
N/Protein Determination in Probiotic Drink according to the Dumas method (He/Ar as Carrier)

Reference: **UNI EN ISO 14891**, **FIL-IDF 185**, 2002 "Milk and milk products - Determination of nitrogen content - Routine method using combustion according to the Dumas principle"

Tested with **VELP Scientifica NDA 702 Dual Carrier Gas Dumas Nitrogen Analyzer** (Code F30800080)



Introduction

After years of increasing prices and supply chain interruptions, obtaining Helium, the conventional carrier gas for elemental analyzers, has become more and more difficult and expensive, especially in some countries. The desire to replace Helium with a more easily accessible carrier gas has intensified and become now reality with NDA 702, where it is possible to switch from Helium to Argon as carrier gas at any time.

People are looking for quick easy ways to add healthy products to their diets. The live active cultures contained in probiotic rich products can restore the good bacteria a digestive system disrupted by poor food choices, illness, or use of antibiotics. They work by strengthening the immune system and restoring good bacteria in the digestive system depleted by poor diet choices or use of antibiotics. Any probiotic foods and drinks can be a great addition to a healthy diet. The digestive benefits along with the immune system boost makes consuming probiotic products an excellent choice for overall health improvement.

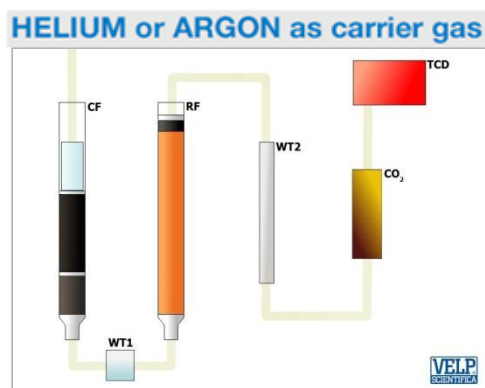
Protein Determination in Probiotic Drink

The Dumas method starts with a combustion furnace (CF) to burn the sample, obtaining elemental compounds.

Water is removed by a first physical trap (WT1 - **DriStep™**), placed after the combustion, and a second chemical one (WT2). Between the two, the elemental substances passed through a reduction furnace (RF).

The auto-regenerative CO₂ adsorbers (CO₂) let pass only the elemental nitrogen that is detected by the **LoGas™** innovative Thermal Conductivity Detector (TCD) with no requirement for a reference gas.

The NDA 702 is controlled through the intuitive **DUMASoft™**.



NDA 702 Preliminary Operations (daily)

Follow the operating manual to start the NDA 702 and check that the following parameters are set:

Temperature Combustion reactor (Code A00000158): 1030 °C

Temperature Reduction reactor (Code A00000226): 650 °C

Flow rate MFC1 Carrier gas (He/Ar): 190 ml/min

Flow rate MFC2 Carrier gas (He/Ar): 220 ml/min

Condition the system by testing 2 EDTA standard (Code A00000149) and 3 to 5 empty tin foils (Code A00000153) as Check up.

Verify the calibration curve with one or more tests as Standard by testing the same standard used for the curve creation.

Sample Preparation

Put into the tin foil 70-80 mg of Chromosorb (Code A00000148).

Fill the tin foil with around 200 mg of liquid probiotic milk (~ 200 µl) with an accuracy of 0.1 mg, taken under stirring.

Close the tin foil, obtaining a capsule and load the capsule into the autosampler.

Analysis Procedure

Fill the following fields in the database: **Sample name, Weight, Method, Sample type, Calibration number**

The dedicated method "MILK CONDENSED" shows the following parameters:

Protein factor: 6.38

O₂ flow rate: 300 ml/min

O₂ factor: 1.0 ml/mg

Press  to start the analysis.

Analysis time: from 3 minutes for one run.

Typical Results on Probiotic Drink

The obtained results are in accordance with the expected value. Results have been obtained with the following calibration curve: in a range of 0 - 5.9 mg N with 5 measurements of EDTA standard (N% = 9.57) (Code A00000149). The data obtained are included in the tolerance admitted by the EDTA certificate.

HELIUM as Carrier Gas		ARGON as Carrier Gas	
Sample quantity (mg)	Protein %	Sample quantity (mg)	Protein %
194.63	1.410	215.89	1.359
223.27	1.372	212.73	1.378
207.69	1.365	225.85	1.391
216.02	1.391	221.00	1.423
236.64	1.410	205.39	1.397
218.21	1.365	222.01	1.378
227.45	1.372	213.20	1.359
Average ± SD	1.386 ± 0.019		1.384 ± 0.023
RSD% *	1.381		1.629

Protein Expected Value: 1.3 %

Protein Factor: 6.38

RSD% = (Standard Deviation * 100) / Average

Conclusion

Results are extremely reliable and reproducible, as demonstrated by the RSD, by using helium and argon as carrier gas, with the same conditions (method and sample weight) since the goal is to obtain < 2.0% relative standard deviation, as requested by official methods.

Helium remains the best choice for premium accuracy but its shortages and interruptions are affecting any related product or instrument, including elemental analyzers. Argon, the best alternative available, has demonstrated to be a valid substitute, ensuring optimal results. VELP Scientifica NDA 702 Dual Carrier Gas Dumas Nitrogen Analyzer is the perfect response to simple, fast and precise nitrogen/protein determination, both with Helium and Argon as carrier gas.