

Review Article

IMPORTANCE OF VITAMINS ON REPRODUCTION IN DAIRY CATTLE

R. Yasothai

Veterinary University Training and Research Centre,
Tamilnadu Veterinary and Animal Sciences University,
Erode – 638004, Tamilnadu, India

Abstract: Micronutrients are required in very minute quantities, they are considered indispensable for normal cellular metabolism, growth and maintenance including reproduction. This review is an attempt to highlight the role of vitamins in farm animal reproduction.

INTRODUCTION

Management and nutritional efforts that maintain a healthy immune system may reap benefits for reproduction. Proper levels of vitamins are also very important for successful reproduction. Being deficient on certain vitamins will have a detrimental effect on reproduction.

Vitamin A

It is required for maintaining healthy tissue in the reproductive tract. In deficient cattle, delayed sexual maturity, abortion, the birth of dead or weak calves, retained placenta and metritis have been reported. The recommended daily supplementation for dairy cows is 30,000-50,000 units. Dry cows fed only poor quality hay for extended periods without additional supplementation may benefit from vitamin A injections. β carotene is a substance found in many plants. The cow converts this into vitamin A. It is known to be in high concentrations in fresh green roughages while grains contain relatively low amounts. Silages, especially alfalfa, contain moderate level while corn silage is a poor source. Dry hays, especially alfalfa, are excellent sources of carotene. Despite high levels at harvest, β carotene levels decrease during storage, with the extent of destruction being dependent on storage conditions. β carotene deficiency in dairy cows and heifers suffered the following reproductive problems:

- Delayed uterine involution
- Delayed first estrus after calving

- Delayed ovulation
- Increased incidence of cystic ovaries
- More early embryonic death and abortion

β -carotene supplementation (300 mg/cow/day) reported restored reproductive function to normal. Blood tests should be used to confirm that cows are deficient (less than 100 mg/100ml) before supplementation is considered.

Follicular wave and plasma beta carotene level

First Follicular Wave	Plasma Beta-carotene during the 3 weeks prepartum
Ovulated (n=13)	2.97 \pm 0.24 μ g/ml
Didn't Ovulate (n=9)	1.53 \pm 0.14 μ g/ml

Vitamin B- complex

Reduction in appetite and decrease in feed intake occurs in B12 deficiency which further leads to delayed sexual maturity and atrophy of the ovaries and uterus in cows. Since cows synthesize this vitamin in rumen existence of deficiency is less. Cobalt is essential for B12 synthesis. In case of biotin deficiency biotin supplementation is essential. Feeding of 200 mg/day reduces conception days from 169 to 108 and reduces service per conception from 2.96 Vs 1.5 (Hedges *et al.*, 2001).

Vitamin D

It is required for normal calcium and phosphorus metabolism. However, deficiencies are seldom encountered in commercial herds. Cows receiving a normal amount of natural light manufacture their own Vitamin D. Most commercial concentrates contain supplemental vitamin D in amounts sufficient to meet the cow's requirement of 10,000 IU per day. Deficiency of vitamin D lead to anestrus, milk fever, metritis and retained placenta in dairy cows and impotentia coeundi in bulls.

Vitamin E

Incidence of retained placenta was 17.5% in cows and it was reduced to 0% in cows receiving both selenium and vitamin E. Incidence of metritis was 60% for cows injected with selenium and 84% for those not receiving selenium. Cystic ovaries were diagnosed in 19% of cows injected with selenium, and incidence was 47% for cows not treated with selenium. Prepartum selenium injections were effective for reducing the incidence of metritis and cystic ovaries during the early postpartum period. Vitamin E > 2000 IU/day supplemented during

transition phase (3 weeks before to 3 weeks after calving) lower incidence of mastitis and retained placenta.

Vitamin E and selenium

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CONCLUSION

Dietary nutrients not only affect productive but also reproductive performance. Supplying sufficient amounts of vitamins A and E may improve the immune status of the periparturient cow thus reducing the incidence of mastitis and/or retained fetal membranes, which in turn may improve pregnancy rates.

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