Modern Pet Food and the Effects of Processing on Vitamin Stability

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Statement of Problem:

Approximately 300 million companion animals world-wide depend on commercially processed food in wet or dry form. Generally these products are formulated to be nutritionally balanced and administered in a single food item. The initial raw ingredients sourced for pet food are often derived from the food industry as secondary or inedible by-products (e.g., fruit and vegetable pomace, meat and bone meal, etc.). In essence after being pressed for their juice or used for specific cuts of meat, the excess material will be collected and processed (e.g. drying or rendering) into valuable ingredients and made available for the pet food industry. These thermal processes in the food and feed industry offers substantial desirable benefits, but can have adverse effects on essential nutrients (Aldrich, 2012)

Natural sacrifices of essential nutrients during storage, chemical interactions and the effects of thermal processing can lead to the need for additional supplementation in order to support animal requirements. Using present information about nutrient analysis on the finished product, nutritionists over formulate in part to
Goals:

1. Evaluate thiamine hydrochloride, choline chloride, Vitamin E and the acetate and beadlet forms of Vitamin A and D in a premix at ambient and stressed conditions over a specified duration to determine the effects of premix interactions between molecules with choline and trace minerals on retained vitamin A, D, E and B1.

2. Determine the level of sacrifice during thermal processing of pet foods at various extrusion and drier conditions to compensate for vitamin sacrifice during thermal processing. This may increase the risk for imbalances or toxicity. Little research has been published in recent years on the magnitude loss during each step of the canning or extrusion manufacturing processes. The same can be said for the premix interactions and the impact from storage.

In a manner of speaking, vitamins are the most labile additive used in pet food. The vitamin sensitivity is contingent to a number of factors. Depending on molecular structure and chemical characteristics, the relative fluctuates due to heat, moisture, pH, inorganic materials, light, and oxygen (DSM, 2012). These factors are common inputs in pet food production. Each of these items coupled with other conditions during production present a challenge when ensuring the food retains its feed value.

Advances in vitamin supplementation by technology have decreased susceptibility while maintaining bioavailability to the hose for certain applications. Redesigning the external structure surrounding and there by providing the vitamin protection. Vitamin manufacturers have utilized insoluble cross linkage reactions between sugar and gelatin, known as beadlet technology. In this process starches are externally applied in a spray-dried coating creating an external physical barrier. This prevents the environmental chemical reactions with the vitamin molecule.
| 3. To determine the effect of storage in ambient and stressed conditions with temperature and humidity on vitamin A, D, E and B1 retention in pet food. | Relying on the exterior coating as a transport vehicle, a protein-based coating is then applied and heated to bind the coating. This ensures the survivability through food processing, but retains its ability to maintain bioavailability. This technology is not exempt from the harsh conditions of the hammer mill, but the sacrifice compared to the raw counterpart outweighs the additional cost of the gelatin beadlet (DSM, Delivery systems).

Vitamin companies conducted retention and sacrifice studies in the 1990’s and 2000’s, and published tables to provide formulators with estimates regarding fortification supplements. However, the basis supports for these guidelines were never published. While an issue in and of itself, modern pet food and processes have changed since these times. The contents of these assumptions may not still be valid therefore there is knowledge needed to fill the gaps. |
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<td>Recent Publications: None</td>
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