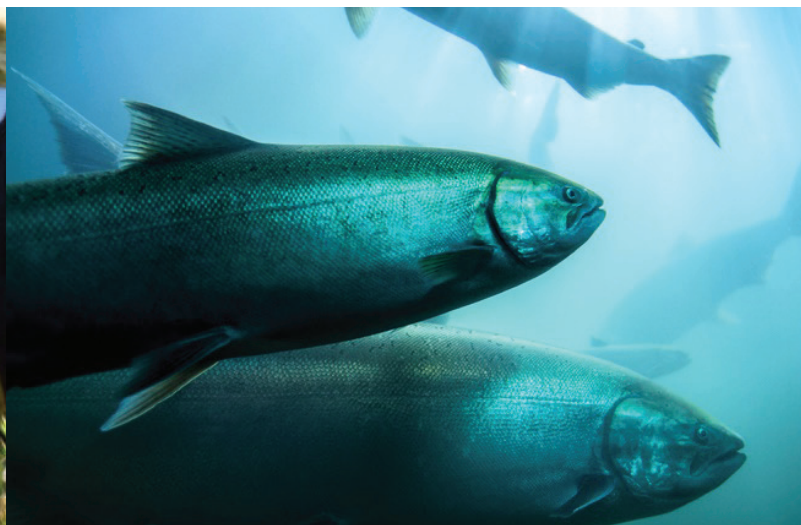




BioAnalyt

Precision Nutrition for Animals with Rapid Measurement of **Vitamin E**, **Vitamin A** and **β -Carotene** Directly On the Farm



July 2019

Effective Control of **Vitamin E**, **Vitamin A** and **β-Carotene** On the Farm with iCheck

iChecks enable direct, on-farm measurement of nutrient levels in blood and tissue samples in minutes, so that animal feeds and supplementation schedules can be optimized for improved animal health and other desired outcomes.

DAIRY CATTLE

PRODUCTS

- **iCheck Vitamin E** to measure vitamin E levels in cattle blood.
- **iCheck Carotene** to measure β-carotene levels in cattle blood.

BENEFITS

✓ Optimized Fertility

Reproductive disorders resulting from β-carotene deficiency bear significant costs for cattle breeders. These disorders account for ¼ - ½ of all herd culling. The majority of basic feedstuff for dairy cows is low in β-carotene. Maintaining high levels of blood β-carotene (>3.5 mg/L) in the immediate pre-calving period significantly improves fertility rates.^{1,2,3}

✓ Increased Milk Production

Vitamin E and selenium improve lactation and milk yield. Although vitamin E is abundant in whole cereal grains, particularly in the germ, it is extremely variable in common feeds. Blood levels of vitamin E also drop significantly around calving too, requiring close control and supplementation.^{1,2,3}

✓ Improved Disease Resistance

Mastitis is an inflammation of the mammary glands and udder tissues and is a major endemic disease of dairy cattle. Cows with low plasma vitamin E (<3 mg/L) levels before calving have a 9x higher probability of clinical mastitis compared to cows with an acceptable blood or plasma level. Higher dietary vitamin E levels are recommended for transition and lactating cows to maintain an optimum immune response.^{1,2,3}



POULTRY AND EGGS

PRODUCTS

- **iCheck Carotene** to measure total carotenoids in egg yolk.
- **iCheck Vitamin E** to measure vitamin E levels in poultry blood.

BENEFITS

✓ Optimized Egg Yolk Color

Carotenoids are added to poultry feed to enhance pigmentation and promote health as an antioxidant. The coloration of egg yolk can be predicted and controlled through the carotenoid content of poultry feed. Controlling this color is important, as varying colors are favored in each community and serve as a consumer determinant of quality.⁴

✓ Improved Disease Resistance

Vitamin E supports strong immune systems and is vital in modern poultry production. By acting as an antioxidant, vitamin E can boost immune function, supporting optimal growth rates and reducing mortality. The result is increased returns and healthier poultry. Carotenoids are also being investigated for their contribution to poultry health as indicators of disease onset.⁵



1. Herdt T.H. et al. Fat-soluble vitamin nutrition for dairy cattle. Vet Clin North Am Food Anim Pract. 7(2): 391-415, July 1991.

2. Rapid Measurement of Vitamin E and β-Carotene at Cow-Side with iCheck. White Paper, BioAnalyt, 2019.

3. Hosseini-Ghaffari M. et al. Rapid field-test for the quantification of vitamin E, β-carotene, and vitamin A in whole blood and plasma of dairy cattle. Technical note. J. of Dairy Sc. July 2019.

4. Hamelin C. et al. A European Survey on colour of egg products, Comparison of fast methods to check the colour. 2013.

5. https://www.dsm.com/markets/anh/en_US/Compendium/poultry.html

BEEF CATTLE

PRODUCTS

- **iCheck Fluoro** to measure vitamin A levels in cattle blood.
- **iCheck Carotene** to measure β -carotene levels in cattle blood.

BENEFITS

✓ Optimized Marbling of Beef

Marbling is a major factor affecting meat quality and thus profitability for beef producers, processors, retailers, and restaurateurs. Marbling quality is positively correlated with lower vitamin A levels in the blood, while vitamin A supplementation is used by farmers to boost immunity. Cattle farmers have a delicate balance to control. In the early stages of cattle fattening, vitamin A stimulates growth of fat cells. In the middle to late stages, vitamin A inhibits fat deposition. Therefore, feeding a vitamin A deficient diet during this stage stimulates marbling. For example, for Wagyu cattle starting at 19 months of age, and for the next 6-8 months, the recommended vitamin A concentration in blood is 30-50 IU/100 mL.

In order to ensure healthy cattle and high meat quality, vitamin A must be closely controlled at every stage of the cattle's development.

β -carotene levels (as the precursor of vitamin A) should be kept low to avoid yellow-coloring of the marbled fat, as well as to prevent it from being a source of excess vitamin A.⁶



SALMON

PRODUCTS

- **iCheck Carotene** to measure carotenoids in salmon flesh.

BENEFITS

✓ Optimized Flesh Color

Consumers prefer a pink-colored salmon flesh, which is found in wild salmon. The pink color is due to the accumulation of dietary carotenoids, especially astaxanthin. Adding astaxanthin to the feed of farmed salmon changes the color of the normally grey flesh of farmed salmon to pink.⁷



PET FOOD

PRODUCTS

- **iCheck Fluoro** to measure vitamin A levels in pet food ingredients (e.g. liver).

BENEFITS

✓ Reduction of Risk of Product Non-Compliance

Pork liver is a preferred component of pet food based on its low cost and taste. Pork liver is rich in vitamin A, a micronutrient critical to pet health and strictly regulated. Levels of vitamin A in pork livers vary greatly, creating a challenge for pet food producers requiring strict controls as high levels of vitamin A can be toxic to pets.^{8,9}



6. Pickworth C.L. et al. Effects of timing and duration of dietary vitamin A reduction on carcass quality of finishing beef cattle. J Anim Sci. 90(8):2677-91, August 2012.

7. Anderson S. Salmon Color and the Consumer. IFET 2000 Proceedings. Hoffmann-La Roche Limited, Cambridge, Ontario, Canada. 2000.

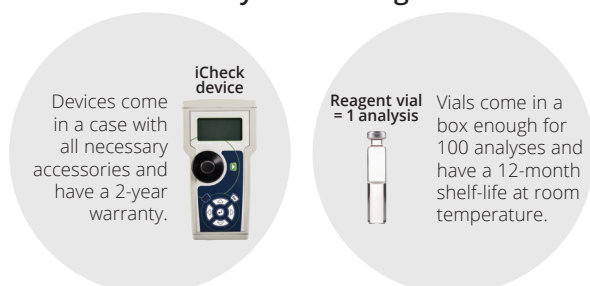
8. <https://vcahospitals.com/know-your-pet/vitamin-a-toxicosis-in-dogs>

9. https://www.dsm.com/markets/anh/en_US/Compendium/companion_animals/vitamin_A.html

iChecks are Portable Devices with All-Inclusive Test Kits that Deliver Results in Minutes

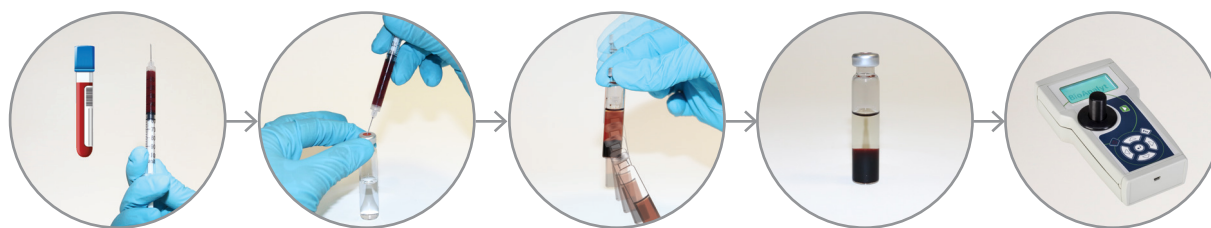
OUR TECHNOLOGY

iCheck consists of 2 parts: a measurement device and a ready-to-use reagent vial.



iCheck Vitamin E and iCheck Fluoro (for vitamin A) are both portable, single-wavelength fluorometers and iCheck Carotene is a portable, single-wavelength photometer. All are pre-calibrated for the quantitative measurement of vitamin A (as retinol), vitamin E, and β -carotene in animal blood and tissue samples.

HOW DOES IT WORK?



Collect whole blood and take it up in a syringe provided with your Test Kit.

Inject the blood into iCheck Reagent vial.

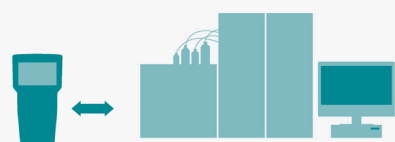
Shake the Reagent Vial vigorously for a minimum of 10 seconds.

Let the Reagent Vial stand for a minimum of 5 minutes for vitamin extraction and phase separation.

Insert the Reagent Vial into your iCheck device and measure. Result is displayed in seconds.

Sample Preparation: Whole blood needs no sample preparation. Egg and salmon samples must be pretreated before injection. Sample Preparation Kits for salmon and egg are provided for a small fee. Liver samples must be homogenized.

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

For orders, technical assistance, or any other inquiries contact BioAnalyt at: contact@bioanalyt.com • +(49) 33 28 35 15 000 • www.bioanalyt.com

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