BioAnalyt

Rapid Measurement of **Vitamin A** in Pet Food with iCheck

November 2025

What is the Role of Vitamin A in Pets?

Vitamin A is a fat-soluble micronutrient that plays multiple key roles in dogs and cats: it supports normal vision (especially night vision), maintains the integrity of epithelial tissues (skin, respiratory and gastrointestinal tracts), supports immune function, and contributes to reproduction and growth. It can be obtained either as preformed vitamin A (retinol and retinyl esters) from animal sources or as β-carotene, a plant-derived pigment that acts as a provitamin A. β-carotene is converted into vitamin A inside the body - although importantly, cats cannot convert β-carotene efficiently and must obtain vitamin A from meat and animal byproducts. When vitamin A is insufficient, epithelial surfaces can degenerate, immune competence declines, and reproductive performance may suffer. On the flip side, excessive vitamin A can be toxic, leading to skeletal lesions, bone deformities, and liver damage.

What are the main sources of vitamin A for pets?
The main sources of vitamin A for dogs and cats are animal-derived foods that contain preformed retinols and retinyl esters - especially liver from various species (beef, pork, chicken, etc.). Liver is among the richest natural sources of vitamin A and is widely used in pet food formulations as in addition to vitamin A it a very rich source of other vitamins and minerals critical for pet's health. The vitamin A content in liver, however, is highly variable. For example, beef liver can contain 53,000-866,000 IU (International Unit)/kg, pork liver 216,000-630,000 IU/kg, and chicken liver 53,000-553,000 IU/kg. The levels can sometimes also be much higher, as in the case of liver sourced from a sau. Because of this variability, pet food manufacturers often add vitamin A through a premix to ensure consistent intake.

What is the optimal level of vitamin A in pets?
For complete and balanced pet foods, industry guidance provides minimum recommended levels. According to the Association of American Feed Control Officials (AAFCO) nutrient profiles, for adult maintenance dog food the minimum is ~5,000 IU vitamin A per kg of diet on a dry matter basis. For cat food, AAFCO gives minimums of 3,332 IU/kg (adult maintenance) and 6,668 IU/kg (growth/reproduction). Similarly, the European Pet Food Industry Federation (FEDIAF) guidelines list minimum and maximum levels for vitamin A in complete dog and cat foods.

In practice, manufacturers often formulate a safe margin above the minimum, and the upper safe limits in diets are reported as up to ~250,000 IU/kg for dogs and ~333,300 IU/kg for cats.

If vitamin A levels are too low: *Pets may suffer from night blindness, poor skin and coat health, impaired immunity, slowed growth, and reproductive failure. Because vitamin A is critical for epithelial and immune functions, deficiency manifests in multiple body systems.*

If vitamin A levels are too high (toxicity): *Over-supplementation or naturally very high input from ingredients (e.g., liver) can cause skeletal abnormalities, particularly in growing animals, liver damage, secondary nutritional imbalances, and even bone demineralisation.*

Shastak, Y., & Pelletier, W. (2024). *Pet Wellness and Vitamin A: A Narrative Overview.* Animals 14(7):1000. https://www.mdpi.com/2076-2615/14/7/1000
FEDIAF (2024). *FEDIAF Nutritional Guidelines for Complete and Complementary Pet Food for Cats and Dogs.* https://europeanpetfood.org/our-resources/

How it works

Quality Control of Vitamin A in Pet Food Production with iCheck Fluoro

Ensuring optimal and consistent vitamin A levels in pet food production is challenging due to large natural variability in liver - the primary source of vitamin A - across species, suppliers, regions, and individual animals. This variability, combined with processing-related vitamin A losses during heating and storage, makes it difficult for manufacturers to predict the final nutrient profile without frequent testing. Traditional laboratory methods such as HPLC offer high accuracy but are slow, costly, and impractical for rapid decision-making when screening incoming raw materials. As a result, pet food producers face the risk of receiving liver batches with unexpectedly high vitamin A concentrations, which cannot be safely diluted and must be rejected to comply with nutritional standards and avoid toxicity.

BioAnalyt's iCheck Fluoro addresses these challenges by enabling rapid, on-site measurement of vitamin A in raw and autoclaved liver, delivering quantitative results within minutes. This allows quality teams to identify out-of-spec materials before they enter production, adjust premix levels more precisely, and maintain tighter control over batch-to-batch variation. The system is easy to implement, cost-effective, and validated against HPLC. By providing fast, reliable vitamin A data directly at the factory or supplier level, iCheck Fluoro strengthens traceability, reduces the risk of nutritional imbalances, and supports safe, consistent pet food production.

What Is iCheck Fluoro?

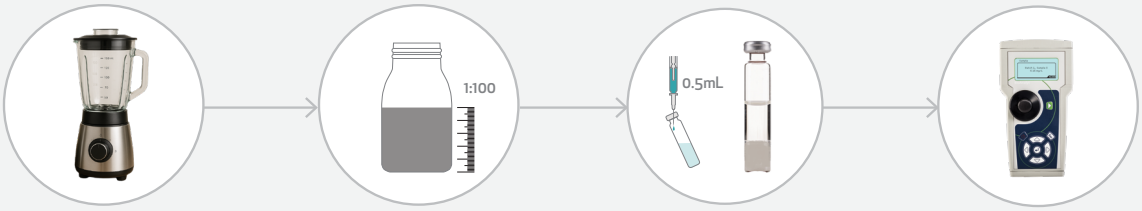
Measurement Device

iCheck Fluoro is a device that measures autofluorescence of vitamin A in the sample and converts it to vitamin A concentration in micrograms retinyl equivalents per liter (µg RE/L). The device comes in a case with all necessary accessories and have a 2 year warranty.

Consumables

Ready-to-use iCheck Fluoro reagent vials come in a Test Kit box, containing 100 reagent vials for 100 analyses. The consumables have a 12-month shelf-life at room temperature.

VITAMIN A MEASUREMENT WITH ICHECK FLUORO



Homogenize your liver sample in kitchen blender until uniform paste.

Dilute your liver paste in distilled or bottled water 1:100 times.

Inject diluted liver sample into iCheck Fluoro reagent vial and proceed with measurement following iCheck Fluoro User Manual.

Multiply the result displayed on iCheck Fluoro with dilution factor to get the concentration of vitamin A in **µg RE/L of liver paste**.

Go to https://www.bioanalyt.com/product/fluoro/ to get detailed protocol for measuring vitamin A in liver with iCheck Fluoro.

Contact us to get **detailed protocol and training**:

Email: support@bioanalyt.com
WhatsApp: +49 3328 35150034

Method comparison

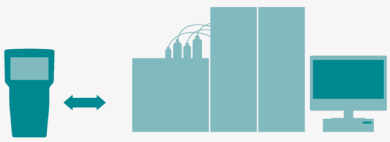
Results with iCheck Fluoro are Comparable to those with the Reference Method

To ensure reliability and accuracy of measurements, results obtained with iCheck devices are compared to expected concentrations in spiked samples and/or traditional laboratory methodologies. Vitamin A in liver samples from different species were measured with both iCheck Fluoro and traditional laboratory methods using HPLC (High Performance Liquid Chromatography). The results are listed in table below and are comparable.

Sample Type	iCheck Fluoro [IU/kg]	Coefficient of variation of iCheck	HPLC [IU/kg]*	Recovery: iCheck Fluoro vs. HPLC
Beef liver	870,000	4%	720,000	121%
Pork liver	446,666	10%	393,333	114%
Chicken liver	316,666	13%	313,333	101%

*The CV of HPLC method was reported to be below 10%.

Benefits of iCheck



- **Speed:** Results in 5 to 60 minutes.
- **Economy:** Cost is only 10% of conventional lab methods.
- **Easy implementation:** Only 1 day of training is required.
- **Scalability:** Portable, with no set-up calibration required.
- **Accuracy:** Performance is comparable to reference lab methods.

iChecks are manufactured in Germany, used in over 80 countries and validated against standard laboratory methods. Learn more at www.bioanalyt.com/products.

measure for life

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