MOLASSES AS A COMPONENT OF DIETS FOR WEANED DAIRY CALVES

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Concentrate supplementation is necessary if dairy heifers are to maintain adequate growth when grazing tropical pastures (Moss and Murray 1992). Protein requirement of early weaned calves is high and rations need to maintain a balance between protein and energy (Moss 1993). Molasses is used effectively by older cattle as an energy supplement in place of grain, but performance of young calves fed molasses may be lower (Peron 1971). Protein content of molasses is low and it contains high levels of potassium which might affect its utilisation by young ruminants. Two experiments were conducted to investigate the utilisation of high levels of molasses by early weaned calves fed high (lucerne) or low (paspalum) quality roughages.

In experiment 1, 24 Holstein-Friesian heifer calves weaned at about 80 days of age and 71 (± 4.3) kg liveweight were randomly allocated to 4 supplementation treatments and fed daily for 12 weeks: (i) 1.5 kg molasses (ii) 1.3 kg molasses + 0.2 kg cottonseed meal (CSM) (iii) 1.2 kg sorghum grain, or (iv) 1.0 kg sorghum grain + 0.2 kg CSM per calf. All calves were fed a basal diet of lucerne *(Medicago sativa)* hay (20% crude protein (CP); 69% *in vitro* dry matter digestibility (IVDMD)) at 2% of liveweight and offered free access to a mineral supplement of 6 salt:1 dicalcium phosphate (DCP). The amount of lucerne fed was adjusted weekly on a liveweight basis with equal quantities of hay fed to all treatments. Liveweight gains were high with no significant differences between treatments ($P > 0.05$), although growth rates tended to be lower for calves fed molasses only and higher initially for calves fed CSM. Animals averaged 130 kg liveweight after 12 weeks (age 164 days). Liveweight gains were:

80 - 108 days: (i) 0.68 (ii) 0.76 (iii) 0.66 (iv) 0.79 kg/day (SEM ± 0.068)
80 - 164 *days:* (i) 0.64 (ii) 0.69 (iii) 0.71 (iv) 0.71 kg/day (SEM ± 0.040)

In experiment 2, 36 Holstein-Friesian calves were weaned at 56 days of age and 64 (± 5.4) kg liveweight and fed concentrate supplements at 1.5% of liveweight for 18 weeks. Molasses was substituted for sorghum grain as 0, 15, 30, 45, 60 or 100% of the energy component of the concentrate but with the protein level maintained at 16% with CSM. A mineral supplement (6 salt:1 DCP) was added to each supplement at 20 g/calf.day. Chaffed paspalum *(Paspalum dilatatum)* hay (7% CP; 48% IVDMD) was offered *ad libitum*. In contrast with grain fed calves, those receiving the high molasses supplements took many hours to consume the concentrate. Liveweight gains were less than required for dairy replacement, but substitution of molasses for grain did not significantly influence calf performance ($P > 0.05$). Calves averaged 128 kg liveweight at 6 months. Liveweight gains were:

56 - 98 *days:* (0) 0.53 (15) 0.44 (30) 0.53 (45) 0.47 (60) 0.50 (100) 0.43 kg/day (SEM ± 0.053)
56 - *182 days:* (0) 0.52 (15) 0.51 (30) 0.52 (45) 0.51 (60) 0.50 (100) 0.50 kg/day (SEM ± 0.048)

Weaned dairy calves fed molasses or grain grew at equivalent rates when rations were balanced for protein and energy but did not achieve desired growth rates when the quality of the basal diet was low (paspalum). These studies indicate that in balanced rations, molasses can be substituted for grain to achieve similar rates of growth by young ruminant calves. In practice, use of molasses for this age group (weaning to 6 months) would be limited by the quality of the forage on offer, as calves fed the lower quality roughage were unable to consume sufficient digestible dry matter to maintain a rate of growth necessary for heifers calving at 2 years of age.

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