The Effect of Soybean Oil Calcium Soap (SOCS) and Cashew Fruit Flour (CFF) on Spermatozoa Motility of Bali Cattle Stored at 5°C

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Abstract. This research was conducted to evaluate the motility of Bali cattle spermatozoa stored at 5°C. Bali cattle was given three different types of ration, those are P1: 40% field grass (RL) + 60% concentrate, P2: 40% RL + 60% concentrate supplemented by 5% soybean calcium oil soap, and P3: 40% RL + 60% of the concentrate which was supplemented by 5% COS + 10% cashew fruit flour (CFF). The variables measured were the motility of spermatozoa stored with Egg Yolk Tris diluent at 5°C and observed for 3 (three) days. This study used a completely randomized design (CRD) with 3 treatments and 3 replications. The data of the percentage of motility analyzed using one-way analysis of variance (ANOVA). If there are significant differences (P <0.05) or very significant (P <0.01), then the Tukey-W-Procedure test with SPSS is continued. Bali cattle consuming P3 rations had higher motility (P <0.05) than P1 and P2. Feeding of 5% soybean oil calcium soap (SOCS) and 10% cashew fruit flour CFF had a significant influence on the motility of Bali cattle.

Keywords: calcium soap, spermatozoa, Bali cattle

1. Introduction
The success of fertilization is very important so that reproductive efficiency can run properly, i.e. every year cattle must produce one cattle. Factor that greatly affects fertility is spermatozoa motility. Good motility will allow the spermatozoa to swim quickly into the channel of the female reproductive organ, the fallopian tube. The speed of movement of motility in cattle is very much influenced by the animal's ration.

The ration given by livestock will be digested in the rumen and will be metabolized as energy, so that the ration that enters can be digested properly, then it must be given processing or technology so that the ration has good digestibility. The method used by decreasing the negative effects of unsaturated fatty acids in ruminant livestock can be done by protecting unsaturated fatty acids from giving negative effects on rumen digestive process. Technology in the form of calcium soaps used to protect unsaturated fatty acids is most widely used. The previous in vitro study conducted by the authors indicated that the supplementation of 5% soybean oil calcium soap + 10%...
cashew apple flour had no negative impacts on the fermentation characteristics, microorganism populations and digestibility of dry matter and organic matter in Bali cattle [1]. Based on these description, a research on the Effect of Soybean Oil Calcium Soap (SOCS) and Cashew Fruit Flour (CFF) on Spermatozoa Motility of Bali Cattle Stored at 5°C was conducted.

2. Materials and methods

2.1 Material

As many as 12 Balinese cattle aged 2 years old with an average body weight of 222 ± 13.55 kg were employed in this research. The research rations were 40% of native grass and 60% of concentrate. The concentrate consisted of coconut meal, cassava, pollard, cashew fruit flour, molasses, soybean oil calcium soaps, CaCO₃, urea, and beef cattle premix. Calcium soap materials composed of soybean oil produced by Mazola, NaOH, KOH, distilled water, technical CaCl₂ [1] and spermatozoa.

2.2 Methods

Bali cattle feed. This research used three treatments of R1 feed: 40% native grass (NG) + 60% concentrate, R2: 40% NG + 60% concentrate supplemented by 5% soybean oil calcium soap (SOCS), and R3: 40% RL + 60% concentrate supplemented by 5% SOCS + 10% cashew fruit flour (CFF). Collection of spermatozoa using the artificial vaginal method.

Tris Egg Yolk solution. Chicken eggs were cleaned first with water then alcoholic cotton was used. The egg yolks were separated from the egg whites by placing them on filter paper until there was absolutely no albumin attached and then transferred back in clean filter paper puncture the vitelin membrane so that the yolk can flow out and be collected in a measuring cup. Buffer solution was made from Tris of 3.028 g, fructose of 1.25 g, citric acid of 1.7 g, glycerol of 6% and added by aquabides to 100 ml, then stirred until it was dissolved and added 20% egg yolk to be stirred again until it was mixed [2].

Spermatozoa collection. The Balinese cattle spermatozoa is collected by the artificial vaginal method and tamping twice a day morning and evening.

3. Result and Discussion

The 5% SOCS + 10% CFF (P3) treatment significantly affected the spermatozoa motility of Bali cattle stored at 50°C compared to all the P1 and P2 treatments seen in Table 1.

Table 1. Motility of spermatozoa of Bali cattle kept at 5°C.

| Treatment | Motility (%/day) |
|-----------|-----------------|
|           | P1              | P2              | P3              |
| 1         | 71 ± 1.83ᵇ      | 71.25 ± 2.22ᵇ   | 83.5 ± 0.58ᵃ   |
| 2         | 64.5 ± 1.29ᵇ    | 66.25 ± 0.96ᵇ   | 83.5 ± 2.38ᵃ   |
| 3         | 61.75 ± 1.26ᵇ   | 64.25 ± 0.96ᵇ   | 81 ± 1.83ᵃ     |

Note: R1= 40% native grass (NG) + 60% concentrate, R2= 40% NG + 60% concentrate supplemented by 5% soybean oil calcium soap (SOCS), and R3= (40% NG + 60% concentrate supplemented with 5% SOCS + 10% cashew fruit flour (CFF).

The results seen in Table 1 show that P3 had a real effect on motility for 3 days. This can be caused by the feed given to Balinese cattle, namely soybean oil calcium soap (SOCS) and cashew fruit flour CFF, which has a complete nutritional content of 86.90% dry matter, 7.76% crude protein, 3.9% fat, 6.65 crude fiber, 3.62 % ash and 64% nitrogen free extract (NFE). Pseudo cashew fruit in dry form contains 85.53% dry matter (BK), 8.62% crude protein (PK), 5.86% crude fiber (SK), 5.86 ether extract (EE), 7.93 crude fiber (SK), 2.71% ash and 60.41% NFE [3].
The nutrients contained in the feed will be absorbed by the body as nutrients for production and productivity which of course will affect the quality of spermatozoa. These nutrients will enter the mitochondria and will be converted into energy in the diney arms [4]. Qualified spermatozoa which moves progressively will be able to fertilize an egg. During the maturation process, the sperm will pass through the head to the cauda epididymis and experience increased motility after passing through the accessory glands [5].

The results show that P3 treatment has motility from 81 to 88%. This shows that spermatozoa have a higher quality than the results stated by on ejaculate cow sperm, stating that ejaculated sperm which has a 40-70% motility, concentration 800-2000x10^6 sperm/ml, and morphology of normal sperm by 65-95%.

4. Conclusion
Feed of 5% soybean oil calcium soap (SOCS) and 10% cashew fruit flour (CFF) have a significant influence on the motility of Bali cattle.

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