EVALUATION OF QUALITY ATTRIBUTES OF GUINEA FOWL SEMEN SUBJECTED TO DIFFERENT CRYOPROTOCOLS AND CENTRIFUGATION

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A thesis submitted to Centre of Excellence in Agricultural Development and Sustainable Environment (CEADESE), Federal University of Agriculture Abeokuta. In partial fulfilment of the requirements for the award of the degree of Doctor of Philosophy, Agricultural Development and Sustainable Environment (PhD AgSE) in Animal Reproductive Physiology.

JUNE, 2025

ABSTRACT

The quality and assessment of Guinea fowl semen's components provides an indication of its capacity for reproduction. Three studies (comparative evaluation of semen viability of Guinea fowl during refrigeration and freezing, comparative evaluation of slow freezing and rapid freezing on sperm viability, and effect of different washing protocols on sperm viability on Guinea fowl during cryopreservation) were carried out to evaluate the quality attributes of Guinea fowl semen during cryopreservation. A total of thirty (30) Guinea fowl cocks of 25-30 weeks' old, weighing between 2-3 kg were used for the experiment. The semen collected were evaluated. In study 1, semen were chilled at 4^0C in refrigerator for 24hrs following evaluation. Second portion was frozen at - 20^0 C in the freezer for 24hrs. In study II, semen were cryopreserved using slow and rapid freezing cryoprotocol for 7 days following semen evaluation. In study III, semen collected were centrifuged at 500 rpm for 5 minutes, supernatant were discounted, cryopreserved for 7 days thereafter thawed and evaluated for sperm viability parameters (sperm motility, acrosome integrity, sperm abnormality, membrane integrity, livability), Malondialdehyde (MDA) concentration, seminal leukocytes, Superoxide Dismutase (SOD), catalase (CAT), Glutathione Peroxidase (GPx). Total motile sperm count (TMSC), Motile sperm recovery rate (MSRR), sperm recovery rate, number of female inseminated per ejaculate were also evaluated. Data collected were subjected to one-way analysis of variance. Higher percentage of semen viability parameters was observed in fresh semen. In study 1, higher ($p < 0.05$) sperm motility, livability, MSRR in freezing compared to refrigeration. Lower ($p>0.05$) MDA concentration was observed in freezing. Lower ($p>0.05$) sperm abnormalities were observed in refrigeration compared to freezing. Acrosome integrity, livability, membrane integrity, SOD, GPx and CAT were not significant in refrigeration and freezing protocols. In study II, sperm viability parameters were significantly higher (p

< 0.05) in slow freezing compared to rapid freezing cryoprotocol. Gpx, female inseminated per ejaculate, motile sperm, TMSC, MSRR were also significantly higher ($p<0.05$) in slow freezing compared to the rapid freezing cryoprotocol. Acrosome integrity and livability for slow and rapid freezing were not significantly different ($p>0.05$). All abnormality parameters measured were not significantly ($p>0.05$) different in study II. Increase in antioxidants capacity (Gpx, SOD, CAT) resulted in a non-significant MDA and seminal leukocytes among the protocols. In study III, significantly ($p<0.05$) higher live spermatozoa, membrane integrity and acrosome integrity in one wash compared to the other protocols. No significant difference in SOD, GPx, CAT, motile sperm and number of females inseminated per ejaculate among treatments. Reduced seminal leukocyte was found in No wash and one wash while MDA concentration was reduced in no wash and two washes. Sperm recovery rate and MSRR were best in no wash than other washes. Higher value of TMSC than recommended value of (TMSC > 2.0×10^6/ejaculate) were recorded in the three studies. The study concluded that refrigeration, freezing, slow freezing and one wash protocols improved sperm viability, antioxidants capacity and optimal seminal oxidative stress parameters of Guinea fowl semen.