

18. THE EFFECT OF EARLY FEEDING OF DIFFERENT SOYABEAN BASED STARTER RATIONS IN RUMEN DEVELOPMENT AND GROWTH PERFORMANCE OF DAIRY CALVES

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An experiment was conducted at Magadu Dairy Research farm (Sokoine University of Agriculture), to compare the effect of early feeding of different soyabean based starter diets on rumen development and growth performance of dairy calves. Two test diets were prepared from extruded soyabean meal (ESBM) and boiled soyabean meal (BSBM) in the ratio of 34% soyabean meal, 60% maize bran, 5% fish meal and 1% mineral and vitamin mix to make the two diets (ESBS and BSBS). Twenty Zebu x Friesian cross bred male calves were allocated to five different feeding programmes and received colostrum and later whole milk up to 14 days. From day 14 first group (WM) continued to receive whole milk only up to weaning at 8 weeks. The second group (ESBS-V) started to receive extruded soyabean meal based starter and the third group (BSBS-V) received the boiled soyabean based starter diet. Both were offered *ad-libitum* starting from the second week up to weaning at eight weeks. The fourth and fifth groups (ESBS-F and BSBS-F) received the extrude or boiled soyabean based starter diet mixed in the milk (force fed) from the second week up to weaning at the eighth week. Post weaning, from ninth to 13th week WM group was given the ESBS while all other groups continued to receive their respective diets. The chemical composition of the starter diets shows the BSBS to have 20.09% CP compared to 22.53% of the ESBS. ESBS had lower utilization efficiency of 0.65 kg gain/kg DM starter intake when compared with 0.88 and 0.89 kg gain/kg DM starter intake of BSBS. Rumen fluid and blood samples were collected and analyzed for rumen pH and VFA, plasma glucose and blood VFA. Rumen pH was higher ($P < 0.05$) for the ESBS-V, BSBS-V, ESBS-F and BSBS-F groups than for the WM (control) group at all the sampling periods indicating a lesser degree of rumen development for the unsupplemented group (WM). Rumen VFA was significantly lower ($P < 0.05$) at week 4 for WM group

indicating less rumino-reticulum development compared to pre-weaning starter fed groups. The control group maintained higher plasma glucose level which decreased from 5.76 to 4.12 mM/dl from week three to week 11. The ESBS –V, BSBS-V, ESBS-F and BSBS-F groups reached a lowest level earlier within the 8 – 10th week, as a result of earlier development of functional rumen with early introduction of the calf starter. Blood VFA was also higher ($P<0.05$) for the ESBS –V, BSBS-V, ESBS-F and BSBS-F groups at week 4 and 12. No significantly difference ($P>0.05$) were found in the pre-weaning growth rates between the treatments. The control (WM) group had significantly lower ($P<0.05$) average daily gain and post weaning growth rate when compared to ESBS –V, BSBS-V, ESBS-F groups. There were insignificant difference ($P>0.05$) in total starter intake for the starter supplemented groups. The pre-weaning starter intake were not significantly different ($P>0.05$) whether forced or offered voluntarily. Post weaning starter intake was significantly lower ($P<0.05$) for the WM group. The total starter intake for the 13 weeks period were 19.90, 33.93, 21.02, 38.44 and 30.65 kg for WM ESBS –V, BSBS-V, ESBS-F and BSBS-F respectively. It was concluded from the study that early introduction of soyabean based starter diets to the calves whether force fed or voluntarily enhance rumen development. It was also concluded that steam heated soyabean meal can be used as a cheap source of good quality protein source in compounding calf starter diets. It gave similar results and was more efficient in body weight gain/kg DM starter intake and economical in terms of cost/kg weight gain than the commercially extruded soyabean meals.