Abstract: Mealworms may serve as an alternative protein source for pet foods because of their high protein content. The amino acid (AA) content and protein quality of mealworm-based ingredients may vary depending on their composition and processing, however, so testing is required. Our objective was to measure the AA composition, AA digestibility, and protein quality of mealworm-based ingredients using the precision-fed cecectomized rooster assay. The University of Illinois Institutional Animal Care and Use Committee approved all animal procedures prior to experimentation. 12 cecectomized roosters (4 roosters/substrate) were randomly assigned to one of three test substrates: 1) whole buffalo mealworm meal (BMW); 2) defatted yellow mealworm meal (YMW); and enzymatically hydrolyzed mealworm powder (HYD). After 24 h of feed withdrawal, roosters were tube-fed test substrates. Following crop intubation, excreta samples were collected for 48 h. Endogenous loss corrections for AA were made by using 5 additional cecectomized roosters. All data were analyzed using SAS version 9.4. All substrates had high AA digestibilities, with all indispensable AA digestibilities being >90% with the exception of histidine (87.9-91.1%) and valine (77.9%-79.7%). AA digestibilities were not different among substrates. Digestible indispensable AA score (DIAAS)-like values were calculated to determine protein quality according to AAFCO nutrient profiles, FEDIAF nutritional guidelines, and NRC recommended allowances for adult dogs, adult cats, growing puppies, and growing kittens. In general, HYD had the highest and YMW had the lowest DIAAS-like values for most indispensable AA. Methionine (HYD; YMW) and tryptophan (BMW) were the first-limiting AA. Our results demonstrate that mealworm-based ingredients are high-quality protein sources. Further research in dogs and cats is necessary to confirm sufficient palatability and digestibility, but these data suggest that they will be valuable sources of protein for pet foods.

Keywords: equine, hempseed meal, palatability