

Effect of Freeze Drying of Follicular Fluid from Waste of Aceh Cattle Ovary on the Estradiol Concentration

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INTRODUCTION

Aceh cattle are one of the many cow's species that are widely preserved and distributed in Aceh Province. This species is the result of a cross between *Bos sondaicus* and *Bos indicus* and has been designated as a native Indonesian class of cattle in 2011 by the Minister of Agriculture of Indonesia through the decision of the Minister of Agriculture number 2907 / Kpts / OT.140 / 6/2011 [1]. Aceh's cattle population in 2017 in total was 627,629 species [2]. Slaughtering the cows results in the obtaining of byproduct or waste such as ovaries. The ovarium of female cows is one of the complement results of animal slaughter house which is infrequently used. In fact, the ovaries comprise follicles which contain many active compounds inside the follicular fluids such as insulin-like growth factor I (IGF-I), follicle stimulating hormone (FSH), luteinizing hormone (LH), estrogen and progesterone [3]. Freeze drying/lyophilization is one of the preservative process which are generally used in food and non-food processing. This study was conducted to determine the effect of these methods on the concentration of estrogen in follicular fluid.

MATERIALS AND METHODS

The study was conducted through several stages: ovarian collecting stage, aspiration of ovarian follicular fluid stage, freeze drying of ovarian fluid stage, and estradiol hormone analysis stage using the Enzyme Linked Immunosorbent Assay (ELISA) method. A total of 30 pairs of ovaries were collected from 30 female cattle from Banda Aceh Slaughterhouse (RPH). Furthermore, the follicular fluid is aspirated, from each of the obtained ovarian cattle was divided into two categories. One tube is a fresh preparation and another tube is dried through a freeze-drying process. Then the two preparations of estradiol hormone were measured using the ELISA method. Data on estradiol hormone concentrations in fresh follicular fluid and freeze-free estradiol hormone

concentration were analyzed using paired T tests.

RESULT AND DISCUSSION

The results of the investigation of fresh follicular fluid after freeze-dried stages turned into a fine powder form, odorless, and brownish white. Figure 1 depicts the differences between the fresh prepared follicular fluid, dried prepared and after being reconstructed with the addition of 200 μ L fluid. After being reconstructed, the dried prepared one shows a clear yellow color.

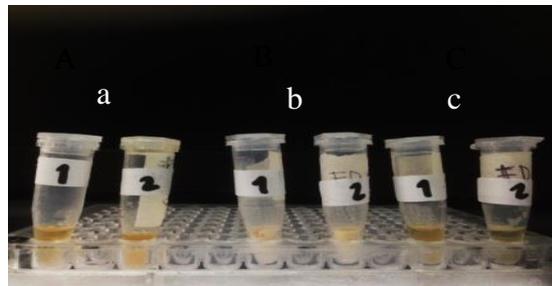


Figure 1. Differences in follicular fluid: a) fresh preparation follicle fluid, b) dry preparation, c) after reconstructing with 200 μ L of *aqua bidestilata*

From the results of the analysis of estradiol concentration between fresh and dry follicular fluid, it shows a close correlation between fresh and dry ovarian fluid estradiol concentration with *r* value of 0.975 (Figure 2a). In addition, the average fresh and dried ovarian fluid estradiol concentrations were also almost equal to a value of 36.59 ± 32.31 ng / ml and 33.91 ± 29.26 ng / ml respectively (Figure 2b). The results of statistical analysis presented that the average estradiol concentration in fresh and dry preparations was not significantly different ($p > 0.05$).

The results showed changes in estradiol concentration from fresh prepared to dry prepared follicle only decreased by 3.4%. The process of freeze-drying process on heat-sensitive food and non-food ingredients will not damage the specimen

and will remain intact because the method uses a relatively low temperature [4]. The freeze-drying process can reduce the water content until approximately 1% remains. The loss of water

content after the freeze-drying process is one of the factors reducing the period of dry follicular fluid preparation.

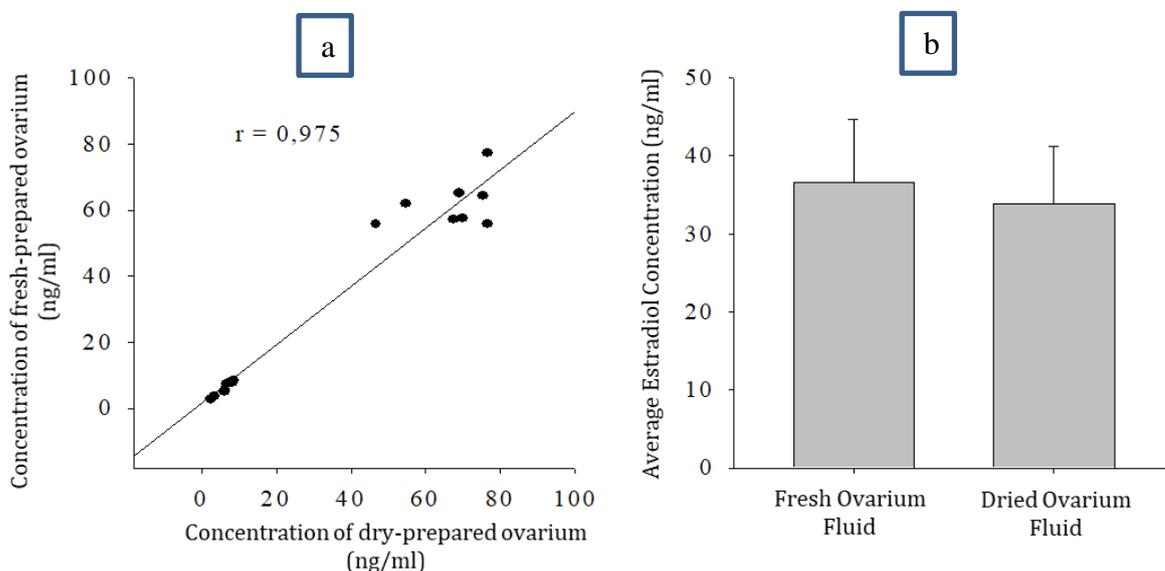


Fig. 2: Estradiol hormone concentration from Aceh cow ovary follicle fluid in Banda Aceh RPH. a. correlation between the concentration of estradiol hormone in fresh and dry follicular fluid. b. average \pm SD the concentration of estradiol hormone in the fresh-prepared and dry-prepared follicle

CONCLUSION

The concentration of estradiol hormone in ovarian follicle fluid of both fresh-prepared and dry-prepared is not significantly different.

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