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EFFECTS OF BY-PASS PROTEIN SUPPLEMENTATION ON MILK PRODUCTION, CALF WEIGHT GAIN AND REPRODUCTION IN BRAHMAN COWS

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Background. The success or failure of a cow-calf operation largely depends on a cow's ability to maintain a yearly calving interval. Length of the postpartum interval from calving until the first estrus accompanied by ovulation may affect the number of females that become pregnant during the breeding season. One of the major factors that effects postpartum infertility is anestrus. Two major factors that affect anestrus are nutrition and suckling. Brahman cattle (*Bos indicus*) have longer gestation lengths (292 versus 282 days) than European breeds (*Bos taurus*). Because of their longer gestation lengths, the Brahman cow has approximately 10 days less (73 versus 83) to conceive after calving in order to maintain a yearly calving interval.

In addition to postpartum energy intake, postpartum protein intake has been shown to influence postpartum interval. Reduced protein intake has been shown to be detrimental to reproductive performance. In recent years, studies have shown that protein sources which are capable of escaping degradation by the rumen microorganisms may be beneficial to reproductive performance, when fed in excess of National Research Council recommendations. Many different sources of escape or "by-pass" protein exist, with two of the more commonly used being blood meal (69% undegradable) and fishmeal (68% undegradable). The objectives of this experiment were to determine the effects of varying intakes of by-pass protein in the suckled, postpartum Brahman cow, with respect to milk production, calf weight gain and reproductive performance.

Research Findings. One hundred and fifteen, spring-calving Brahman females in good body condition were randomly placed into one of three management groups after calving based on parity, sex of calf, and breed of sire of calf (Angus, Brahman or Tuli). The rations contained 4.47 lbs ground corn and either 2.2 lbs soybean meal (Control) 1.1 lbs soybean meal plus .79 lbs Menhaden Fish Meal (Half), or 1.58 lbs Menhaden Fish Meal (FM). The Menhaden Fish Meal was Sea Lac, supplied by Zapata Haynie Corporation. The Control diet was calculated to contain 36.56% of its protein as "by-pass", the Half 55.74% by-pass, and the FM 76.28% by-pass. The cows received these supplements daily, from day 7 to 119 after calving. Cows and calves had unlimited access to water, minerals, Coastal bermudagrass hay and pasture. The calves were not allowed to consume any of the concentrate. Cow and calf body weight and cow body condition scores were recorded on days 7, 35, 73, 91 and 119 after calving. Four hour milk production measurements were taken on the same days for 18 Control, 19 Half and 18 FM cows. An

injection of oxytocin was utilized to help obtain the milk samples. Milk production was affected by parity of the dam, time after calving, and an interaction of supplement group by parity. First-calf heifers produced less milk in the 4 hour period ($2.33 \pm .09$ lbs) than mature cows ($2.79 \pm .07$ lbs). Milk production on days 35, 63, 91 and 119 across all three groups was $2.62 \pm .51$, $2.73 \pm .66$, $2.55 \pm .59$ and $2.53 \pm .51$ lbs/4 hours. Average milk production by heifers was $2.60 \pm .15$ in Half, $2.33 \pm .18$ in Control, and $2.07 \pm .13$ lbs/4 hours in FM. Average milk production in mature cows was $2.84 \pm .13$ in FM, $2.82 \pm .13$ in Half and $2.75 \pm .13$ lbs/4 hours in Control.

By-pass protein supplementation did not affect cow body weight change or BCS, but a tendency was found for greater ADG in Half ($2.00 \pm .07$ lbs) than FM ($1.89 \pm .07$ lbs) or Control ($1.80 \pm .07$ lbs) calves. The postpartum interval (PPI) of cows returning to estrus was affected by parity, with first-calf heifers having longer PPI (107.2 ± 5.6 days) when compared to mature cows (75.6 ± 3.3 days). First service conception rates to AI were lower in the Control (29.2%) when compared to the Half (57.6%) or FM group (54.6%). Number of animals failing to return to estrus during the AI period was affected by diet. Control group animals had a 35.1% failure to return rate compared to the Half and FM groups' 15.4% failure to return rates. Overall pregnancy rates were not significantly affected by treatment.

Application. The findings of this study indicate that inclusion of a source of by-pass protein in the diet of postpartum Brahman cows can be beneficial to reproductive and calf performance, when compared to a diet with a low level of by-pass protein. Through inclusion of a by-pass protein source into the diet, first service conception rates can be improved and the number of animals returning to estrus during the breeding season can be increased. Increasing the number of animals conceiving upon first service will potentially increase the number of calves born early during the next calving season, which will result in heavier calves being marketed at weaning. Increasing the number returning to estrus during the breeding season can potentially decrease the number of open cows at the end of the breeding season. Furthermore, a slight advantage in calf average daily gain was seen in calves whose dams received the increased amount of by-pass protein. Finally, it needs to be noted that there were no significant differences in reproductive or calf performance between animals in either the Half or FM groups. Therefore, it appears that while inclusion of a by-pass protein source in the diet is advantageous to reproductive and calf performance, inclusion at rates higher than those found in the Half group appears to provide no additional advantage.