



The effect of dietary vitamin E supplementation on semen
quality of A.I. dairy bulls

By

Kim LaRey

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For the Department of Animal and Wildlife Sciences,

Faculty of Natural and Agricultural Sciences, University of Pretoria

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PROMOTOR: PROF. E.C. WEBB

Abstract

The importance of semen quality in the breeding bull is often underestimated and breeders should investigate ways to improve the semen quality in order to improve conception rates. The diet of four bulls was supplemented with a vitamin E supplement, Rovimix E, to investigate the effect on the percentage normal spermatozoa, percentage major semen defects and the percentage minor defects. The results obtained were compared to those obtained for four bulls in a control group which were fed only the concentrate diet with no vitamin E supplementation. The results indicate that abnormal loose heads and macrocephalic spermatozoa were significantly ($p > 0.05$) affected, but overall vitamin E supplementation did not significantly ($p < 0.05$) influence the incidence of major and minor semen defects. It would generally seem that vitamin E supplementation could improve bull semen.

Opsomming

Die belangrikheid van bulsaadkwaliteit op die reproduksie proses word dikwels onderskat. Telers moet wyses ondersoek om die kwaliteit van bulsaad te verbeter om die kalwingspersentasie te verhoog. Ons het die dieët van vier bulle aangevul met Rovimix E, wat 'n vitamien E supplement is, om die invloed op die persentasie normale spermatozoa, persentasie major saad defekte en die persentasie minor saad defekte te ondersoek. Die resultate wat ons gekry het vir die proefondevindelike groep van bulle is vergelyk met 'n kontrole groep van vier bulle wat die normale dieët sonder vitamien E gevoer was. Daar is bevind dat van die saad defekte statisties betekensvol was soos

die abnormale loskoppe defek en die makroefaliese spermatozoa defek. Die vitamien E supplement het egter nie die persentasie major- en minor saad defekte statisties beïnvloed nie. Alhoewel die effek nie statisties betekenisvol was nie, het die vitamien E supplement wel die persentasie van saad defekte verminder.

Declaration

I declare that this dissertation has not been submitted by anyone to any other tertiary institution.

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Summary

The bull is a vital part of any reproduction system, whether it be dairy or beef cattle. When analysing possible causes for reproductive inefficiency in the herd, emphasis is often placed on the female, however, the male must not be forgotten. It must also be remembered that at the beginning of any breeding season, the male must be properly tested and judged for reproductive efficiency with regards to semen quality, scrotal circumference and conformation. The bull must be tested for any diseases which may be transmitted to the female resulting in the loss of pregnancy and result in a lowered calf crop. The management of the breeding bull involves a proper balance between the environment to which he is subjected, the level of nutrition and the way in which he is treated in order to minimise stress and maximise his reproductive ability.

Examinations of bull semen must also be done as there may be genetic traits regarding the semen which can adversely affect a bull's ability to fertilise a female. Many defects can be found in the semen of breeding bulls, many of which are caused by adverse environmental conditions resulting in stress, but this can be solved and most importantly be avoided. Each semen defect has

a particular point of origin in the reproductive tract of the male and knowledge of the defects and their characteristics should help in the identification of the problem.

There are continuous investigations on aspects that could improve the quality and thus fertility of bull semen to ensure that a cow conceives and produces a healthy calf. This study investigated the effect of dietary vitamin E on the quality of semen in Friesian bulls. Eight bulls were selected which were of similar ages and were all half brothers, ensuring a similar genetic make up. They were randomly divided into two groups of four animals each. One group was fed a basic concentrate diet supplemented with a vitamin E supplement, Rovimix E, and the other group was maintained on the normal basic concentrate diet. Both group of bulls were fed *Eragrostis tef* hay *ad libitum* and had access to fresh water.

Over a three month experimental period, semen was collected from each bull in both the treated and control groups every two weeks. The semen examined for the percentage normal spermatozoa, percentage major semen defects and the percentage minor semen defects. When compared to the results obtained from the bulls in the control group, it was found that the vitamin E supplementation did not significantly affect the semen quality, either positively or negatively. The vitamin E treatment slightly decreased the occurrence of abnormal spermatozoa present in the ejaculates of the supplemented bulls.

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Abbreviations

ABN	Abnormal Loose heads
ABAK	Abaxial implantation
A.I.	Artificial insemination
AKR	Knobbed acrosome
ANDR	Other midpiece defects
DAG	Dag defect
DEG	Degenerative heads
DLA	Degenerative loose acrosome
DPD	Distal droplet
DUBB	Double forms
C	Control group
GEBR	Broken Flagellum
KERN	Nuclear vacuole
KRTR	Corkscrew
KRUL	Curled endpiece
MAKR	Macoephalic spermatozoa
MIDS	Midpiece reflex
MIKR	Microephalic spermatozoa
MIT	Mitochondrial aplasia
NRM	Normal loose heads
PEER	Pyriiform heads
PMAJOR	Percentage major defects
PMINOR	Percentage minor defects
PNORM	Percentage normal



PPD	Proximal droplet
PSD	Pseudodroplet
R	Experimental group
SD	Standard deviation
STMP	Stumptail
TERAT	Teratoid spermatozoa
VOU	Nuclear ridge or fold



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