

KEY WORDS: Colostrum, gain, survival, immunoglobulin, dairy heifer.

- P 87 Effect of serum from vitamin E supplemented calves on Infectious Bovine Rhinotracheitis virus replication. P. G. Reddy\*, J. L. Morrill, H. C. Minocha, R. A. Frey, M. B. Morrill and A. D. Dayton, Kansas State University, Manhattan.

Effect of supplemental vitamin E on serum factors that may influence the replication of Infectious Bovine Rhinotracheitis virus in tissue cultures was investigated. The treatments given to Holstein heifer calves from birth to 3 mo were: 1) 0 IU 2) 1400 IU 3) 2800 of dl- $\alpha$ -tocopheryl acetate given orally at weekly intervals or 4) 1400 of dl- $\alpha$ -tocopherol given by injection at weekly intervals. Serum samples were collected at alternate weeks starting from 1-2 days of age. Duplicate cultures of monolayers of Madin-Darby Bovine Kidney cells were infected with virus at a multiplicity of 0.1 plaque forming units per cell for 1 hr and then incubated with media containing 10% serum from each experimental calf. Cells were harvested 48 hrs later and virus titers were determined by TCID<sub>50</sub> method. Virus replication was significantly lower with serum collected at 12 wks of age from calves given high level of oral supplementation and calves given injections, as compared with serum from unsupplemented calves. Although there were no significant differences at other weeks, a trend toward progressively increasing inhibition of virus growth was observed starting from week 6, with serum from supplemented calves as compared to that of unsupplemented calves. Vitamin E supplementation may influence serum factors, in yet unknown way, to provide increased protection against pathogens to calves at a time when they are more vulnerable to diseases.

KEY WORDS: Vitamin E, calves, IBR virus replication.

- P 88 Influence of soybean protein concentrate or milk protein in milk replacers on changes in the villi of the small intestine of baby calves. A.G. Silva, \*J.T. Huber, T.H. Herdt, R. Holland, Michigan State University, East Lansing and R.M. DeGregorio, Land-O-Lakes Cooperative, Webster City, Iowa.

Sixteen male Holstein calves were divided into two groups at birth (after receiving their dams' colostrum) and were fed one of two milk replacers (14% solids) for three weeks as the only feed. Replacers contained 23% crude protein of which: (1) 100% was from milk (M) or (2) 66% was from soybean protein concentrate and 34% was from milk (S). Groups were subdivided after three weeks. Subgroups received M or S for 10 days and were then switched to the opposite diet for an additional 10 days. During the second week of life, calves were surgically fitted with an intestinal Y-shaped cannula, positioned about 50 cm posterior to the pylorus to permit biopsy of intestinal mucosa. The biopsy tool used enabled obtaining a mucosal sample 50 to 100 cm from the cannula to avoid cannulation effects. Biopsies of mucosa were taken at surgery and on the last day of each feeding period. Mucosa were examined under light microscopy for length and normality.

Compared to the M diet, the S diet resulted in lower weight gains and feed efficiencies; but higher rectal temperatures, more diarrhea and greater villi atrophy. Data on villi length suggest that calves were more sensitive to soybean protein during the first two weeks of life than at older ages and that calves which were fed soybean protein concentrate (SPC) during the first three weeks reacted more negatively to SPC from 3 to 7 weeks, than if SPC were initially introduced after three weeks.

KEY WORDS: Protein substitute, soy protein, protein for calves.

- P 89 Effect of fat level in diets of veal or ruminating calves on feed intake, growth, body composition and nutrient utilization. J. Doppenberg, D. L. Palmquist\*, and Donna J. Kinsey, Ohio Agricultural Research and Development Center/Ohio State University, Wooster.

To determine the influence of fat on early growth, 24 male Holstein calves were assigned at 3 d to conventional or veal feeding regimes. Conventionally-fed calves were fed milk re-