

# Analysis of the Alabio Ducks Rearing Business with Herbal Medicine Supplementation in Lebak Swamplands of South Kalimantan

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**Abstract.** Ducks are one of the sources of income for farmers in the Lebak swamp area, South Kalimantan. Duck rearing is one of the prospective ducks farming activities. The study aims to determine the analysis of Alabio ducks rearing business with herbal medicine supplementation. Due to the high prevalence of disease attacks, herbal medicine supplementation was given to ducks to boost their immune systems. The research was carried out in Sungai Durait Hulu village, Babirik subdistrict, Hulu Sungai Utara (HSU) Regency in April-December 2019. A total of 700 female Alabio ducks were used as samples with a mixed rearing system (intensive system for ducks aged 1-30 days; semi-intensive for ducks aged 1-5 months), and a 5-month of observation period. The parameters observed were production parameters, mainly duck mortality and/or loss, and economic parameters to determine business feasibility. The herbal medicine supplementation significantly affected immune systems, as shown by a lower mortality rate (30%) for ducks with herbal medicine supplementation compared to ducks without herbal medicine supplementation (50%). Duck rearing in this area was feasible and profitable which shown by R/C values were greater than one for both groups of ducks, namely 1.84 and 2.28 for ducks without and with herbal medicine supplementation, respectively.

## 1 Introduction

Ducks are one of the commodities raised by farmers in the Lebak area of North Hulu Sungai Regency, South Kalimantan. Farmers have specialized in duck farming businesses such as hatchery businesses (producing ducklings / DOD), rearing businesses (producing pre-laying ducks), fattening male ducks, producing consumption eggs, and hatching eggs. Farmers'

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livestock businesses have proven to be a source of income, poverty alleviation, food security, and organic fertilizer [1–5].

In 2022, the duck population in North Hulu Sungai (HSU) Regency was 946,338 heads, accounting for approximately 2.67% of the duck population in South Kalimantan. The egg production in HSU District was 7,577,261.37 kilograms, and the meat production was 591,919.90 kilograms [6]. The scale of ducks farming varies depending on the capital ability of the farmers, which ranges from 25 to 500 heads. The maintenance system carried out is a combination of semi-intensive and intensive systems [1].

The main problem facing duck farmers is the ongoing outbreak of avian flu, which began in 2010 and continues to this day. This has an impact on the scale of farmers' businesses, which have reduced significantly, decreasing between 25 and 1000 birds/farmer. Prior to the avian flu outbreaks, the business had between 50 and 3000 birds/farmer. [7] stated the same thing, that the problem of ND and AI diseases in poultry farming enterprises at the farmer level with simple raising management causes a decline in productivity and a high mortality rate. This demonstrates that people's poultry farming businesses have poor biosecurity. Facilitation of farmers by the government, private sector, and stakeholders to enhance local poultry management must be carried out as an alternative effort to control disease while considering climate change into account [8]. Other problems are rising feed prices, and fluctuating product prices. Other issues encountered in the fattening duck business or rearing are unstable growth rates and high mortality rates. Efforts that can be undertaken include providing feed in both quantity and quality, as well as providing herbal herbs or Phyto-biotics to increase appetite and stamina [[9]. Particularly with the restrictions on the use of antibiotics, the use of antibiotics has now been mostly replaced by other safer products [10].

Therefore, farmers try to keep their livestock healthy by maintaining the cleanliness of the environment, utilizing high-quality duck breeds, and giving vitamins or herbal medicines to livestock. Herbal livestock medication is made using ingredients derived from herbal plants such as ginger, curcuma, turmeric, *sambiloto*, and others that are considered to have numerous benefits. Phyto-biotics are herbal herbs that are effective for maintaining livestock performance and as growth promoters for livestock, in both poultry and ruminants [5, 11–13].

According to [14], herbal medicine has been shown to strengthen poultry immune systems and can be utilized as an antidote and preventative measure for major infectious hazardous diseases. In recent years, the use of herbal/plant medicines in livestock production has expanded because (1) the use of chemical drugs has side effects, including residues in products, causing resistance to pathogens, in addition to high prices, and (2) supporting the organic livestock production system [15].

This study aims to determine the impact of the use of herbal medicines supplementation on the raising business of Alabio duck breeds, specifically on production performance, which is focused on reducing mortality rates due to better animal stamina and on economic performance (farmer income).

## 2 Materials and Method

This research activity was carried out in Sungai Durait Hulu Village, Babirik District, HSU Regency. HSU Regency is one of the development centers of ducks in South Kalimantan. The assistance carried out was in the form of improving livestock farming management, especially the prevention of duck diseases through the provision of livestock herbal medicines. Provided livestock herbal medicines aims to increase livestock appetite, reduce manure odor, reduce livestock mortality, increase livestock growth, increase livestock stamina or immunity, and improve the digestive system of livestock.

To make 10 liters of poultry herbal medicine, the ingredients used were ginger (165 grams), curcuma (165 grams), turmeric (80 grams), garlic (165 grams), *temulawak* (50

grams), black *temu* (50 grams), betel leaves (62.5 grams), citronella (30 grams), *sambiloto* (250 grams), molasses / brown sugar (250 grams), clean water (10 liters), and probiotics EM-4 (250 ml). All ingredients were carefully cleansed then thinly sliced and mashed in a blender to get herbal extract. The herbal extract was added with molasses, water, and probiotics, then thoroughly stirring, and mixing before were placed in a tightly covered container and fermented for 7 days, until no gas forms. The gas produced during the early stages of fermentation was removed by opening the container's lid, stirring, and closing it again. When the fermenting process was complete, the herbal medicine was ready for usage. Herbal medicine was mixed into drinking water and was given at a dosage of 1 ml/duck/day to ducklings aged one week for 10 days, then afterward at a dosage of 2 ml/duck per week. In this study, 500 female Alabio ducks were treated with herbal medicine supplementation, while 200 ducks without herbal supplementation served as controls. Feeding management used were starter commercial feed for DOD – 1 month old, and followed by rice bran, sago, and a small amount of commercial concentrate until 5 months old.

The parameters observed included production parameter i.e., duck mortality/loss, and economic parameters i.e., total income; income over feed and duck costs (IOFDC); and business feasibility (R/C value). The criteria of duck mortality and loss become inextricably linked. Data was collected for 5 months, and analyzed using the formula:

$$Pd = TR - TC \quad (1)$$

where:

Pd = Total Income

TR = Total Revenue

TC = Total Cost

[16] defines income as the difference between revenue and total costs. Farmers' revenue is calculated by multiplying their output by the selling price. To find out income over feed and duck costs were calculated by using a formula:

$$IOFDC = TR - (DOD \text{ cost} + \text{total feed cost}) \quad (2)$$

Business feasibility was calculated using Revenue-Cost Ratio (R/C) as follows:

$$R/C = \frac{Pd}{TC} \quad (3)$$

## 3 Results and Discussion

### 3.1 Impact of herbal medicine on duck mortality

According to observations, mortality and/or loss in ducks given herbal medicine supplementation from the age of one day to ready for sale at the age of five months was 30%, compared to 50% in control ducks. The mortality rate was still quite high in both ducks supplemented with herbal medicine and control ducks. The research findings of native ducks in West Sumatra that were extensively maintained in the lowlands revealed mortality rates in the middle phase ranging from 0.62% to 8.11% and in the late phase ranging from 7.57% to 13.26% [17]. Duck mortality was high because livestock was only kept intensively from the age of one day to 30 days, and afterward ducks were kept semi-intensively, with ducks caged only from the afternoon to the morning. The difference in mortality and/or loss between ducks given herbal medicine and ducks not given herbal medicine was quite significant. This demonstrated that medication containing herbal ingredients benefits animals, particularly by boosting illness resistance and quickening growth. Herbal ingredients are natural growth promoters that are safe to consume for humans and livestock.

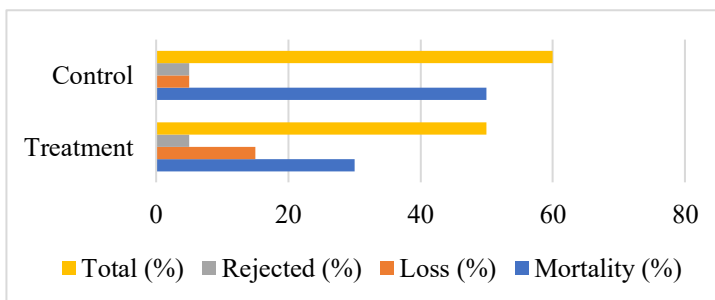
The less antibiotics and chemical medications are used, the less residue is left on livestock products (meat, eggs, and milk). Herbal ingredients are considered safe and are frequently used by farmers in various countries, including Indonesia.

Herbal medications, according to [18], are the most effective source of components for drug detection and phytopharmaceutical formation for the control of devastating parasite infections. Furthermore, the usage of herbal medicines is inexpensive and easy to obtain and produce by farmers themselves. In addition, the usage of herbal medications is inexpensive and easy to obtain and produce by farmers themselves[4,5,11]. According to[14], herbal medicine has been shown to boost chicken immune systems and can be used as an antidote and preventative measure for hazardous infectious diseases.

The use of herbal medicine as a feed additive to poultry, such as broilers, layers, native chickens, quails, ducks, and domestic birds, also can reduce ammonia production around cages, thereby reducing the impact of greenhouse gas emissions[18]. Although not as significant as agriculture, forestry, or the industrial and transportation sectors, livestock, specifically ruminants and poultry contribute to greenhouse gas emissions that can harm the environment. Some diseases can be prevented by using herbal medicine, particularly those caused by parasitic infections, such as protozoa, Helminthes, blood parasites, and ectoparasites. Spices and herbs contain bioactive ingredients with antioxidant, antibacterial, antiparasitic, anti-diabetic, anti-cancerous, among others that are beneficial to health and have no detrimental effects on the body [18].

According to [19], ducks given herbal medicine regularly at the recommended dose have a healthy appearance, such as dry feathers, have good appetite, low mortality, and good stamina, which ultimately has an impact on farmers' profits. While ducks raised without herbal treatment exhibit signs of wet feathers and low stamina.

In this study, the number of ducks decreased not simply because of mortality, but also because of the loss of ducks due to being nurtured semi-intensively after aged one month. Based on observations, mortality in ducks with herbal medication was 30%, and without herbal supplementation was 50%. The number of ducklings lost and rejected in ducks with herbal medication was 20%, and 10% for ducks without herbal supplementation. Thus, the total mortality and rejected/lost ducks in treatment group was 50%, while in control group was 60% (Figure 1). The loss of ducks may be because they were separated from their flocks while grazing, stolen, or preyed upon by other animals. The percentage of ducks lost was relatively high, thus farmers should pay attention to avoid it, one of them by implementing a fully intensive rearing system.



**Fig. 1.** Percentage of mortality, loss, and rejected ducks

The dose of herbal medicine administered in drinking water was as much as 2 ml / week / head and was quite effective. According to[11] that the administration of herbal Phyto biotics at a 2% ration dose generated the best results for the parameters of final body weight, average daily weight gain (ADG), and FCR in male Alabio ducks up to six weeks of age. [20] found that the best dose level of herbal medicine to produce broiler duck carcasses was

9 cc / head / day, with a higher body weight than other treatments, and a business scale of 140 heads yielded a profit of IDR 2,150,000 / maintenance period, with an R/C of 1.35. [21] found that giving 5 ml/head of herbal medication to male Peking ducks via sonde yielded optimal results in terms of body weight and weight gain. In their research, [22] discovered that administering livestock herbal supplementation every four days to super-native chickens can be used as a substitute for vitamins and chemical drugs. [19] concluded that capsule forms of herbal medication were more effective than liquid or powder forms. [13] advocated using 0.33% *temulawak* as a feed additive in super-native chicken feed to produce optimal weight gain and final weight. According to [23], turmeric supplementation boosted egg production and egg quality of local ducks by 4% when compared to ginger.

Some of the studies mentioned above demonstrate that administering herbal medicine has advantages. The benefits include improving health and digestion, increasing productivity and immunity, and as antioxidant function [4,11,15,19,24,25]. According to [20], the use of herbal treatments is effective in boosting the performance, productivity, and economic value of ducks. According to the findings of [26], broiler chickens with herbal medication of curcuma and turmeric has better feed conversion ratios by 19.52 and 14.76%, respectively, when compared to the control group.

The ingredients of herbal medicine used in this study have been shown to have content and functions that can boost stamina, stimulate growth, and even prevent disease. Turmeric rhizomes, for example, have inhibitory power against *Eimeria tenella* sporozoites and can reduce intestinal damage in poultry [27]. Ginger (*Zingiber officinale*) possesses analgesic, anti-inflammatory, gastrointestinal regulating agent, antibacterial, and antioxidant properties [28]. Garlic, according to the studies, is a rich source of essential nutrients and beneficial phytochemicals that can be added to animal feed to enhance digestion and stimulate growth in livestock and poultry. In livestock, garlic ingredients exhibit antibacterial, antifungal, hypo-cholesterol emic, and antioxidant effects [29]. *Kencur* (*Kaempferia galanga*) has substances that may prevent stomach inflammation and boost appetite. Betel leaf contains antibacterial, antiseptic, and disinfecting properties, as well as the ability to reduce faeces odor. Betel leaf serves a similar effect to antibiotics, both antibacterial and antifungal. In general, betel leaves contain up to 4.2% essential oil, which is antibacterial and can suppress the growth of certain types of bacteria [12]. *Sambiloto* can inhibit aflatoxin in feed, boost stamina, and contain anti-viral and anti-coccidiosis ingredients. *Sambiloto* has the potential to be used as an anti-bacterial for livestock [30]. This is due to the active ingredients in *sambiloto*, such as andrographolide, which acts as an immunostimulant against both specific and non-specific immunological activities. The content of flavonoids and tannins in *sambiloto* has potential as an anthelmintic [31].

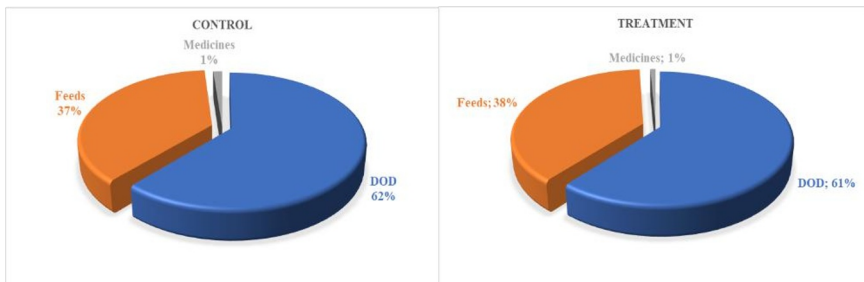
### 3.2 The impact of herbal medicine on farmers' income and business feasibility

The business of providing herbal medicine supplementation to female Alabio ducks demonstrated a good, feasible, and beneficial effects. The results of the business analysis (Table 1) obtained the R/C value in ducks with herbal medicine supplementation was 2.28, while it was 1.84 without herbal medicine supplementation. Both groups of ducks are feasible and profitable, but providing herbal medicine supplementation yields better results. In contrast to the research of [3], which found that the provision of herbal medicine has no significant effect ( $P > 0.05$ ), both the technical aspect of production and the economic aspect. Although the economic aspect does not differ significantly, giving 1 percent herbal medicine to broilers was the best decision.

**Table 1.** Economic analysis of rearing business of female Alabio duck breeds

No	Description	Price (IDR)	Treatment		Control	
			Volume	Value (IDR)	Volume	Value (IDR)
<b>Costs</b>						
1	DOD (duck)	12,000	500	6,000,000	200	2,400,000
2	Feed BR (zak)	370,000	4	1,480,000	1	370,000
3	Bran (kg)	3,000	206	618,000	100	300,000
4	Sago (stem)	305,000	5.3	1,616,500	3	762,500
5	Concentrate (kg)	10,000	6	60,000	2	20,000
6	Herbal Medicine (liter)	15,000	5	75,000	-	-
7	Vitachick (sachet)	10,000	-	-	5	50,000
	Total cost			9,849,500		3,902,500
<b>Revenue</b>						
	Sell ducks	90,000	90,000	22,500,000	80	7,200,000
	Total income			12,650,500		3,297,500
	Income/duck/period			50,620		41,218.75
	R/C			2.28		1.84

According to the results of economic analysis, giving herbal medication during rearing for 500 ducks costs IDR 75,000 per period, whereas for 200 heads without herbal medication, need vitamin costs of IDR 50,000 per period. If 500 ducks were not given herbal medication, vitamins would cost IDR 125,000 every period. So, the expenses for ducks with herbal medicine supplementation were IDR 50,000, or roughly 40%, less than the costs for factory-made vitamins. This demonstrated that using herbal medicine was less expensive [11]. However, when the total cost of keeping ducks in the treatment group was determined, it was greater than the control, at IDR 7,699/head/period against IDR 7,512.5/head/period. This is because the treatment group spent more feed than the control group, resulting in higher feed expenses per duck (IDR 7,429.12/tail/period versus IDR 7,260/head/period). Giving herbal medicine causes rapid growth in ducks, resulting in a higher feed intake need than in control ducks. However, the percentage of ducks that could be sold was greater in the herbal medicine group because the mortality and lost or rejected rates were lower (50% vs 60%). Farmers' income per duck was also higher in the herbal treatment group compared to the control group, which was IDR 50,602 / head and IDR 41,218.75/head, respectively. This demonstrates that feeding herbal medication to ducks can improve duck performance, stamina, and reduce mortality, making it profitable.



**Fig. 2.** Percentage of production costs of Alabio duck rearing

From the results of the calculation of IOFDC in Table 2., it can be seen that herbal supplementation gave a higher value of income over feed and duck costs, amounted IDR 50,902/duck/period, or 56.6% compared to control ducks of IDR 41,844/duck/period

(46.5%). This result is in line with [32] study on broiler chickens given herbal supplementation which resulted in higher income over feed and chick costs (55.26%) compared to controls.

**Table 3.** Income over Feed and Duck Costs (IOFDC) of the rearing business of female Alabio ducks, Sungai Durait Hulu Village, Babirik District, HSU Regency, 2019

No.	Description	Treatment (IDR)	Control (IDR)
1.	DOD cost	6,000,000	2,400,000
2.	Total Feed costs	3,774,500	1,452,500
3.	Total feed and duck costs	9,774,500	3,852,500
4.	Total Revenue	22,500,000	7,200,000
5.	IOFDC/period	12,725,500	3,347,500
6.	IOFCD/duck/period	50,902	41,844
7.	IOFDC (%)	56.6	46.5

Furthermore, herbal medicine provided to livestock was made by themselves, ensuring cleanliness and freshness (not expired). These herbal medicines can also be mass-produced for sale, increasing family income. This is since some farmers prefer to buy ready-to-use herbal medicines. Herbal medication production costs only IDR 5,000/liter, yet it costs IDR 10,000-20,000/liter to buy (Fig 2). This could be another economic opportunity for duck farmers to increase their income. Research reported by [33] that the use of herbal ingredients in broiler chickens is efficient in saving maintenance costs. Herbal medicine has long been known to Indonesian people as traditional medicine. Herbal ingredients are expected to become valuable food elements to improve the health of the veterinary community. The use of herbal medicine is an alternative to traditional medicine that is commonly used and has the potential to reduce the use of antibiotics which can contribute to reducing the high level of resistance of pathogens to antibiotics [34]. Another study reported by [33] that broiler chickens given livestock herbal medicine obtained an R/C value of 1.42.

## 4 Conclusions

Giving herbal medication to ducks can increase livestock stamina and have a positive effect, which was shown by low mortality. The herbal medication dose was 2 mL per head each week. Rearing business of female ducks was likewise feasible and profitable, in both the herbal medication and control groups. Female Alabio ducks reared with herbal treatment had an R/C value of 2.28 compared to 1.84 without herbal treatment. The implementation of a fully-intensive rearing system is required to prevent ducks for getting lost.

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