This study was conducted to investigate the effects of rumen-protected tryptophan (125 g tryptophan per day) in heifers and dairy cows. Blood samples from dairy cows and heifers were collected for 24 h in 3-h intervals on the day before tryptophan supplementation, on day 2, 5 and 7 of tryptophan supplementation, and in heifers additionally on d 14 after tryptophan supplementation was ceased. Plasma tryptophan, melatonin, serotonin, and prolactin concentrations were determined. Tryptophan plasma concentrations on d 5 were augmented at day (11:00 h) and nighttime (02:00 h), (P < 0.05) in response to tryptophan supplementation in heifers by 119% and in dairy cows by 47%, respectively, as compared with d 0. Melatonin increased (P < 0.05) in response to tryptophan supplementation in heifers, but not in cows. The effect of tryptophan supplementation on plasma tryptophan and melatonin was reversible as demonstrated in heifers on d 14 after cessation of tryptophan supplementation. Serotonin and prolactin in plasma did not respond to tryptophan supplementation. However, milk yield during morning milking increased significantly in tryptophan supplemented cows on d 1, 3 and 4 as compared to the day before tryptophan supplementation. Additional blood samples were taken
during afternoon milking in cows at 1-min intervals for the analyses of oxytocin and prolactin on the
day before the start and on d 7 of tryptophan supplementation. Milk flow curves were recorded during
milking. No effect of tryptophan supplementation on the milking related release of oxytocin and
prolactin and on any characteristic of milk flow was observed. In conclusion, tryptophan
supplementation caused increased plasma tryptophan in cows and heifers and plasma melatonin in
heifers. However, plasma serotonin, prolactin and oxytocin release in cows remained unchanged by
tryptophan supplementation. Milk yield at morning milking increased slightly and transiently in
response to tryptophan supplementation.

Stichworte: Melatonin; Tryptophan; Serotonin; Prolactin; Dairy cow

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