initial feeding were observed in the control group. This is likely because the delay in early feeding leads to the formation of lesions on the gizzard surface. This finding aligns with the view that stress-induced gastric ulcers are triggered and exacerbated by increased acid secretion and a weakened mucosal barrier (Al-garni et al. 2021, cited in Haque, Zuo, & He, 2013). Feeding with microbially contaminated material generates significant amounts of biogenic amines (such as histamine), which catalyze gastric acid secretion; histamine is also a chemical substance potentially toxic to livestock and poultry. Several causes of GE include: delayed access to feed (starvation), stress during the hatchery incubation period, mycotoxin content in breeder flocks, and vertical transmission of viruses and bacteria from the parent stock (Anonymous, 2022).

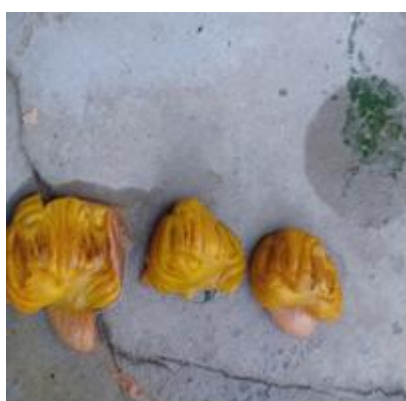


Figure 1. Control gizzard



Figure 2. Initial feed for sprouts.



Figure 3. Initial Noodle Feed



Figure 4. Nutrijell starter feed.

Das Kumar Amit (2024) stated that long-term delays in feeding can cause stress and injury to the gizzard surface in cases of reo virus infection. The gizzard is a fundamental organ in the digestive system of poultry, functioning to digest ingested food. It features two pairs of strong muscles and an internal lining. The interior of the gizzard consists of a very hard, tough layer and often contains small stones that aid in the digestive process (North and Bell, 2017).

(Anggorodi, 2015) Factors influencing chicken gizzard development include feed intake and the practice of feed withdrawal—often employed when intake falls below standards—which stimulates the birds to consume larger quantities of feed. Additionally, the fiber content of the feed plays a significant role in gizzard development; crude fiber enhances feed digestibility by stimulating the optimal development of the digestive tract, including the gizzard. Initial stimulation of gizzard development occurs through feeding at the time of chick placement and during the brooding period. Subsequently, development is influenced by the inclusion of whole wheat and the particle

size of the consumed feed. Gizzard weight correlates positively with feed particle size, particularly with crumble or granular forms. For day-old chicks, medium-textured feed containing coarse corn particles can increase gizzard weight by 26–41%, with this increased weight serving as an indicator of proper gizzard development (Bell, 2018).

4. Conclusion

Based on the description above, it is concluded that early feeding influences the occurrence of gizzard surface lesions in Grade B broiler chicks. Chicks that did not receive early feed exhibited the most extensive gizzard surface lesions.

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