

Blood Biochemical Profile in Madura Cows with Repeated Breeding

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Abstract:- This research aims to identify the biochemical profile of blood in Madura cattle that have experienced repeated breeding. There are ten female cows divided into two groups. In the first group, five cows are being mated repeatedly. The second one has five fertile cows. The observed variables consist of total blood protein, blood phosphorus, and blood ureum nitrogen. The blood samples are taken through the jugular vein and analyzed at the Integrated Research and Testing Laboratory (LPPT) at Gadjah Mada University of Yogyakarta. The biochemical analysis of blood uses the spectrophotometer method with the Microlab 300 photometer. The data are analyzed using a t-test. The blood biochemical profile analysis in Madura cattle shows that they are fertile and have experienced repeated breeding. The phosphorus in the blood of fertile cows is higher than in those that experience repeated breeding. Meanwhile, the highest total protein and blood ureum nitrogen are in the cattle that have experienced repeated breeding compared to fertile cows. It means that the biochemical profile of blood in fertile and repeated breeding cattle is not significantly different.

Keywords:- Blood Biochemistry, Madura Cattle, Repeated Breeding.

I. INTRODUCTION

Cattle that experience repeated breeding are characterized by long calving intervals (18 to 24 months) (Purohit, 2008), low conception rates, and high serves per conception (> 3) (Nurkholis et al., 2018). West (2003) explained that a high rate of repeated breeding influences low reproductive efficiency and productivity per year. The livestock's reproductive performance is closely related to nutrition. It is because nutrition plays a role in metabolic mechanisms in postpartum reproductive activity by providing metabolic substrates (amino acids, glucose) in reproductive tissues through the modulation of metabolic hormones. Lack of nutrients and minerals triggers emaciation, inactive ovarian function, and low conception rates (Pradhan and Nakagoshi,

2008). The nutritional content in the cattle feed will influence their reproductive physiology (Bindari et al., 2013). There will be an evaluation of nutritional conditions based on the biochemical profile of the blood. Blood biochemical profiles are related to livestock reproductive disorders, especially those related to anestrus (Widayati et al., 2013; Pariza et al., 2013). Low calcium and phosphorus levels can worsen fertility and increase service per conception (Mahen et al., 2018). However, if phosphorus has been adequately supplemented, the service rate per conception will decrease and affect ovarian function by inhibiting regulation of the pituitary gland. This state leads to abnormal estrus cycles (Hurley and Doane, 1987). Lack of protein will affect the deficiency of amino acids needed for gonadotropin biosynthesis and gonadal hormones. This causes reproductive hormonal disorders and inactive ovaries (Dunn and Moss, 1992). It also triggers silent heat, so it is difficult to detect delays in mating (Imran et al., 2014). Meanwhile, excessive protein feeding will increase high blood ureum nitrogen concentrations and affect reproductive performance (Bearden et al., 2004). It can also lower uterine pH and negatively influence implantation and embryo development (Amundson et al., 2016).

This research aims to determine the biochemical profile of blood in Madura cattle and the status of fertile mating or repeated breeding. The results can be a benchmark for improving livestock rearing systems in smallholder farms to improve reproductive performance.

II. MATERIALS AND METHODS

➤ Research Site

The research site is a local cattle farm on the island of Madura. There is a blood biochemical analysis at the Integrated Research and Testing Laboratory (LPPT) of Gadjah Mada University – Yogyakarta.

➤ *Research Materials and Instruments*

The materials are blood serum from Madura cattle. There are ten cows consisting of five fertile and five repeated breeding ones. Their average age is 3-5 years. They have given birth at least once. Their reproductive cycle is normal, and they are all healthy. All cows have a different (uncontrolled) ratio according to the farmers' habits (Prihatno et al., 2013).

The instruments used are venojet needles, tube holders, 5 ml purple EDTA K3 vacutainers, 1 ml syringes, 2 ml microtubes, ice packs, cool boxes, distilled water, 70% alcohol, pipettes, cotton swabs, centrifuge (PLC Srries, Taiwan), spectrophotometer (Microlab 300, UV-VIS HITAVHI U-2810, Japan), micropipette (+yellow tip and blue tip), and vortex-mixer.

➤ *Sample Collection*

A 3-ml blood sample is taken from the jugular vein using a venojet needle equipped with a 5-ml sterile vacuum tube containing EDTA as an anticoagulant. The blood sample is put into a blood tube (EDTA) within an ice flask. It is centrifuged at 2000 rpm for 20 minutes. The plasma is immediately transferred to the microtube and labeled. The blood plasma is stored at -20°C.

➤ *Blood Biochemistry Measurement*

The measurement of phosphorus in the blood, total protein, and blood ureum nitrogen uses the Microlab 300 Spectrophotometer provided at LPPT UGM.

➤ *Data Analysis*

The data analysis uses the T-test (Bewick et al., 2004). If there is a difference between the breed and mating status of the fertile and repeated breeding cattle, the process will use Duncan's New Multiple Range Test (DMRT).

III. RESULT AND DISCUSSIONS

➤ *Cattle's Blood Phosphorus Levels*

Table 1 shows the results of the blood levels of phosphorus in fertile and repeated breeding Madura cattle. There are mathematical differences in values. However, it is not significantly different because they are still at normal levels. Phosphorus levels in Madura cattle generally depend on the nutrient content of the feed. The nutrition in animal feed available in the livestock groups is almost the same, and there is no concentrated feed. The feed usually includes forage grass and old agricultural residues with low phosphorus levels. The available feed sources are generally rich in protein. A feed source high in phosphorus contains a lot of protein (Satter et al., 2005). Low phosphorus levels in the blood of cattle are due to some factors. They are the phosphorus level in the feed, the amount of phosphorus excreted by the salivary glands, and those taken from storage sites such as bones and teeth in regulating blood phosphorus levels (Smith, 2009). This phosphorus deficiency will lead to gonadotropin hormone secretion by the anterior pituitary. This condition triggers reproductive disorders such as anestrus, irregular estrus cycles, and low pregnancy rates. The phosphorus content of the diet is low. Other dietary deficiencies

associated with low-quality feeding may contribute to lustful behavior (Noakes et al., 2009). These findings are higher than other studies (Ardhiansyah, 2015) on PO (2.6-3.1 mmol/L) and Bali (2.74 mmol/L) cattle. The normal phosphorus level is 4.24-7.58 mg/dL (Fielder, 2022).

➤ *Total Blood Protein*

Table 1 presents total protein levels in fertile Madura cattle and those experiencing repeated breeding. The results show that the total blood serum protein level of beef cattle that have experienced repeated breeding is higher than the fertile ones but still at normal levels. Allegedly, breeders do not pay attention to the feed according to the physiological needs of livestock. They may provide the feed with unbalanced protein. Therefore, the findings conclude protein levels exceed normal standards for fertile and re-breeding cattle. Low protein levels trigger a lack of amino acids needed for the biosynthesis of gonadotropins and gonadal hormones. Thus, there will be a delayed onset of puberty and estrous cycles in postpartum cows due to hormonal disturbances which lead to inactive ovaries (Khan et al., 2010). Other influential factors include different types of feed for Madura cattle and high consumption of dry matter and crude protein (2.43% and 1.29% of body weight). This might raise higher total protein in the blood. High consumption of dry matter and crude protein significantly increases microbial protein synthesis in the rumen. This finding supports Uddin et., al, (2012) that blood protein levels are related to dry matter consumption and rumen microbial growth. The results of this study conclude that the total protein level in the blood of Madura cattle is high but still in normal condition. According to Fielder (2022), the low protein level in cows is about 6.7 to 7.5 g/dL. Meanwhile, Kumar et., al, (2014) found the total protein value in fertile cows is 6.7 ± 0.09 mg /dl, and those who had repeated breeding is 6.32 ± 0.04 mg/dL. These are lower than another finding (Ramandani and Nururrozi, 2015) which is 6.815 ± 0.821 vs 7.56 ± 5.60 mg/dl.

➤ *Blood Ureum Nitrogen Levels*

The findings also show that blood ureum levels are lower in fertile cows than in those having repeated breeding. It is suspected that the increase of blood ureum nitrogen levels in cattle that have repeated breeding is due to low feed consumption. It is because the amount of feed is low even though it contains high protein. Therefore, the protein breakdown during feed consumption is limited and not optimal. This is because the consumption of crude protein in cattle that have undergone repeated breeding is low, but the consumption of TDN is high. Thus, there is an imbalance between consumption of crude protein and energy. High BUN levels can lower uterine pH. It will trigger an adverse effect on implantation and embryo development (Ocon and Hansen, 2003). This research has found a higher value than Maulida et., al, (2017) in fertile cross-breeding and repeated breeding cattle at the Office of Dairy Cattle, Faculty of Animal Husbandry of UGM (31.99 ± 4.80 vs 28.10 ± 3.97 mg/ dl) and significantly different. It might be due to concentrate feeding and pollard with high protein levels.

IV. CONCLUSION

The research findings conclude that there is no difference in blood phosphorus, total protein, and blood ureum nitrogen in breeding status between fertile and repeated breeding cattle.

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Table 1 Blood Biochemical Levels in Fertile and Repeated-Breeding Madura Cattle

Blood Biochemical	Fertile (M±SD)	Repeated breeding(M±SD)	Average
Phosphor	6,79±1,52	6,10±1,57	6,45±1,50
Total blood protein	8,00±0,60	8,16±0,23	8,08±0,44
Blood Ureum Nitrogen	24,86±12,69	25,20±12,29	25,03±11,78