Vitamin Losses in Processing and Storage – What Do We Know?

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Vitamins are a group of organic compounds that are essential for life. They are involved in every major metabolic pathway in the body. Pets, such as dogs and cats, cannot produce vitamins or produce enough vitamins to meet their needs. They must obtain vitamins through their diets. A pet needs only a small amount of a vitamin each day, but insufficient intake of a vitamin can cause abnormal metabolism and even death if the deficiency persists for too long.

Natural food and feed ingredients contain vitamins. However, the levels of vitamins in these ingredients vary significantly depending on the conditions under which the ingredients are obtained. Vitamins naturally occurring in ingredients are generally unstable during pet food process, such as extrusion, baking, or retort, and during long time of storage. To ensure an adequate amount of vitamins in pet foods at the end of shelf life, commercial pet foods are typically supplemented with vitamins.

Most of the biologically active forms of vitamins are unstable and prone to damaging factors such as oxidation, heat, pressure, moisture, light, pH, etc. Commercial vitamins for pet food supplementation are highly processed. They are in various forms to achieve good stability, bioavailability, and handling properties. Vitamin product forms have been developed by modifying vitamins chemically and physically. The modifications include, but are not limited to, vitamin derivatization, coating, adsorption, spay drying, crosslinking, and encapsulation. These vitamin products can be in liquid, powder, and water or fat soluble/dispersible forms. Each form is designed for specific applications and could have different stability under various conditions. The quality of vitamins from different suppliers can be different because of different technologies and processes used by the suppliers.

Vitamin premix is widely used in pet food industry to ensure high quality nutrition of pet foods. It is cost effective and user friendly in modern commercial pet food production. Extrusion and retort are the most commonly used processes for commercial pet food production. Vitamin loss could occur in every step, from the manufacture and storage of the vitamin premix, during the pet food process and storage, to the time when a pet consumes the pet food.

Limited data is available on the stability of commercial vitamins during pet food production and storage. The effect of various processing conditions on vitamin stability during extrusion, retort, and storage will be discussed. Recently, the effect of screw speed and drying temperature during extrusion as well as pet food pH, acidifiers, meat type, and retort time in canned pet food production on vitamin stability were investigated. The new study data will be presented and discussed.