Evaluasi Bahan Pakan Unggas

Evaluasi Pakan

Tujuan: memberikan informasi tentang komposisi pakan atau bahan pakan serta kesesuaian untuk kebutuhan unggas

Evaluasi pakan adalah proses kunci dalam industri perunggasan.

Bahan pakan perlu diuji untuk merumuskan pakan lengkap, dan harus dievaluasi untuk menentukan kesesuaiannya untuk unggas.

Key to Nutrient Analysis

The analysis is only as good as the sample you take !!!

1 quart sample has to represent several tons of feed/feedstuff“representative sample”

Why analyze rations or feedstuffs

- **Nutrient Analysis Book values are averages over many locations**
- Overfeeding/underfeeding nutrients
- Contaminants in feedstuffs
- Toxins, chemical residues, or other harmful compounds

How often/When?

Every time you change batches/ loads of feedstuffs

When you change feedstuffs in your rations

Every time you mix a new batch of feed

Monthly samples of forages/silages

Evaluasi Pakan

- Evalusi Fisik (warna, bau, berat, etc)
- Evaluasi Kimia (proksimat, Van Soest)
- Evaluasi Nilai Tabel
- Evaluasi Prediksi Persamaan
- Evaluasi NIRS
- Evaluasi In Vivo
- Evaluasi In Vitro

REMEMBER

- Chemical analysis is the starting point for determining the nutritive value of feeds
- The actual value of ingested feedstuffs is dependent upon the ability of the body to make use of the nutrients in the feedstuff

Evaluasi *In Vivo*

Feeding trials

- **Simply give an indication of:**
  Palatability of feedstuff in a ration (will the animals eat it?)
- Growth response compared to another feedstuff/ration
- Tells NOTHING of why different results were obtained

Type of Feeding Experiment

- Feeding trials ---> Growth, Production, reproduction
- Slaughter experiment --> meat component, market value
- Digestion trials --> Intake, digestibility
- Balance trials ---> measure nutrients retention

Feeding Trials Compare between > 2 rations

- Feed intake (input-feed cost)
- Growth, reproduction, or other function
- Efficiency of feed utilization, ADG, weekly gain, final (weight % initial wt (%) , FCR

Feeding Trials with Laboratory Animals

- Small animals e.g. Rat
- Growth, reproduction
- Cheap (feed, labor, short life cycle)
- Useful for fundamental principle of Nutrition

The purified-diet

- Diets contain of purified source of nutrients

Contoh: AME dari biji kapok

- Specific nutrient interested more completely diet --> less satisfactory on Animal

Feeding Management in the Trials

- Group Feeding vs Individual
- Feeding group - simplest equipment need cheap labor cost complicate in the interpretation of results some animal many consume less feed
- Individual correlation of individual performance with food intake statistics analysis advantage

Controlled vs ad libitum feeding

- Ad libitum is the most common in farm practice
- Gives unbiased results of direct practical
- Measure : feed required per kg gain total increase in body weight
- Does one animal grow because it eats more or the other fail because it eats less ?”

Slaughter Experiments

- Killing of the animal when require specific information
- Analysis of certain specific tissues or whole body
- Protein source - protein tissue & concentration(Initial - Final) composition of body chemical
- Time & labor cost

- Measures of market value: carcass, dressing percentages, carcass quality, quality of product, selling price
- Meat quality, color, vitamin), fat thickness

In vivo: Metabolism Trial

- Determines nutrient retention/excretion
- Complete analysis on ration
- Feed known amount to animals
- Collect urine/feces
- Compete analysis on urine/feces

- Calculation: [(In – Out)/In] * 100
- Nutrient retention = Nutrient intake –Nutrient excretion (Urine + Feces) x 100Nutrient intake

In vivo: Digestibility studies

- Effluent from small intestine or feces is collected and analyzed for nutrient(s) being studied
- Collection at terminal SI is referred to as ileal digestibility
- Collection of feces determines total tract digestibility

How is TRUE digestibility determined?

- Usually only in monogastrics (termasuk ayam)
- Usually only concerned with true AA digestibility
- Chicken—cectomized animals
- Surgically remove ceca from birds and measure digestibility

The use of indigestible marker in nutrition studies

- **Inert, no toxic on animal & micro flora**
- not be absorbed or metabolized in GI
- mixed well/ associated with feed
- should not influence GI secretion digestion absorption or motility
- precise - quantitative analysis / not interfere with other analysis

Evaluasi *In Vitro*

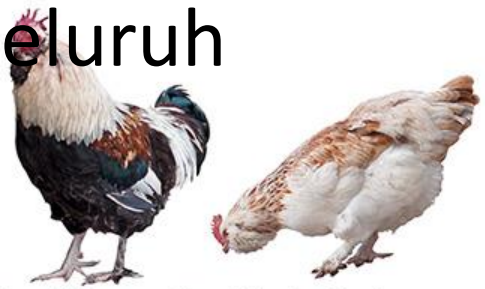
- **Method to estimate digestibility of feedstuffs**
- Uses enzymes and (or) microorganisms in a test tube to simulate GIT environment
- Method is cheap, with results in about hours
- Rough estimate of digestibility

Advantages

- Cepat dan lebih murah
- Meminimalkan variabilitas ternak
- memungkinkan simulasi segmen saluran pencernaan (GIT)
- mengatasi masalah etika berkaitan dengan penelitian issue animal welfare

Sistem pencernaan 1, 2 atau 3- tahap

- Model pencernaan satu tahap : mensimulasikan pencernaan nutrisi pada fase lambung
- model 2 tahap: mensimulasikan fase lambung dan usus kecil
- Model 3 tahap meniru pencernaan dan di lambung, usus kecil dan usus besar, yang menyebabkan hilangnya nutrisi di seluruh saluran pencernaan



Prediksi in vitro AME

- setengah gram sampel pakan diinkubasi dengan larutan pepsin (mengandung 20 mg pepsin, 11.400 unit) pada 37 C dan pH 4,13 selama 4 jam dalam shaker water bath.
- Setelah menyelesaikan tahap pencernaan ini, pH diatur antara 7,0 dan 7,1 dengan larutan natrium hidroksida. Larutan enzim yang mengandung pankreatin, garam empedu dan enterokinase ditambahkan.

- Tahap pencernaan selanjutnya berlangsung selama 6 jam pada 37 C.
- Pada akhir tahap kedua inkubasi, sampel disentrifugasi (1.500 selama 15 menit) dan supernatan dibuang.
- Endapan yang tidak tercerna dicuci dengan air suling, disentrifugasi lagi, dan supernatan dibuang.
- Residunya adalah dianggap sebagai bahan yang tidak dapat dicerna. Residu ini dikeringkan dalam oven pada suhu 65 C selama 48 jam dan ditimbang.

Kecernaan in vitro energy (kcal/g) =

((GE pakan x F) – (GE residu x R))/F

Dimana:

GE = gross energy,

F = berat sampel pakan,

R = berat residu

Prediksi in vitro kecernaan protein

- Setengah gram sampel diinkubasi dengan larutan pepsin (mengandung 20 mg pepsin, 11.400 unit) pada 37 C dan pH 4,13 selama 4 jam dalam shaker water bath
- Setelah menyelesaikan tahap pertama pencernaan, pH disesuaikan antara 7,0 dan 7,1 dengan larutan natrium hidroksida dan cairan usus.

- Tahap kedua pencernaan kemudian berlangsung selama 4 jam pada 37 C. Pada akhir inkubasi tahap kedua, sampel disentrifugasi (1.250 selama 10 menit pada suhu 5 C) dan supernatan dibuang.
- Endapan yang tersisa dicuci dengan air suling, disentrifugasi kembali dan supernatan dibuang lagi. Residu dianggap sebagai bahan yang tidak dapat dicerna.
- Endapan yang tidak tercerna kemudian ditransfer ke kertas saring kering yang telah ditimbang sebelumnya untuk penentuan BK dan protein.

Kecernaan in vitro BK dan kecernaan protein ditentukan menggunakan rumus berikut:

Kecernaan in vitro BK (%) =

((BK pakan – BK tidak tercerna)/BK pakan) x 100

Kecernaan in vitro PK (%) =

((PK pakan – PK tidak tercerna)/PK pakan) x 100