

Guidelines for Describing Diets for Experimental Animals

The following guidelines are intended to encourage an adequate description of experimental diets and to foster a high degree of uniformity in diet description.

1. TERMINOLOGY AND EXPRESSIONS

The appropriate terms used to describe experimental diets (purified, nonpurified) are defined in *J. Nutr.* 107: 1340–1348, 1977. All components of the diet should be expressed quantitatively in units (e.g., milligrams, grams, millimoles) per kilogram of diet. Additionally, nutrient density may be expressed as units of nutrient per kilojoule gross energy, digestible energy or metabolizable energy, whichever is appropriate. For definitions of units of energy, see *Nutritional Energetics of Domestic Animals and Glossary of Energy Terms*.¹

2. DESCRIPTION OF DIETS

Nutritionally complete experimental diets for rats and mice, including vitamin and mineral mixtures, have been described in *J. Nutr.* 107: 1340–1348, 1977 and *J. Nutr.* 110: 1726, 1980 and by references cited in these reports. Complete diets and nutrient requirements for most laboratory, domestic or production animals (including birds and fish) may be found in the series of publications on *Nutrient Requirements of Domestic Animals* by the National Academy of Sciences-National Research Council.¹

List the ingredient content of all diets including commercially prepared experimental diets. The vitamin and mineral premixes may be listed as a footnote to the ingredient table. A diet may be referenced only if it has been previously published in the *Journal of Nutrition*. If the diet has been subsequently revised or modified, or uses ingredients that are now prepared differently, then redescribe the diet. Proximate analysis and analysis for specific nutrients should be done for those nutrients whose exact concentrations are crucial to the interpretation of the results.

¹For sale by the National Academy of Sciences-National Research Council, Printing & Publishing Office, 2101 Constitution Ave. NW, Washington, DC 20418.

3. INGREDIENT DESCRIPTION

The Joint United States–Canadian Tables of Feed Composition from the National Academy of Sciences-National Research Council¹ provides a description and the nutrient composition of most ingredients used in animal feeds. Other references should be cited or a description given for other feed ingredients used. The nutrient composition of many feed ingredients varies significantly depending on source, processing and storage. When critical to the interpretation of results, the lots of feed ingredients actually used should be chemically or biologically analyzed for the specific nutrients in question. Guidelines for purity and quality of commercial feed ingredients such as minerals, vitamin preparations, cereal grains, soybean and other protein meals, animal- or cereal-derived byproducts, and feed grade fats may be found in the *Proceedings of the AFIA Nutrition Council*.²

4. PURIFIED INGREDIENTS

a. Proteins

Describe the source and the protein content (e.g., casein (94% crude protein), isolated soy protein (86% crude protein)). Crude protein is defined as the percent nitrogen $\times 6.25$. Indicate whether the protein content is expressed on "as is" or "moisture-free" basis. Reference the commercial supplier and, if applicable, the method of preparation.

b. Carbohydrates

Indicate the specific type (e.g., sucrose, lactose, etc.). Indicate whether the glucose used in anhydrous or the monohydrate (the usual feed grade form). Indicate the source of starch (e.g., maize, potato) and, if applicable, whether partially hydrolyzed or dextrinized.

c. Lipids

Specify the source of triglycerides (e.g., corn oil, olive oil, lard, tallow). If a commercial mixture is used then

²Published by the American Feed Industry Assoc., 1701 North Ft. Myers Dr., Arlington, VA 22209.

reference the brand name and supplier. Indicate whether the product is partially hydrogenated. Note the addition of an antioxidant to the lipid or diet.

d. Amino acids

Indicate whether the L or D,L isomers are used. Indicate the crystalline salt used (e.g., basic amino acid • HCl, Na or K L-glutamate).

e. Minerals

Indicate the exact chemical form of the compounds, including the waters of hydration (e.g., $\text{CuSO}_4 \cdot 5\text{H}_2\text{O}$, $\text{CaHPO}_4 \cdot 2\text{H}_2\text{O}$). For some minerals such as magnesium carbonate, which may contain varying amounts of oxide, or some calcium phosphates for which the structure is uncertain, indicate the known percentage of the specific mineral elements. Clearly distinguish between the quantity of the source compound and the amount of essential elements, such as Cu or P, per unit of diet.

f. Vitamins

Indicate the chemical form or derivative of the vitamin. See the Nomenclature Policy on previous pages of this issue of THE JOURNAL for terminology. Indicate the purity (e.g., the percentage of menadione in a menadione sodium bisulfite preparation, or the percentage of choline in a choline chloride preparation). Indicate which salt of choline is used. Indicate whether the vitamin was a stabilized preparation (e.g., microbeadlets of gelatin-encapsulated retinyl palmitate). Indicate whether the vitamin D was ergocalciferol or cholecalciferol. Some commercially prepared vitamin premixes are not clearly labeled as to the chemical form of the vitamins provided. Exact information on the specific lot number of the premix used should be requested from the supplier at time of purchase.

g. Fiber and fillers

Indicate the pertinent chemical or physical characteristics of the product (e.g., methyl cellulose, polyethylene cubes, washed silica). Also indicate particle size. Some purified wood cellulose preparations contain significant amounts of lignin. Give the commercial designation and address of manufacturer or supplier, which may serve as a source of more detailed information.

5. DIET PREPARATION

Indicate whether the diet has been pelleted, or extruded, or describe any other process that might affect the physical or chemical properties of the diet or its ingredients.

6. FEEDING AND FASTING

Indicate the time and frequency of feeding for restricted-fed animals. Indicate the light-dark schedule. Accurately indicate the length of the fasting period in hours after which blood is sampled or other observations are made. "Overnight fast" is not a sufficiently precise description for small animals.

7. COMMITTEE MEMBERSHIP

These guidelines were developed by the Experimental Animal Nutrition Committee of the American Institute of Nutrition. Participating committee members were: D. C. Beitz, *Chairman*, 1982–1983, J. D. Garlich, E. C. Naber, R. A. Britton, J. C. H. Shih, L. S. Jensen, R. E. Austic, R. L. Prior and W. G. Bergen. Revised 1986.