Abstract

With respect to practical and economic significance of feed in animal nutrition, developing feed efficiency is an optimum strategy for increasing usefulness in animal industry. In order to study physiological dimensions of residual feed intake (RFI) as a way of determining efficiency and to study its relation to diets, this research was implemented in the form of three 2*2 factorial experiments in the frame of accidental design on a group of 40 growing Kermani male lambs within a 168-day period. The factors in the first experiment were the followings: 1) diet type (all-forage and all-concentrate), 2) residual feed intake (RFI) group: low efficiency (high RFI) and high efficiency (low RFI). The factors in the second experiment were the followings: 1) diet form (pelleted and unpelleted), 2) RFI group: low efficiency (high RFI) and high efficiency (low RFI). The factors in the third experiment were the followings: 1) intake type (ad libitum and restricted), RFI group: low efficiency (high RFI) and high efficiency (low RFI). According to the results, the effect of diet type, diet form, intake type and RFI on feed intake was meaningful. With respect to efficiency, daily weight increase was the same in different lambs in all experiments. Diet type and diet form and intake type had a meaningful effect on the glucose, insulin and Ghrelin concentration. Plasma concentration of glucose, insulin, Ghrelin and insulin-like growth factor were influenced by feed efficiency. High efficiency lambs fed by an all-forage diet had the most concentration in volatile fatty acid and propionic acid in their rumens. The most population of protozoa was seen in rumen liquid of low RFI lambs fed by the all-forage diet. High efficiency lambs when feeding pelleted and ad libitum diet had the most level of volatile fatty acid, propionic acid and ammonia in rumen liquid. Comparing cecum content showed high concentration of all volatile fatty acid, acetate and ammonia in low RFI group fed by unpelleted diet and low RFI group with ad libitum feeding. The most level of microbial protein was seen in lambs with low RFI in three manners: all-concentrate diet, pelleted diet and ad libitum intake.

Key Words: Residual Feed Intake, Pellet, Fermentation, Cecum, Intake type

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