



BioAnalyt

Innovative method for Vitamin Analysis at point of production





Bringing quality control to the production line

Implementing a system for quality control of raw materials and products at the production line facilitates improvement in product quality and consistency while maximizing throughput. This is especially true for the analysis of vitamins A and D, which are costly and where addition of the right levels is critical but challenging. Insufficient levels of vitamins can impede child development and significant overdoses can lead to serious toxicities. For a producer, if a finished product does not meet specifications, an entire batch may need to be discarded, leading to significant costs.

Traditional, laboratory-based quality control methods add substantial costs and delays to a process already operating with thin margins. Until now, the main laboratory method for vitamin analysis in dairy products with dependable accuracy has been high performance liquid chromatography (HPLC). Semi-quantitative methods have been developed for vitamin detection in premix and milk. However these methods are time-consuming, bound to a laboratory setting and often do not deliver the accuracy needed.



Promising to change all of this is a new method that employs fluorometric determination of vitamin A, **iCheck Fluoro**. It is an all-inclusive, portable test kit designed specifically to deliver **lab-quality vitamin analyses** at the production line.



An innovative method for vitamin analysis

iCheck Fluoro is a portable fluoro-photometer specifically developed for the quantitative measurement of vitamin A in food. It comes with pre-filled reagent vials, that serve as 2-in-1 disposable extraction vials and cuvettes. The reagent vials contain a patented mixture of reagents developed to efficiently extract vitamin A from the sample. The iCheck device displays the exact vitamin A concentration in micrograms retinol equivalents per liter ($\mu\text{g RE/L}$) so no additional calculation is needed.



Liquid milk or milk powder diluted with water

Liquid sample is injected with a provided applicator into the reagent vial for vitamin A extraction

iCheck Fluoro detects the fluorescence of vitamin A in the vial upon excitation with UV light and calculates the exact vitamin A content

TECHNICAL DATA

Analyte	Retinyl palmitate , retinyl acetate, and retinol
Sample type	Milk, milk powder, sugar, biological fluids, flour, processed foods and vitamin premix.
Sample preparation	Dilution and homogenization in water for solids
Analysis method	Fluorometric
Sample volume per analysis	500 μL (0.5 mL)
Linear range	50 - 3000 μg retinol equivalents (RE)/L
Time per analysis	10 minutes
Variation	5%
Method comparison	Validated against reference method HPLC
Staff qualification	1 day training
Weight	0.45 kg
Dimensions	11 x 4 x 20 cm (W x H x L)



Enabling QC at every step of the value chain

Analysis with iCheck Fluoro can be performed directly on the sample, with little or no sample preparation and used for immediate results anywhere along the value chain.

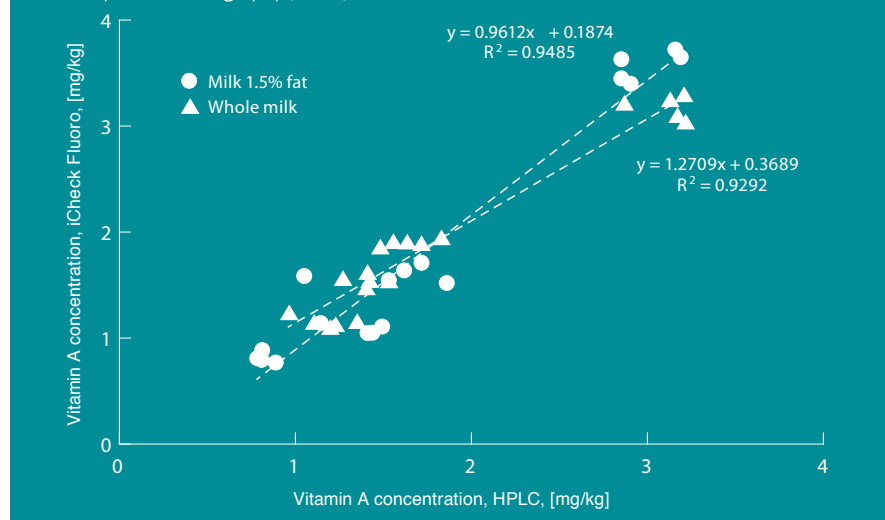




Lab level accuracy in minutes and at 10% of lab costs

The method comparison of iCheck Fluoro with the standard reference method of HPLC demonstrates **excellent correlation**¹ ($R^2 > 0.9$). The method has been **validated internally and externally** with results published in scientific peer-reviewed journals.

Figure 1: Linear regression between vitamin A quantification in milk obtained with high-performance liquid chromatography (HPLC) and iCheck Fluoro



- ✓ iCheck Fluoro delivers the **result in under 10 minutes** vs. hours with traditional lab methods, or days if the samples must be shipped to external lab.
- ✓ The iCheck device and running costs for reagent vials are **10% of the costs** incurred with traditional methods taking into account equipment and personnel costs.

¹: Assessment of a portable device to quantify vitamin A in fortified foods (flour, sugar, and milk) for quality control. A. Lailou et al. Food and Nutrition Bulletin, 35(4), 2014.

Ensuring the final product always meets specifications

For a producer, out-of-specification results for a finished product can mean discarding an entire batch and significant costs. Controlling that vitamin levels are on target during production greatly reduces this risk.



Liquid and Powdered Milk

Dairy producers can use iCheck Fluoro along the value chain for quality testing of raw milk as it is received, particularly to determine intrinsic Vitamin A content in order to adjust dosing levels and save costs.



Infant Formula Base

The right levels of vitamins are critical for health, yet too high levels can be toxic, especially for infants. Our customers use iCheck to ensure the vitamin blends are being added at the right levels during production, to enable immediate correction, thus reducing risk.



Nutrition Facts	Amount/Serving	%DV*	Amount/Serving	%DV*
	Serv. Size 1 cup (240mL) Calories 130 Calories from Fat 45 <small>*Percent Daily Values (DV) are based on a 2,000 calorie diet</small>	Total Fat 5g	8%	Potassium 400mg
Sat. Fat 3g		15%	Total Carb. 13g	4%
Trans Fat 0g		0%	Fiber 0g	0%
Cholest. 20mg		7%	Sugars 12g	
Sodium 130mg		5%	Protein 8g	
Vitamin A 10% • Vitamin C 2% • Calcium 30% • Iron 0% • Vitamin D 25%				

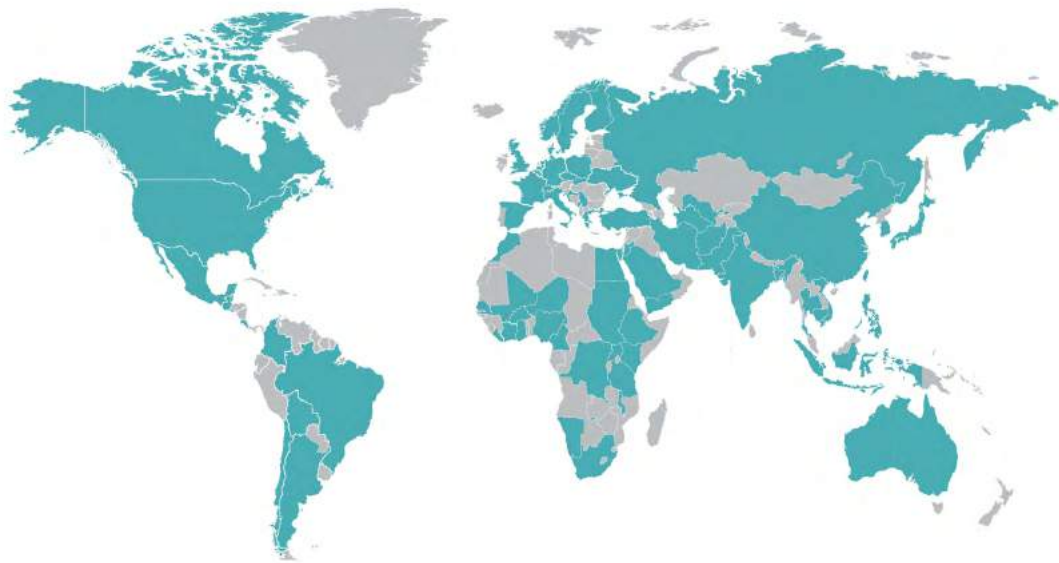
INGREDIENTS: REDUCED FAT MILK VITAMIN A PALMITATE VITAMIN D



BioAnalyt

BioAnalyt is a product innovator of nutrient test kits. We empower companies and organizations in over **80 countries** around the world with tools to ensure food quality and safety. Our team of expert scientists help global food and ingredient producers, research institutes and food testing laboratories to lower nutrient testing costs.

Apart from **vitamin A in dairy products**, our products can also measure vitamin A in edible oil, iron, iodine, zinc and total carotenoids in foods and beverages.



● Countries using iCheck

Our technology has won **five innovation awards**, the latest being Deloitte Technology Fast 50 2015 and has been published in peer-reviewed journals. Our products are manufactured in Germany meeting international quality standards ISO 9001:2008 and calibration standards ISO 17025. Each iCheck is further internally and externally validated to assure performance and accuracy of the results.



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