Leucania Leucophaga is a native legume of the Yucatán Peninsula. This forage, because of its high protein level, could be used as a dietary protein source for farm animals. The use for monogastrics is limited by the crude fiber level (around 20% of the dry matter) and the content of the toxic amino acid selenite. The toxicity produces a decrease in the growth rate and a nervous syndrome. It could be prevented by the addition of ferrous sulphate which is linked with the selenite and it becomes an indigestible quenate (Kl.бит, Sokar and Tomacoom, 1979).

Working with growing pigs, Malagy (1974) used as much as 40% Leucania leaf meal (LM) in the diet — with good results. Dunn et al. (1978) could only reach 30% in the diet using ferrous sulphate as a bonding product. These results may differ probably because of the variable content of selenite in the LM, the analysis was not reported by the authors.

The objective of the experiments reported here was to study the chemical composition and nutritional value of the LM grown in the Yucatán Peninsula, for the growing rat.

Leucania was harvested in the Eastern part of the State of Yucatán, Mexico. The leaf and stem parts were dried and ground to a particle size of 1 mm — with a mill mill.

The chemical composition of the LM was (dry matter basis): 20.6% crude fiber, 11.4% crude protein (CP) (32.1% of the CP was estimated in the neutral detergent fiber and 67% of the CP was true protein) and 0.0% ash. The amino acids showed that methionine (0.38%), threonine (0.31%), valine (0.24%), histidine (0.04%) and lysine (1.83%) were the first five limiting amino acids for the growing rat.

Four experiments with rats were conducted with vitamin A.

Experiment 1: 20 rats were assigned, on a randomised block design according to the body weight, to 5 diets. Control diet consisted of 12.5% casein, 0.4% wheat flour, 10% sugar, 5% alpha cellulose, 4.0% corn oil, 1.75% MgO, 1.25% CaO, 0.75% minerals and 0.5% vitamins. In the other four diets casein and wheat flour were partially replaced by LM (7.1, 14.3, 21.4 and 28.5% which represented a percentage of 11.4, 22.7, 34.0 and 42.2% of the CP of the diet). The experiment lasted for 3 weeks. The increasing levels of LM with diet decreased the final body weight of the animals. There was no statistical difference between the control diet and the diets with 7.1% and 14.3% of LM. However, there was an increasing difference when LM was increased in the diet. The brain and liver samples were subjected to histological analysis. It didn't reveal any kind of disorder. The digestibility of the CP was estimated, using the regression method (Rodriguez, 1980), at 71.4%.

Experiment 2: 20 rats were distributed in a completely randomised design to 4 treatments to determine the influence of the supplementation with methionine or lysine to a control diet of LM. The control diet consisted of 17.1% CP, 4.0% corn starch, 2.0% corn oil, 10.0% sugar, 2.47% L-Cysteine, 0.6% minerals and 0.3% vitamins. Each one of the other diets was supplemanted with 0.35% D-methionine, 0.45% L-lysine and 0.2% methionine + 0.4% lysine. All rats provided 1.0% Ca. The supplementation with methionine increased the final body weight (P < 0.05) in relation to the control diet. There was no effect found with the use of L-lysine.

Experiment 3: 35 rats were assigned, in a randomised block design, according to body weight, to 5 diets. The diets had different supplementary methionine levels: 0.15%, 0.25%, 0.35%, 0.45% and 0.55%. No effect of the level of supplementation on the final body weight was found (P > 0.05).

Experiment 4: The protein utilization of the LM was carried out using the modified method suggested by O retailer and Lohman (1978). 30 rats were assigned to 3 dietary control (free protein, control + protein and control + LM). The protein utilization of casein was 63.2% and of LM 40.5%.

Conclusions:

A limiting factor in the utilization of LM in the diet of the growing rat is the low protein availability. It can be used providing 13.7% of CP, in the diet with no deleterious effects. The growth rate can be increased with the inclusion of 3.4% methionine as 0.15% of the diet.

Selected references:


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