

Nutritional value of NuPro® for dogs: digestibility and palatability

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INTRODUCTION

NuPro® 2000 (Alltech Inc.), an extract from a specific strain of *Saccharomyces cerevisiae*, is a protein source high in crude protein (51-55%) and amino acids that has been used as a functional ingredient in feeds, especially during the weaning phase, because it seems to improve immunologic response. It also provides a good source of glutamic acid that possibly stimulates "umami" taste receptors and enhances palatability in dogs.

OBJECTIVES

- (1) To determine NuPro® palatability effects.
- (2) To determine NuPro® digestibility and metabolizable energy.

MATERIAL AND METHODS

Diets

- Basal diet according to nutritional recommendations for dogs (AAFCO, 2004)
- NuPro® 30%: 70% basal diet + 30% NuPro®
- NuPro® 2%: Basal diet + 2% NuPro® (replacing corn gluten meal)

Palatability Trial

Animals & treatments

- 38 adult male and female dogs of various breeds housed in individual kennels
- The basal and 2% NuPro® diets were offered in separate pans at the same time each morning; same diets offered in the afternoon with pan positions reversed.

Measurements & analysis

- First choice and feed intake
- Chi-square test (5%) to compare the first choice
- t -test (5%) to compare feed intake

Digestibility assay and metabolizable energy analysis

Animals

- 12 adult Beagle dogs (mean 11.53 + 1.12 kg) housed in individual metabolism cages (1 m³)
- 2 treatment groups (6 dogs each)
- Vaccinated, clinically examined, blood and coproparasitological analyses performed

Treatments

- Basal diet and NuPro® 30%
- Diet adaptation - 7 d, trial lasted 14 days
- Fed twice daily as per NRC (1985) energy requirements
- Water provided *ad libitum*

Measurements

- Feces and urine collected during the second 7-d period.
- ME was determined without urine collection (AAFCO, 2004).
- Feces were ranked (0 to 5) as follows: 0 (liquid) - 5 (-Firm feces, hard and dry); (ideal = 4)
- Dry matter (DM), crude protein (CP), acid ether extract, crude fiber, ash and gross energy levels were determined in feces and diet samples (AOAC, 1995).
- Digestibility coefficients of CP, DM, organic matter, acid ether extract, nitrogen-free extract, crude fiber, CP and metabolizable energy of NuPro® were evaluated using the replacement method. The percentage of ingredient replacement was corrected to dry matter, as follows:

$$CD_{ap} = \frac{CD(RR) + [CD(RT) - CD(RR)]}{\% \text{ replacement}/100}$$

Where:
CD_{ap} = Apparent digestibility coefficient
CD (RR) = Apparent digestibility coefficient of basal diet
CD (RT) = Apparent digestibility coefficient of experimental diet
% replacement = % of replacement of RR for NuPro®

NuPro® digestibility coefficient was calculated:

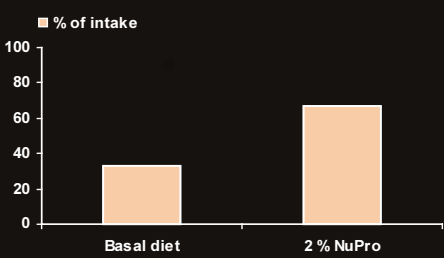
$$ND = (N/100) \times CD_{ing}$$

Where:
ND = Digestible nutrients
N = Nutrients on dry matter
CD_{ing} = Digestibility coefficient of ingredient tested

RESULTS

Palatability Trial

- There were no differences between diets as to first choice (P>0.05). However, consumption rate indicated that the animals preferred the 2% NuPro® diet (P<0.01), which was consumed in a rate of 67% vs 33% for the control diet (Figure 1).
- NuPro® (2%) improved diet palatability, possibly due to the high levels of glutamic acid, which increases palatability by stimulating the gustative papillae.



Digestibility Trial

- Dogs consumed the experimental diets normally; no vomiting or food refusals were observed.
- Dog health status was maintained during the 14-d period.
- Apparent digestibility of CP for NuPro® was lower (72.4%) than soybean meal (84.0%) and 60% corn gluten (92.0%) possibly due to the higher level of nucleic acids in NuPro® (~ 5%), since this compound contains nitrogen, which is quantified as CP by the Kjeldhal method.
- ME of NuPro® was higher for dogs (2.89 kcal/g) compared with rates for pigs and poultry, which are 2.73 and 2.00 kcal/g (Alltech Inc.), respectively.
- NuPro® at 30% resulted in black and softened feces (Table 3). (These negative effects were not observed at the 2% level.)

CONCLUSIONS

- NuPro® (2%) increased diet palatability, showing a positive effect as a flavor enhancer for dogs, without negatively affecting fecal quality.
- NuPro® had a moderate level of metabolizable energy, possibly due to its low fat level.
- NuPro® had intermediate digestibility compared with other vegetable protein sources.

Table 1. Apparent digestibility coefficient of NuPro® (mean ± standard error).

	Digestibility (%)
Dry matter	70.59 ± 4.64
Organic matter	71.49 ± 4.32
Crude protein	72.44 ± 2.96
Acid ether extract	75.68 ± 2.79
Nitrogen-free extract	71.26 ± 6.49
Gross energy	69.04 ± 3.97

Table 2. Nutrient digestibility and ME of NuPro® (mean ± standard error).

	Digestibility (%)
Digestible DM, %	65.61 ± 4.32
Digestible CP, %	35.18 ± 1.42
Digestible OM, %	62.98 ± 3.81
Digestible EE, %	0.53 ± 0.02
ME, kcal/kg	2.89 ± 0.18

Table 3. Fecal score, feces production and DM (mean ± standard error).

Diet	Fecal score	Feces DM (%)	Feces production (g/kg/d)	Feces production (g DM/kg/d)
Basal	3.9 ^a ± 0.10	40.46 ^a ± 2.24	3.75 ^b ± 0.33	1.48 ^a ± 0.08
30% NuPro®	3.3 ^b ± 0.14	32.47 ^b ± 0.78	6.42 ^a ± 0.52	2.09 ^a ± 0.19

