




LABORATORY SERVICES

Customized technical services to support process- and application development.

 Our laboratory services are designed to complement inhouse capabilities of our clients and partners in each development phase of plant- derived active ingredients and their formulation.

A flexible set-up of modern equipment offers us the possibility to run parallel testing and screenings in small to medium throughput and contribute to a wide array of tasks required in the development of plant-derived products.

OUR SERVICES

- (preliminary) screening of plant libraries for bioactivity / target compounds
- screening for high-producing plant (cell) lines
- plant metabolomic studies
- manufacturing process development and optimization for active and functional ingredients (herbal extracts, pure phytochemicals)
- quality testing of plant material and active/ functional ingredients
- Other operations we are equipped for related to process and product development (solubility testing, kinetic studies,..)

CORE TECHNOLOGIES

Thin Layer Chromatography (TLC) is commonly known as a simple, quick, and inexpensive procedure that gives the chemist a quick answer as to how many components are in a mixture. In phytochemistry it is the standard technique used in the identity testing of plant raw materials, herbal extracts, plant compounds and their presence in formulations. It is widely applied in stability testing.

Following enhancements in process automation, development of novel adsorbents, high-resolution digital imaging techniques and efficient coupling possibilities with other analytical techniques have turned this simple chromatographic method into an extremely versatile and efficient – but still inexpensive analytical tool - **High performance thin layer chromatography (HPTLC)**.

Another central building block within our range of technologies is a highly productive set-up for sample preparation (cell disruption, extraction, purification, filtration), synthesis and pre-formulation based on **Adaptive Focused Acoustics (AFA)** and a **multifunctional synthesis platform**.

Additionally we are equipped for

- standard analytical technologies (UV-Vis spectroscopy, HPLC, KF Titration,..)
- pilot scale process development (pilot reactors and extractors) and
- cell culture (Orbital shakers, CO2 incubator,..) .

BIOACTIVITY & FUNCTIONALITY

QUALITY

PROCESS

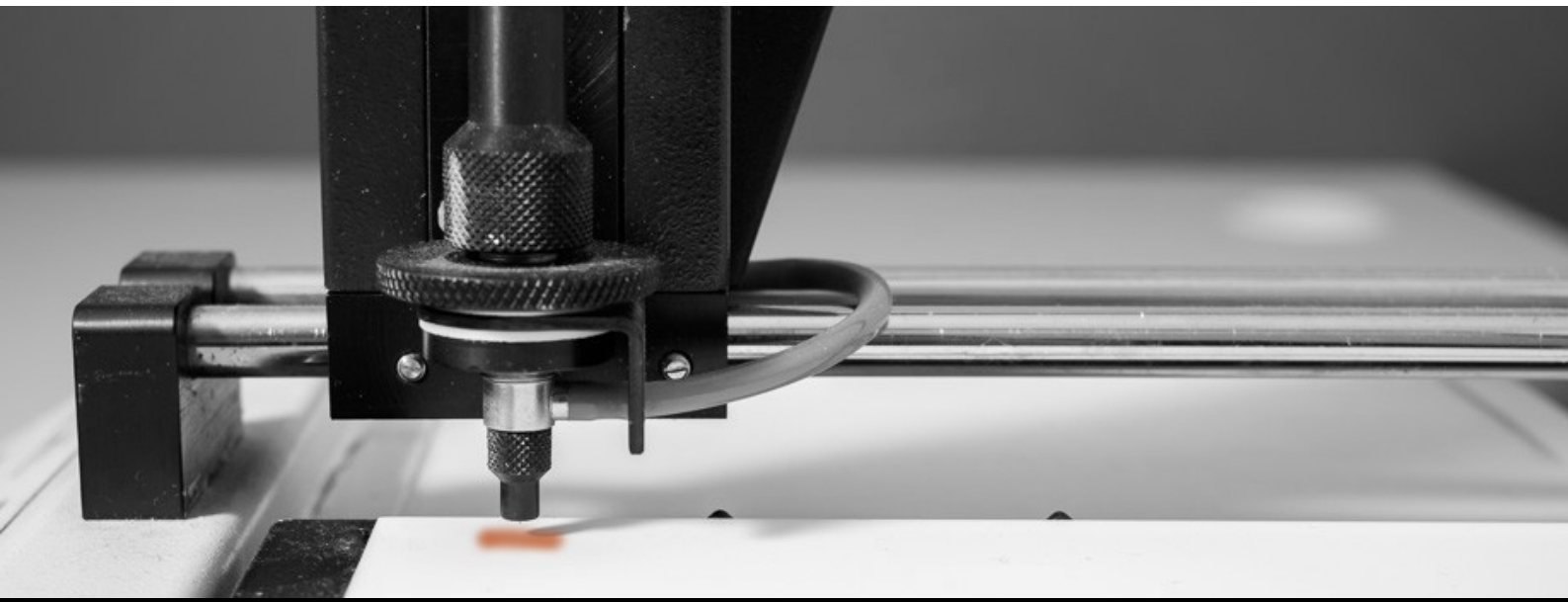
R&D

(PRE-)FORMULATION

METABOLOMICS

High performance thin layer chromatography (HPTLC)

	Equipment/ Method/ Applications
Sample Application	CAMAG Linomat: (Semi-)automated, precise application of defined sample volume and exact positioning on a wide range of adsorbents (from Silica, Cellulose to nanostructured or functionalized materials)
Seperation/ Development	Horizontal / Vertical Development Chambers, Automated Multiple Development (AMD): Chromatogram Development can be performed in an exceptionally economical, flexible and reproducible way in Horizontal Developing Chambers. Besides these isocratic development modes, our the AMD system allows a solvent gradient from polar to non-polar over several steps with intermediate drying
Derivatization	Automated chromatogram immersion system: An advantage of HPTLC is that fractions remain stored on the plate and can be derivatized after chromatographic development. This allows the <ul style="list-style-type: none"> • conversion of non-UV- light absorbing substances into detectable derivatives • improvement of the detectability (lowering detection limits) • detection of all sample components • selective detection of certain substances/ substance classes, e.g. associated to bioactivity such as Polyphenols, Alkaloids • Induction of fluourescence
Bioautography	Autoclavable dipping chambers, biological lab. (incubators,..): Besides postchromatographic derivatization, on-plate bioassays allow a direct identification of compounds of interest. We offer HPTLC- bioassays based on chemical scavengers such as DPPH, enzyme inhibition, as well as antifungal and antibacterial assays.
Documentation	High-Resolution digital imaging system (CAMAG Visualizer, visionCATS Software): allows a qualitative evaluation and comparison of chromatograms.
Quantitative Evaluation	CAMAG TLC Scanner: allows data acquisition over the entire spectral range from 190 to 900 nm with high spectral selectivity. Absorption spectra for substance identification and for selection of the most suitable measurement wavelength can be recorded within this range, allowing a quantitative determination. .
Sample Characterization*	HPTLC-Hyphenation with UV/Vis/FLD, MS, FTIR, NMR: Further characterization of compounds of interest can be efficiently performed directly from the HPTLC plate
Preparative Fractionation and Sample Purification	HPTLC- based method development preperative chromatography HPTLC is well suited technique for method development for chromatography techniques such as Flash Chromatography, prepHPLC or Centrifugal Partition Chromatography for laboratory scale sample fractionation and purification. .



E210x

Covaris

High-Throughput Sample Preparation, Synthesis and Pre-Formulation

Adaptive Focussed Acoustics (AFA)

COVARIS E210 Ultrasonicator:

AFA is a non-contact and isothermal ultrasonication technology allowing a highly standardized and reproducible sample preparation for a variety of application areas. Unlike common sonicators operating at about 1 kHz, AFA delivers highly-controlled and focused acoustic energy at the inaudible frequency of 500 kHz to the samples.

Sample Prep. for further Bioanalytic Studies, such as sequencing, bioassays (ELISA,..) or flow cytometry

- Nucleic acid extraction
- DNA / RNA shearing
- Biomarker extraction
- Cell Lysis, Tissue disruption

Sample Preparation for Chemical Analysis:

- Small molecule drug extraction
- Dissolution, Multiwell mixing
- Tablet disruption and extraction

Formulation and Process Technology

- Nanoemulsion, Liposome formulation
- (Nano-) crystallization
- Micronization, Nanoparticles

Multifunctional Synthesis Platform

MiniBlock Parallel Synthesis System:

Process Development and Process Optimization can be ideally supported by statistical design of experiments (DoE). Our multifunctional synthesis platform is well suited to run respective experiments - parallel synthesis and screenings - such as optimization of critical process parameters.

Functions

- Mixing
- Reflux and Inerting Capability
- Purification & Filtration
- Temperature Range
- -20°C (-78°C) to 120°C (160°C)
- Capacity: 4 ml (96-well), 55 ml

Applications

- Parallel (Bio-) Synthesis
- Reaction Screening
- (Green) Solvent Screening
- Biocatalyst/ Enzyme Screening
- Solid/ Solution Phase Synthesis

Pilot Reactors and Extractors

For further process development and scale-up glass-lined, stirred pilot reactors (2 l, 10 l capacity), extractors (percolator, 2l capacity) and suitable vacuum evaporators are available.

A scale-up for industrial production on site is possible through our partnership with UNA-Synth permitting manufacturing in stirred reaction vessels up to 2500 l or transfer to suitable contract manufacturers.

Flash- Chromatography

Our Flash Chromatography system allows us to efficiently perform bioactivity guided fractionation and isolation/ purification of compounds of interest, as well as the isolation of reference standards and impurities.



Analytical Capabilities for Product Development and Quality Testing*

UV-Vis thermocontrolled	UV/Vis measurements in general (Concentration, Dissolution, Kinetics, Colorimetric) in the range of 190 bis 90 nm, including temperature control (-10°C to 100°C) and stirring <ul style="list-style-type: none"> • Measurements of nucleic acid (DNA/ RNA) and protein concentrations *** • DNA- Melting Point Determination • Determination of labeling efficiency for fluorescent dyes for use on microarray experiments • Kinetic measurements (e.g. Enzyme/ Reaction kinetic studies) • Enzyme activity measurements • Colorimetric bioassays
Microscopy	High-resolution digital imaging <ul style="list-style-type: none"> • Identification Testing of Plant Material • Particle Size/ Shape • Testing for the presence of particles in liquids, liposomes, emulsions (Ph. Eur.,)
HPTLC	<ul style="list-style-type: none"> • Identification Testing • Stability Studies • Toxin Testing (Aflatoxin, Ochratoxin) • Pesticide Testing
Other Performed Tests	<ul style="list-style-type: none"> • Assay, Impurity Testing (HPLC-UV, autosampler) • Water Content (KF Titration) • Total ash, Acid insoluble ash ** • Heavy Metals ** • Foreign Organic/ Inorganic Matter • Microbial Analysis (**)

* quality testing is only offered for products manufactured under contract and released by acphis.

** in cooperation with contracted partners

*** microvolume analysis can be performed upon request.