Fatty Acid Composition in Milk of Lactating Beef Cows Fed a Caloric-restricted Diet

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Various types of stresses may account for the decreased weaning rates of free grazing beef cattle herds in Israel. Among these stresses, reduced protein and energy levels in the diet, especially during the hot and dry seasons are of a high probability to occur. Mother milk production (quantity and quality) is likely to affect weaning success of offspring. To explore this possibility, we investigated the effect of low-energy-protein diet on milk production and content in gestated lactating beef cows. Control cows (n=4) were served 11.5% protein - 1.9 Mcal diet *ad lib*, whereas the diet of experiment cows (n=6) was comprised of 7% protein - 1.45 Mcal, *ad lib*. The experiment lasted 3 months, and the average age of calves in each group, at the beginning of the experiment, was 5.5 months. Calves were supplemented with suckling ration, *ad lib*.

Weight gain of control calves (49 ± 5.5 Kg) was higher than experiment calves (34.7 ± 26), however, due to a big variability among experiment calves, did not differ significantly. Also weight losses of the experiment cows group varied widely (7-100 Kg) in comparison to a slight increase in the weight of the control cows group. A weight suckle weight measurement has revealed a significant reduction (1.88 ± 0.85 and 0.5 ± 0.22 Kg weight gain for control and experiment calves, respectively) in the potential of energy-deprived cows to produce milk. Milk fat was significantly higher in experiment cows

(5.2 ± 0.44% vs. 4 ± 0.38%). Fatty acid composition of milk had a reciprocal tendency: the proportions of short FA and SFA were significantly higher in the control milk, whereas MUFA and PUFA proportions were significantly higher in the experiment milk.

Whereas the expression of α_{s1}-casein was dramatically increased in experiment milk somatic cells, HSP70 was markedly down-regulated.

We conclude that energy-restricted diet results in a stress response in lactating beef cows that promotes a compensative response which is reflected in milk quality, to serve the energy and metabolic demands of the suckling calf.