DYAD LABS

CAPABILITIES OVERVIEW

INTRODUCTION

Dyad Labs offers comprehensive testing solutions for the Dietary Supplement and Food & Beverage industries. As a full-service, ISO/IEC 17025 accredited, third-party contract laboratory, we provide services to multinational brands through the entire supply chain including: raw material suppliers, contract manufacturers, brand manufacturers and retail brand owners.

We utilize robust and accurate methods specifically designed for assay analysis of complex matrix samples by Ultra Performance Liquid Chromatography (UPLC), Gas Chromatography (GC), and specialized Mass Spec (LC-MS/MS and GC-MS/MS). We also offer trace metal and mineral testing services by Inductively Coupled Plasma Mass Spectroscopy (ICP-MS) and Direct Mercury Analyzer (DMA) as well as possess a vast Fourier Transform Infrared Spectroscopy (FTIR) identity testing library, and much more.

We partner with our customers to provide the highest quality, fastest turn-around times available. Together, we are Dyad.

> "With more than a decade of serving the nutraceutical industry, we provide a valuable element to your supply chain and quality control program.

3 STAGES OF WHERE DYAD CAN BE A PART OF YOUR QUALITY CONTROL PROGRAM

1. Raw Materials

***Verify Suppliers C of A

TESTING METHODS OFFERED	IDENTITY	PURITY	STRENGTH
	FTIR	Microbials	Assay/Analytical
	Assay/Analytical	Allergens	LC/GC
	Wet ID	ICP-MS	
		Elemental/Toxicity	
		Pesticides/Residual Solvents	
		UPLC, LC-MS/MS, GC, GC-MS/MS	

2. Finished Product Testing

*** Verify Label Claim of Product
LC = Liquid Chromatography

TESTING METHODS OFFERED	PURITY	STRENGTH	COMPOSITION
	Microbials	Assay/Analytical	Assay/Analytical
	Elemental/Toxicity	LC	LC
	Allergens	GC	GC
	LC		
	UPLC, LC-MS/MS, GC		

3. Stability Testing

Enables Manufacturers to establish Expiration date of Product

*** New products encouraged to have at least 6m of data

TESTING METHODS OFFERED	ACCELERATED STABILITY		REAL TIME STABILITY	
	STRENGTH	PURITY	STRENGTH	PURITY
	Analytical	Microbials	Assay/Analytical	Pesticides/Residual Solvents
	LC	Elemental/Toxicity	LC	GC-MS
	GC	ICP-MS, LC-MS/MS	GC	Microbials
		Pesticides/Residual Solvents		
		GC		

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Capabilities – Chromatography

POTENCY TESTING VIA LIQUID CHROMATOGRAPHY

Verification of potency claims by liquid chromatography is a technique in analytical chemistry used to separate, identify, and quantify each component in a mixture. Dyad Labs utilizes compendial methods, AOAC validated test methods and analytical methods developed by Dyad through its years of experience in product testing.

ULTRA-HIGH PERFORMANCE LIQUID CHROMATOGRAPHY

Ultra-high performance liquid chromatography (UPLC) has evolved from high performance liquid chromatography (HPLC). Both techniques involve liquid chromatography used to separate the components from mixtures. UPLC differs from HPLC because smaller particle size columns are used. With smaller-particles sizes, there is increased pressure and the instrumentation itself is designed to allow for that. Smaller particle sizes allow for increased chromatographic efficiency and therefore a better and more resolved separation of peaks. With narrower peak shapes, run time can be decreased. All nine of our chromatographic systems at Dyad utilize UPLC instead of HPLC. Assays that we conduct with UPLC/UV detection include:

- Amino acids
- Creatine and related compounds
- Water-soluble vitamins
- Organic acids
- Fat-soluble vitamins
- Alkaloids (already referenced in water soluble vitamin section)
- Caffeine, theophylline, theobromine, catechins, theacrine, BHB
- Curcuminoids, ginsenosides, resveratrol

LC-MS/MS

LC-MS/MS combines the separation of components using liquid chromatography with the detection specificity of mass spectrometry. With all of the matrices we analyze and the complexity of them, this is a powerful technique. Compared to HPLC & UPLC, LC-MS/MS's added specificity is especially critical in analysis of finished good with low concentrations of compounds, although raw materials can be analyzed just as well. Combined with the specificity, because of the added sensitivity, samples can be diluted relatively more than occurs using UV detection, thus allowing mitigation of sample matrix problems. Some of the assays we analyze on these instruments include:

- Protein identification (whey, casein, pea, soy, rice)
- Methyl and cyanocobalamin
- Melamine
- Low concentrated water-soluble vitamins
- Fat-soluble vitamins (Vitamins D2, D3, K1, and K2: menaquinone-4 and -7)
- Glyphosate / Herbicides

POTENCY AND CONTAMINANT TESTING VIA GAS CHROMATOGRAPHY

Verification of potency claims by Gas chromatography is a technique in analytical chemistry used to separate, identify, and quantify each component in a mixture. Dyad Labs utilizes compendial methods, AOAC validated test methods and analytical methods developed by Dyad through its years of experience in product testing.

- Fatty Acids including DHA & EPA
- Pesticides (USP 561)
- Residual Solvents

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Capabilities – Chemistry

PURITY TESTING VIA INORGANIC

For analysis of heavy metals and minerals, we have two Agilent 7700 ICP-MS systems (Inductively-coupled plasma mass spectrometry). The ICP source converts the atoms of the elements in the sample to ions by high temperature. These ions are then separated by their mass and detected by the mass spectrometer. This process is highly sensitive, allowing for analysis down to concentrations in the parts-per trillion for some ions. The technology is reproducible, even when analyzing trace metals. In addition, interference removal and matrix tolerance is a critical part of our approach, which allows us to analyze different sample types. As a result, our customers have an accurate measurement of results, including heavy metal contamination and mineral composition.

IDENTITY TESTING VIA GENERAL CHEMISTRY

We offer testing on more than 100 different compounds using more than 20 different types of testing. Dyad Labs' extensive intrumentation can handle all of your general chemistry needs.

Testing includes: FTIR (identification; primarily for raw materials) and wet chemistry identification

ASSAY / ANALYTICAL TESTING VIA GENERAL CHEMISTRY

- Proteins via nitrogen testing (Kjeldahl: Foss Kjeltec and Dumas: Leco TruMac)
- Mercury (using Milestone DMA-80)
- Fiber (Total Dietary Fiber using Ankom's Fiber Analyzer)
- Fat (using acid hydrolysis on Foss Hydrotec/Soxtec)
- Karl-Fischer
- pH
- Ash
- Specific gravity
- Viscosity
- Titrations
- Gluten and soy allergens
- Calories and carbohydrates

MICROBIOLOGY TESTING

No matter where materials and consumables fall into the supply chain, they are constantly being introduced to micro-organisms. Most microbes are harmless but there are some that can damage the human health, product quality, contaminate the environment and irreversibly change a product. Here at Dyad we offer the following Micrbobiology services.

For rapid microbiology testing, we use AOAC-approved Invisible Sentinel Veriflow technology for the detection of Salmonella, Listeria species and many more to come. This new platform utilizes PCR based technology with a much shorter turn-around-time (36-48 hours). Great for food companies who need to know if there products/raws/enviroment contains pathogens.

- Invisible Sentinel Veriflow Platform
- VWR Symphony (4)
- Biomerieux Smasher (2)
- Biomerieux Smasher XL
- Biomerieux Dilumat Expert Evo
- Biomerieux Tempo
- Rapid Micro - Three Day Screenings
  - E.coli (GL 424)
  - Salmonella (GL 465)

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Capabilities – Chemistry

NUTRITIONAL SUPPLEMENT PANEL *(Requires minimum of 100g of sample, Full Panel/NLEA)*

Test	Method	Notes
Total Fatty Acids	GC	Includes Saturated Fat, Trans Fat, Monounsaturated Fat, and Polyunsaturated Fat
Cholesterol	AOAC	
Carbohydrates	Calculation	Includes Ash and Loss on Drying
Dietary Fiber	AOAC 991.43	
Sugars	LC-MS/MS	
Protein	AOAC 2001.11	
Vitamin D	LC-MS/MS	
Sodium	AOAC 993.14	
Calcium	AOAC 993.14	
Potassium	AOAC 993.14	
Iron	AOAC 993.14	
Total Vitamin A	AOAC	
Ascorbic Acid	UPLC	
B Vitamins Package	UPLC	Includes Niacin, Pyridoxine, Thiamine, Riboflavin

STANDARD TURN AROUND TIMES

CHEMISTRY

4 Days or Less

- ICP-MS (Heavy Metals or Minerals)***

5 Days or less

- FTIR (2 Days)***
- Elisa (Soy or Gluten)***
- DMA (Mercury)***
- Wet ID***
- Protein (Nitrogen – Dumas or Kjeldahl)***

7 Days or less

- Liquid Chromatography
  - UPLC ***
  - LC MS/MS***
- Gas Chromatography
  - GC FID***
  - GC MS/MS***

****Indicates capability to rush*

MICROBIOLOGY

5-6 Days

- Micro Panel
- Rapid Micro 4 Days

3-4 Days

- Rapid Micro Panel
- 36 Hours Veriflow Method
  - Salmonella
  - Listeria

7 Days

- Total Probiotic Count

RUSH SURCHARGES

(Not available on all tests, surcharge rates will apply.)

Same Day — Please Call for Pricing
1 Day — 300% surcharge
2 Day — 200% surcharge
3 Day — 100% surcharge

Rushes are accepted on a case by case basis please contact clientservices@dyadlabs.com