

## Beta-Carotene's Effect on Mare Reproduction

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Beta-Carotene has a role as an antioxidant and in controlling progesterone secretion by the corpus luteum. If it is deficient in the mare's diet, her reproductive ability may be impaired. Mares on dry hay, as opposed to green forage may not obtain sufficient Vitamin E to maintain high plasma beta-carotene concentration and ovarian storage to maximize reproductive ability. Horses on green pasture have plasma beta-carotene concentrations 8 to 13 times higher than those fed hay and grain (Hintz, 1986).

Beta-carotene supplementation to both cows and mares not grazing green grass has been reported by some to:

- (i) improve ovarian activity,
- (ii) produce earlier and stronger periods of oestrous,
- (iii) improve conception rates, and
- (iv) reduce embryonic mortality;

while others report no benefit for either mares or cows (Bonsembiante et al., 1966; Ott et al., 1989). Beta-carotene given orally would be expected to be of little benefit since most of what is ingested is split into Vitamin A upon absorption. Beta-carotene availability is also low in conventional beta-carotene preparations because apparently it is present in large-droplet form. Beta-carotene's bioavailability is greatly enhanced in emulsified products. This was demonstrated when heifers were injected with 450 mg of beta-carotene. Four days later, the plasma beta-carotene concentration in those not injected and those injected with conventional and dispersion preparations or an emulsified preparation were 204, 355 and 1214 µg/dl respectively (Hopper et al., 1993).



A significant benefit of injecting mares and sows with an emulsified preparation of beta-carotene has been reported. In a field trial of 5000 sows on 12 commercial farms, those injected with 200mg of beta-carotene at weaning had 12 to 13.3% higher conception rates, pigs born live, and pigs weaned and provided \$100/sow/yr more income than did noninjected sows on the same farm (Herrick, 1993). Conception rates in 155 randomly selected Thoroughbred mares on 6 farms near Ocala, Florida, injected intramuscularly with 400mg of beta-carotene (10ml of Equate) on the second or third day of oestrous, and again two to three days later, during April was 91.6% versus 67.6% in 108 mares on the same farms not injected (Smith, 1993). No localized swelling or adverse reactions to the injections were observed. The administration of a highly localized beta-carotene preparation may, therefore be of significant benefit, particularly for mares receiving forage with little or no green colour. However, it may be of much less or no benefit for mares on green pasture forage or consuming hay containing a significant amount of green colour and, therefore, high amounts of beta-carotene.

### ***References***

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