

## Inotiv - Teklad Standard Natural Ingredient Diets – 9 month Shelf-Life Guidance

There is no definitive point where one is able to predict when a specific diet will spoil or become deficient in one or more nutrients.

Longstanding practice in North America has been to use these types of diets through six (6) months of the date of manufacture (*Guide for the Care and Use of Laboratory Animals, 8th edition, National Academies Press*) under proper storage conditions. This guidance was influenced by Fullerton et. al 1982.

In Europe and Asia, these types of diets (including those produced by Inotiv) are routinely used through nine (9) months, per local practices and regulatory oversight.

Common practice is a strong indicator of suitability of use. Historical use of natural ingredient diets for 9 months without adverse effects noted, coupled with some literature support (*Spencer, 1985*) and vitamin testing over time, provides confidence that these diets continue to support animal health and study integrity out to at least 9 months post-production.

We recommend the following storage conditions:

- Cool and dry; at or below 70 degrees Fahrenheit; minor excursions in temperature will not appreciably impact quality
- Relative humidity (RH) below 50% ideal, but up to 65% is acceptable; the logic of choosing 65% RH as an upper limit is that this will minimize the likelihood of mold growth with extended storage.
- Clean and free of pests in original packaging or in a container that prevents continuous exposure to light and minimal exposure to air

Primary shelf life or use period considerations are vitamin stability and microbiological growth.

**Vitamins:** Modern preparations used are quite stable, relative to the early years of diet manufacturing when the 6 month practice began. Vitamin levels in standard natural ingredient diets are generous relative to estimated requirements.

**Microbiology:** Standard natural ingredient diets are dry (i.e. 12% moisture or less) with an active water content below levels required to support microbiological growth or other reactive processes that would make diet unsuitable for use.

Irradiation in combination with vacuum packaging is expected to decrease the time-related decline in nutritional quality. Therefore, when vacuum packaged and irradiated, standard natural ingredient diets could be used through 9 months (North America) or 12 months (Europe) if permitted by institutional policy.

This guidance also applies to natural ingredient diets for primates and guinea pigs that contain L-ascorbyl 2-phosphate, a form of stabilized vitamin C. The official recognition by the USDA of the 6 month shelf life for these products occurred in late 2003. Likewise, these diets produced for Europe and Asia are used for 9 months post-production.

Guinea pigs, rabbits, dogs, cats and primates may be more sensitive to subtle changes in palatability associated with older diet. Observations of intake and body condition are recommended. If either decline, the older diet can be mixed with fresher diet before being fed, at a proportion not to exceed 1 part older diet with 1 part fresher diet.

### **Inotiv believes that research customers can confidently use Standard, Natural Ingredient diets out to 9 months post-manufacturing.**

Stated above are the recommendations of Inotiv. We understand that the policies and protocols of institutions may take precedence over this assessment.

Additional supporting information is available by request at [askanutritionist@inotivco.com](mailto:askanutritionist@inotivco.com).

#### **Resources**

Fullerton, F. R., Greenman, D. L., & Kendall, D. C. (1982). Effects of storage conditions on nutritional qualities of semipurified (AIN-76) and natural ingredient (NIH-07) diets. *The Journal of Nutrition*, 112(3), 567-573.

- Minor loss of vitamin A and thiamin were observed in one sample of the natural ingredient rodent diet (NIH-07) over 6 months of storage at 23-30° C with no change in the bacteria count. Peroxide values did not vary dramatically in any of the samples during the 168 day period.

National Research Council. 2011. *Guide for the Care and Use of Laboratory Animals: Eighth Edition*. Washington, DC: The National Academies Press.

Spencer KEV. 1985. 8th ICLAS/CALAS Symposium, Vancouver 1983. Gustav Fischer Verlag, Stuttgart, NY.

- Concluded the effective life of irradiated rodent diet stored at room temperature was at least one year; there were no differences in reproductive indices, growth and diet consumption between rats fed old (up to 22 months) vs. fresh (<3 months) diet.

Tobin G, Stevens KA, Russell RJ. Nutrition. In: Fox JG, Barthold SW, Davisson MT, Newcomer CE, Quimby W, Smith AL, editors. *The Mouse in Biomedical Research*. 2nd ed. Vol. III. London: Academic Press; 2007. pp. 360-361.

#### **Inotiv Teklad Technical Services**

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