Asuryan

CHAUVIN ARNOUX
INDATECH

Biotech Pharma Agri-food

Detection and quantification of vitamins in solution

Blends and active pharmaceutical ingredients which are complex and sometimes of very different compositions…
But how can you analyze those blends quickly and reliably?

Complex blends and formulations

Vitamins are essential elements for our bodies which are present in many areas of industry (agri-food, biotechnology, pharmacy, etc.).

In the pharmaceutical industry, they are often combined with formulations containing active pharmaceutical ingredients to achieve optimum efficacy.

The regulations require compliance with the stated concentration of the active ingredient and homogeneity within the product, even at very low concentrations.

Precise quantification of the various products of interest is therefore essential.

Goals

To formulate a complex active pharmaceutical ingredient, you need to know and precisely quantify the various agents. Vitamins are present in different forms and in small amounts..

The goal for the customer?

Their end-product was based on a formulation combining three vitamins (B12, caffeine and nicotinic acid).

They needed to implement precise in-line measurement for low concentrations in order to guarantee the end-quality of the formulation.

How?

The chemical molecules used in industry have properties which can be exploited by our technology:

- Presentation of the specific structures of the vitamins (their electronic activity can be monitored in UV at around 280 nm)
- Rise of functional groups with high activity (even at low concentrations)
- Advantage of processing the spectra in order to isolate each of the constituents of the blends analyzed

Complex blends can now be analyzed using a multi-channel UV spectrometry system: **our Asuryan solution!**

Qualification and quantification of vitamins in a blend in solution

The quantification model was set up on the basis of a blending plan involving the 3 products of interest at low concentration (between 0.1 mg/mL and 0.001 mg/mL). For greater flexibility, two sensors with two different optical trajectories were used simultaneously.

Figure 1 presents the blending plan used to generate the model on the basis of the production conditions, but also outside the quality criteria.

Figures 2 and 3 show the spectra measured with each of the sensors.

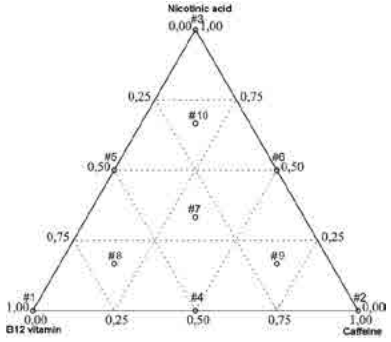

Figure 1: Blending plan for the 3 products under consideration

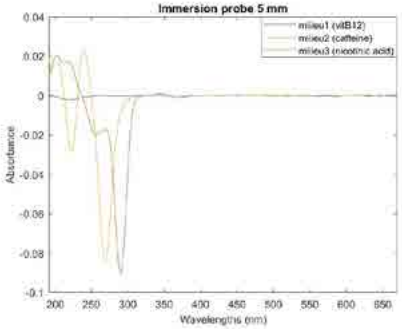

Figure 2: Preprocessed spectra of media 1, 2 and 3 in the blending plan, optical trajectory 5 mm

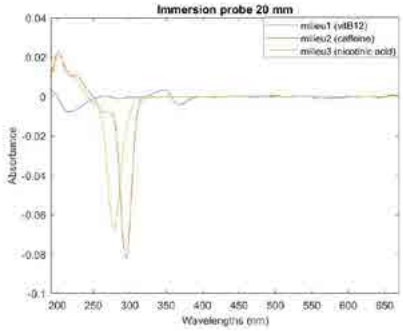

Figure 3: Preprocessed spectra of media 1, 2 and 3 in the blending plan, optical trajectory 20 mm

The solution proposed by Indatech enabled the customer to set up in-line testing and automate their process.

Indeed, as shown by the table in Figure 4, the predictions made in just a few milliseconds by Asuryan are close to the measurements made in the laboratory, which took several hours.

Optical trajectory	20 mm		5 mm			
Vitamin	VitB 12		Caffeine		Nicotinic acid	
Variable (mg/mL)	Reference	Prediction	Reference	Prediction	Reference	Prediction
Media 7	1.00E-03	1.05E-03	2.00E-01	2.07E-01	8.00E-02	6.35E-02
Media 8	1.50E-03	1.58E-03	7.50E-02	8.07E-02	9.00E-02	9.59E-02
Media 9	1.13E-03	1.05E-03	3.00E-01	2.99E-01	3.00E-02	5.44E-02
Media 10	3.75E-04	4.11E-04	2.25E-01	2.19E-01	1.20E-01	1.29E-01

Figure 4: References and predictions of the products of interest in the blends

Advantages of Asuryan

Asuryan's versatility offers sensitivity and measurement accuracy covering diverse products and concentrations thanks to its adaptability.

- Differential optical trajectory (by using several sensors simultaneously)
- Repeatability over time
- Possibilities for measurements at several points simultaneously (continuous processes)

Asuryan: a system for prediction of several products of interest within a complex blend and quick, reliable measurement by means of chemometrics

INDATECH's teams will be delighted to answer any questions you may have by telephone: +33 4 80 78 01 40.

9062211649 - Ed.1 - 04/2021 - LC - Non-contractual document

CA INDATECH
4, rue Georges BESSE - 34 830 Clapiers - France
Tél. : +33 4 80 78 01 40
sales@indatech.eu | **www.indatech.eu**

CHAUVIN ARNOUX
INDATECH