

## FACTS ON ANIMAL FEED FORMULATION

### MANAGED, FIXED, OR LEAST COST FORMULATION – WHICH IS BEST?

**Biomedical researchers advance science through experimental research conducted with animal models. Accurate results and meaningful conclusions are achieved only when tight control is maintained over all materials and methods used in every research study. The animal diet is a key variable that must be controlled and managed to minimize changes over time.**

**Variation in natural ingredient diets fed to animals involved in biomedical research could confound experimental results or influence the interpretation of results.<sup>1</sup> Therefore, it is important to manage diet formulas and have tight controls when manufacturing the diet. In fact, it is unlikely that lots manufactured according to the same formulations would contain exactly the same concentrations of nutrients or contaminants as different batches of ingredients may be used.<sup>2</sup>**

**Three common practices used to formulate and manufacture animal diets include Managed Formulation (delivering CONSTANT NUTRITION®), Fixed Formulation, and Least Cost Formulation, which are detailed below.**

#### MANAGED FORMULATION (CONSTANT NUTRITION®)

CONSTANT NUTRITION® is a management program of diet formulation, exclusive to PMI® LabDiet®. Using this method, we are able to account for biological variation of natural feedstuffs to deliver a constant level of nutrients. Ingredients are assayed daily and necessary formulation refinements are made, if required, to minimize nutrient variation. Neither the actual ingredients used nor their order of inclusion in the diet change.

The benefit to the scientific community is a constant baseline of nutrition to help control unwanted, nutritionally induced variables. In addition, ingredients are assayed for interfering environmental contaminants to further reduce the possibility of unwanted variables introduced through the diet.

CONSTANT NUTRITION® through a managed formulation process removes uncertainty and assures control, predictability and maintenance of baseline data in research experimentation.

#### LEAST COST FORMULATION

The practice of ingredient interchange, known as least cost formulation, is widely practiced within the commercial feed industry for production animals. When the cost of one ingredient increases, a lower cost ingredient may be used as a substitute in order to produce a lower cost feed; thus providing the customer with the most economical feed. It is widely known, however, that laboratory feeds are fed to animals raised for breeding and research, not for animals used to produce food such as meat, milk and eggs. Because laboratory animal diets need to be consistent products, least cost formulation should not be used.

#### FIXED FORMULATION

Fixed formulation is a method where the ingredient inclusion levels are fixed and do not change based on nutrient content of incoming ingredients. Extensive ingredient research has proven that formulas produced under fixed formulation, without credence to ingredient variability, will result in unknown and sometimes radical changes in nutrient concentrations. Although fixed formulation is used in the laboratory industry, PMI® primarily uses this approach in economy-minded feeds that can be safely fed for production purposes to the beef, swine, and dairy industries. The finished product testing on these feeds from season to season proves ingredient variability can change the nutritional composition of an animal feed.

*Please refer to the chart on the reverse side of this sheet for specific data on fixed formula diets.*



## LABDIET® NUTRITION STANDARDS

In harmony with Ph.D. nutritionists, the PMI® Formulation Department manages the nutritional standards for each LabDiet® product. Through computer assisted technology, they evaluate and assure all products conform to the standards on a daily basis.

The LabDiet® nutritional standards assure CONSTANT NUTRITION® is delivered in your formulation. LabDiet® formulations do not change with individual ingredient price - there is no interchange between ingredients, such as gluten meal, soybean meal, fish meal, meat meal, and others. Small formula changes are made only when absolutely necessary due to the proven and documented variability in nutritional content of individual ingredients. To minimize the need for such changes LabDiet® products are formulated with a wide variety of ingredients to help maintain nutrient consistency and minimize formula changes.

In summary, managed formulation (CONSTANT NUTRITION®) is the formulation method that accounts for inherent nutrient variability in grains. Our goal is to maintain animal performance day in and day out. No ingredient substitutions or deletions are ever used. By maintaining nutrient requirements at strict levels and making no exceptions in ingredient specifications, along with maintaining a database of analytical information, a consistent and constant diet will be produced.

Based on database maintained at PMI®, the following example shows how widely protein alone can vary in a fixed formula:

FIXED FORMULA DIET		THE INGREDIENTS COULD CONCEIVABLY CONTAIN THE FOLLOWING PROTEIN LEVELS:		
	%		Low	High
Corn	30	Corn	6.5	10.0
Wheat	17	Wheat	9.0	14.0
Soybean Meal	15	Soybean Meal	45.0	50.0
Midds	6	Midds	14.5	17.0
Fish	4	Fish	60.0	60.0
Oats	4	Oats	12.0	12.0
Alfalfa	3	Alfalfa	17.0	17.0
Misc.	21	Misc.	—	—
	100			
Calculated protein level in formula above:			14.5	17.3

**LabDiet**

*Your work is worth it.®*

<sup>1</sup> Knapka, J.J. Natural-Ingredient Diets: Managing the Variation in Dietary Nutrient Concentrations. Lab Animal, October 1997; 40-42

<sup>2</sup> Rao, G.N. and Knapka, J.J. Contaminant and nutrient concentrations of natural ingredient rat and mouse diet used in chemical toxicology studies. Fundamental and Applied Toxicology; 9:329-338, 1987