Crossbred sheep were used to evaluate the use of poultry litter in a feedlot-type diet fed for 28 days. Twelve female and castrated male sheep previously exposed to creep feed while nursing were weaned at 96 ± 0.3 days of age and placed in 1.2 m X 1.6 m pens with slatted steel floors (d = -23) and ad libitum access to feed and water. Animals were fed either a control diet (75% commercial feed, 25% alfalfa pellets) or a poultry litter-based diet (40% poultry litter, 35% corn and 25% alfalfa pellets). The sheep were allowed a 23-d adjustment period in which they were gradually introduced to the treatment diet such that at the end of the adjustment period, the animals were receiving 100% of the treatment diet and no digestive problems were noted (d = 0). Animals were weighed and blood samples taken via jugular venipuncture at days -23, -16, -9, -2, 0, 7, 14, 21, and 28 for serum leptin radioimmunoassay and feed consumption was determined every other day for the 28-d trial and samples of unconsumed feed were collected to determine percent dry matter, percent crude protein and percent ash. Body weights (31.5 ± 0.5 kg for control and 30.9 ± 0.5 kg for poultry litter) and average daily gain (213 ± 20 g/d for control and 156 ± 20 g/d for poultry litter) were similar for sheep fed both diets. Dry matter intake was also similar for sheep fed the control diet (2.6 ± 0.1 kg) when compared to sheep consuming the poultry litter-based diet (2.5 ± 0.1 kg). However, serum leptin concentrations were greater (P<0.05) in sheep fed the control diet (8.1 ± 0.3 ng/ml) when compared to sheep receiving the poultry litter-based diet (7.0 ± 0.3 ng/ml). Serum leptin was also positively correlated to body weight for sheep fed both diets (r = 0.51, P<0.001). Dry matter intake of crude protein was similar between treatments, but as expected, ash consumption was greater (P<0.01) for sheep consuming the poultry litter-based diet (9.7 ± 0.4 kg) when compared to the sheep fed the control diet (6.7 ± 0.4 kg). Overall, this study indicates that short-term use of poultry litter in sheep diets can be effective.