Identification the first limiting amino acid in cooked polished white rice fed to weanling holztman rats

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Abstrak

Forty-eight male weanling rats (91 g) were utilized to study the nutritional adequacy of cooked polished white rice. Rats
were individually housed, and allowed ad libitum access to one of six treatment diets. Treatment diets were 1) polished
white rice plus 10% casein and 0.18% methionine, CAS, 2) polished white rice, WHR, 3) polished white rice plus
0.45% lysine, LYS, 4) polished white rice plus0.40% methionine, MET, 5) polished white rice plus 0.30% threonine,
THR, 6) polished white rice plus 0.45% lysine, 0.40% methionine, and 0.40% threonine, COM. Rice was cooked prior
diet formulation using a 3 to 1 ratio of water to rice. Vitamins (AIN-76) and AIN minerals were added to all diets to
meet NRC (1978) requirements. Rats fed CAS diets were significantly heavier on d 21 (P<0.05) than rats on COM,
LYS, MET, THR, or WHR diets, (219.9 vs. 171.6, 153.2, 153.2, 148.3, or 155.4 g respectively). Supplementation of the
most deficient essential amino acids, lysine (LYS) or methionine (MET) did not improve (P>0.05) rat performance over
WHR fed rats, Average daily gain (ADG) for CAS was 6.1 g/d and ADG for LYS and MET was 3.0 g/d. The addition
of threonine (THR) significantly (P<0.05) reduced ADG when compared to WHR diets (2.7 vs. 3.0 g/d). When rats
were fed to COM diet significant (P<0.05) improvement in ADG was observed compared to WHR fed rats (4.8 vs. 3.0
g/d). The increased gains achieved with COM diet and the poor gains observed with the single amino acid diets (LYS,
MET, or THR) would suggest that polished white rice is limiting in more than one essential amino acid.