



Range of Services

**Laboratory & Analytics**

## About us:

Since its foundation in 1960, the Institut für Getreideverarbeitung GmbH (IGV) has developed from an application-oriented research institute for the milling, bakery and food industries into a modern, future-oriented analytics and technology partner. The conversion into a limited company in 1994 through a management buy-out laid the foundation for dynamic further development.

Today, our diverse activities are divided into three business areas: TESTLAB, FOODTECH and PLANTTECH. Our focus is on innovative solutions for the food industry, technological services and the further development of sustainable production processes.

Our expertise covers numerous areas of focus:

- Development of novel technologies for protein-based products
- Resource-efficient and sustainable manufacturing processes
- Creative recipes based on functional ingredients
- Production of food from algae and plants
- Ensuring food safety for industry and trade

In addition, we complement our portfolio with an accredited testing laboratory, training courses, project management and technology consulting, and targeted knowledge transfer.

The TESTLAB division represents our core business in the field of analytics. As a testing laboratory accredited according to DIN EN ISO 17025, we offer a wide range of chemical, physical and microbiological tests for food, feed, plant-based raw materials and their processed products.

With state-of-the-art laboratory technology and the extensive know-how of our team, we guarantee reliable results that offer you real added value in practice. Our services include, among other things:

- Food testing
- Feed analysis
- Marketability assessment
- Declaration checks
- Microbiological testing
- Preparation of well-founded expert reports

With our comprehensive range of services and combination of state-of-the-art technology and in-depth expertise, we are your reliable partner. Whether it's compliance with legal requirements, ensuring product quality or optimising your processes – we support you in achieving your goals efficiently and sustainably.

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## Range of Services



### **Analysis of food and feed ingredients**

including protein, amino acids, fat, fatty acids, fat indices, digestible and indigestible carbohydrates (fibre according to AOAC/§ 64 LFGB/ICC,  $\beta$ -glucans, pentosans, inulin low molecular weight fibre-NDO), water, minerals, preservatives,  $\beta$ -glucan, sugar (mono-, di-, polysaccharides)



### **Special grain analysis**

including falling number, wet gluten, hectolitre weight, amylogram, viscometer, farinograph, extensograph, dough simulation curve (Mixolab), botanical impurities



### **Analysis of medicinal and aromatic plants and essential oils**

including essential oils according to Ph.Eur, GMP, LFGB, individual and main component analysis of essential oils (GC-FID, GC-MS), active ingredient testing according to Ph.Eur. (thymol, carvacrol, fenchone, estragole, valeric acid, rosmarinic acid, hypericin, apigenin-7-glucoside, etc.), contaminant analysis



### **Analysis of undesirable substances**

including heavy metals (lead, cadmium, mercury etc.), active ingredients in plant protection products (fungicides, herbicides, insecticides), growth regulators (ethephon, chlormequat, mepiquat), mycotoxins (ergot alkaloids, pyrrolizidine alkaloids, aflatoxins, ochratoxin A, fumonisins, zearalenone, DON, T-2/HT-2 toxins, fusarium toxins, etc.), acrylamide, 3-MCPD fatty acid esters, PAHs, plasticisers



### **Molecular & microbiological testing**

including detection of GMOs and allergens, microbiological status (approval in accordance with Section 44 of the Infection Protection Act to work with pathogenic germs), process hygiene controls, preservation stress test, inhibition test

## Certifications:



- DAkkS accredited according to ISO 17025 - D-PL 14024-01
- Private cross-check experts for the chemical and chemical-physical examination and assessment of officially retained samples within the meaning of Section 42 of the Food and Feed Act

## Special grain expertise

- falling number
- wet gluten
- amylogram
- farinograph
- extensograph
- dough simulation curve (Mixolab)

## Research focus:

- Development of innovative measurement methods for protein analysis (proteomics), e.g. for authenticity verification
- Special harvest studies on the formation/influence of secondary plant compounds (metabolomics)
- Background information on mycotoxin formation on plants
- Determination of processing properties of flours
- Development of methods in the field of trace analysis of residues and contaminants

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## 1. Food and feed analysis

## method

### 1.1 Assessment of marketability, declaration check

Labelling check in accordance with LMIV

### 1.2 Chemical and physical analyses

ALLERGENS	
Cashew °	PCR; ELISA
Egg °	ELISA
Peanuts°	PCR; ELISA
Gluten	PCR; ELISA
Hazelnut °	PCR; ELISA
Crustaceans °	PCR
Lactose	HPAEC-PAD
Lupine °	PCR; ELISA
Almond °	PCR; ELISA
Milk°	ELISA
Celery °	PCR
Mustard °	PCR; ELISA
Sesame °	PCR; ELISA
Soy °	PCR; ELISA

General parameters	
aW value	Aquaspector, AQS-2-TC
Refractive index	refractometric
Density	pycnometric
Total minerals (ash)	calcined residue 550 °C, 900 °C
Weight/Filling Capacity	weighing
Conductivity	potentiometric
Particle size (dry) Particle size distribution (dry)	mechanical screening laser diffraction

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pH value	potentiometric
Sand	hydrochloric acid-insoluble carbon residue
Dry matter/ Drying loss/ Water	<ul style="list-style-type: none"> <li>Drying cabinet 103°C, 130°C, with sea sand if necessary</li> <li>Karl Fischer titration</li> </ul>
Viscosity – Brookfield Viscosity – Rotation (cone/plate, plate/plate)	Brookfield viscometer Rotational viscometer

#### MEDICINAL AND SPICE PLANTS

Essential oil	Ph.Eur. 2.8.12, ASU L 53.00-5
Composition of the essential oil Thymol, carvacrol, anethole, estragole, etc.	Ph.Eur. 2.2.28 GC-FID, GC-MSD
Apigenin-7-glucoside	Ph.Eur. Monograph Chamomile
Hypericin	Ph.Eur. Monograph on St. John's Wort
Piperine	ASU L 53.05-1, DIN 10235
Rosmarinic acid	Ph.Eur. Monograph on lemon balm
Valerenic acid	Ph.Eur. Monograph Valerian
Water	Distillation Ph.Eur. 2.2.13

#### PROTEIN & AMINO ACIDS

Protein	Kjeldahl
<p>Amino acids:</p> <ul style="list-style-type: none"> <li>after hydrolysis Aspartic acid, glutamic acid, serine, histidine, glycine, threonine, arginine, alanine, tyrosine, valine, phenylalanine, isoleucine, leucine, lysine, proline, hydroxyproline, cysteine, methionine, tryptophan</li> <li>Free amino acids <math>\alpha</math>-aminobutyric acid, arginine, alanine, asparagine, aspartic acid, <math>\gamma</math>-aminobutyric acid, glutamine, glutamic acid, glycine, histidine, isoleucine, leucine, lysine, methionine, ornithine, phenylalanine, serine, threonine, tryptophan, tyrosine, valine, hydroxyproline, proline Curcubitin (on request)</li> </ul>	<p>Hydrolysis/derivatisation HPLC</p> <p>Extraction/derivatisation HPLC</p>

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ENZYM ACTIVITIES	
α-Amylase	photometric
β-Amylase °	photometric
Xylanase °	photometric
Lipase °	photometric
Lipoxygenase °	photometric
Peroxidase °	photometric

ENZYMES	
Screening α-amylase, lipase, xylanase, maltogenic amylase, glucoamylase	LC-MS/MS

FATS, FAT COMPONENTS, FAT INDICES	
Total fat	Weibull-Stoldt
Oil content in oilseeds	Petrolether-Extraction
Fatty acid spectrum (saturated/unsaturated fatty acids)	GC-FID
Trans fatty acids	GC-FID
Butterfat (butter or milk fat content)	GC-FID
3-MCPD-Ester, Glycidol, 2-MCPD-Ester	GC-MS/MS
Acid number, free fatty acids	titrimetric
Saponification value	titrimetric
Iodine value	titrimetric
Peroxide value	titrimetric
Anisidine number	photometric
Toxicity index	titrimetric, photometric
Unsaponifiable fraction	Saponification, gravimetric
Density	pycnometric
refractive index	refractometric
Oxidation stability of an oil	Induction time, Rancimat

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GENETICALLY MODIFIED ORGANISMS (GMOs)	
Double screening (35S, NOS) including DNA extraction°	real-time PCR
Triple screening (35S, NOS, FMV) including DNA extraction°	real-time PCR
Quadruple Screening (35S, NOS, FMV, cry1Ab/Ac) incl. DNA Extraktion°	real-time PCR

CEREALS, FLOUR, DOUGH & BAKED GOODS	
Sample preparation	Cleaning, drying, grinding
Moisture	DIN EN ISO 712-2
Hectolitre weight	EN ISO 7971-3
1000-grain weight	DIN EN ISO 520
Germination capacity/germination potency	Seed bed method/TTC method
Grain hardness, protein (wheat)	NIR
Ingredients Wheat, rye, barley Corn, millet	DIN EN 15587, ICC 102/1, ICC 103/1 DIN EN 16378
Detection of spelt, wheat and rye content in cereal milling products	LC-MS/MS
Hulling yield • Oats • Spelt	<ul style="list-style-type: none"> <li>• Compressed air peeler</li> <li>• Centrifugal peeler</li> </ul>
Grinding tests/flour yield	Automatic milling machine (Bühler, Brabender)
Flour grip	air jet screening
Sieve analysis	mechanically
Air jet screening	mechanically
Sensoric	descriptive test
WAI/WSI	according to Anderson
water absorption	ICC 115/1
Total minerals	ICC 104/1
Crude protein	ICC 105/2 oder 167
Sedimentation value – flour Sedimentation value – grain	ICC 116/1 ICC 118, 116/1

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Wet glue/Index Dry adhesive	ICC 155 Drying Flat dryer
glue content	ICC 137/1
source number	according to Berliner
Starch	ICC 123
Damaged starch	ICC 164
Case number	ICC 107/1
Ascorbic acid	ASU L 26.04-2 mod
Detection of ascorbic acid	Tauber's reagent
Maltose	according to Berliner
β-Glucan	ICC 166
<b>Dough rheology studies</b>	
Amylogram	ICC 126/1
source curve	according to Drews
Farinogram	ICC 115/1
Extensogram	ICC 114/1
EU dough test	EU Directive
Mixolab curve	ICC 173; DIN EN ISO 17718
<b>Baking tests</b>	
Wheat baking test, tin baking test, wholemeal baking test Rapid mix test	Standard methods of AGF Detmold
Rye bread trial Sourdough trial with Berlin short sourdough fermentation	Standard methods of AGF Detmold
<b>Further dough and baked goods analyses</b>	
Gas retention capacity	Rheofermentometer test according to Chopin
Rheofermentometer test according to Chopin	Titration ASU L 17.00-2
Volume measurement	rapeseed displacement method
Texture analysis to determine the freshness of baked goods over the storage period	AACC (74-09) Stable Micro Systems Ltd.

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CARBOHYDRATES	
Sugar as total sugar (glucose + fructose + sucrose + lactose + maltose)	HPAEC-PAD
Individual sugars (glucose, fructose, sucrose, lactose, maltose, galactose, arabinose, xylose)	HPAEC-PAD
Inulin/oligofructose	HPAEC/PAD
<b>Starch</b> Cereals Foodstuffs (> 10 %) Foodstuffs (< 10 %) Animal feed	polarimetric, ICC 123 polarimetric, ASU L 17.00-5 enzymatic (TK r-biopharm) Regulation (EC) No. 152/2009
Damaged starch	enzymatic, ICC 164
<b>Dietary fibre</b> Total dietary fibre, soluble and insoluble Total dietary fibre including ethanol-soluble dietary fibre	ASU L 00.00-18, ICC 156, div. AOAC-methods
Beta-glucan Cereals Cereal products (including liquid)	ICC 166 ICC 166 mod., HPAED-PAD
Crude fibre	according to the VDLUFA method or Annex III Regulation (EC) No 152/2009
<b>Pentosans</b> Total pentosans, soluble and insoluble	photometric or acid hydrolysis, HPAEC-PAD

PRESERVATIVES	
Benzoic acid, sorbic acid, PHB methyl, ethyl, propyl ester, 2-phenoxyethanol	HPLC
Propionic acid °	Distillation, HPLC

NUTRITIONAL VALUES
According to LMIV <ul style="list-style-type: none"> <li>• Water, total minerals, protein, fat, saturated fatty acids, total fibre, sodium, total sugar (Glu + Fru + Sac + Lac + Mal)</li> <li>• Calculation of salt, carbohydrates and calorific value</li> </ul>

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OILSEEDS	
Moisture/dry matter	Drying at 103 °C
Foreign Matter	DGF B-I -3
Sensory testing	descriptive examination
oil content	DGF B-15
Free fatty acids	titrimetric
fatty acid spectrum	GC-FID

RESIDUES, UNDESIRABLE SUBSTANCES	
<b>Plant protection products and pesticides</b>	
Pesticide residues Multi-method	LC-MS/MS, GC-MS/MS
Highly polar pesticide residues Chloromequat, mepiquat, ethephon, glyphosate, AMPA	LC-MS/MS
Dioxins °	DIN EN 16215
Dithiocarbamates °	according to DFG S15, Ph. Eur. 2.8.13
Methyl bromide °	DFG S18, Ph.Eur. 2.8.13
<b>Undesirable substances</b>	
Plasticiser °	GC-MS/MS
PAKs	GC-MS/MS
3-MCPD-Ester, Glycidol, 2-MCPD-Ester	DGF-C-III-18 (09)
Hydrocarbons (mineral oils) MOSH, MOAH °	LC/GC-FID
Acrylamide	LC-MS/MS
Tropane alkaloids (atropine, scopolamine)	LC-MS/MS
Pyrrolizidine alkaloids °	LC-MS/MS
<b>Mycotoxins</b>	
Aflatoxin B1, G1, B2, G2	LC-MS/MS
Aflatoxin M1 °	HPLC
Alternaria toxins (AOH, TEA, TEN, AME) ON REQUEST	LC-MS/MS
Ochratoxin A	LC-MS/MS

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Fumonisin B1, B2	HPLC
Deoxynivalenol (DON)	LC-MS/MS
Zearalenon	LC-MS/MS
T-2-/HT-2-Toxin	LC-MS/MS
Other Fusarium toxins, DON-3-Glc, 3-Ac-DON, 15-Ac-DON, NIV, DAS, FUS-X	LC-MS/MS
Ergot alkaloids	LC-MS/MS
Patulin	LC-MS/MS

SPECIAL INGREDIENTS	
Cannabinoids (THC, CBD, CBG, etc.)°	LC-MS/MS
Carotenoids	HPLC
Carotenoid, total (carotenes, xanthophylls)	photometric
Chlorophyll, total Chlorophyll a and b	photometric HPLC-DAD
Cholesterol	GC-FID
Coffein	HPLC
Acetic acid	enzymatically
Ethanol °	enzymatically
Lactic acid	enzymatically
Opiates (morphine, codeine, thebaine, oripavine)	LC-MS/MS
Total polyphenols	photometric
Theobromine	HPLC
Thymoquinone	HPLC

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TRACE ELEMENTS/HEAVY METALS	
Pressure digestion with concentrated nitric acid	
Aluminium °	ICP-MS
Arsenic °	ICP-MS
Lead	Graphite tube AAS
Cadmium	Graphite tube AAS
Calcium	Flame AAS
Iron	Flame AAS
Potassium	Flame AAS
Copper	Graphite tube AAS
Magnesium	Flame AAS
Sodium	Flame AAS
Nickel	Graphite tube AAS
Phosphorus	Photometrisch nach Aufschluss
Mercury	Hydrid-/Kaltdampf-AAS nach Amalgamierung
Zinc	Flame AAS

ANIMAL SPECIES IDENTIFICATION	
Horse, pig, cow (others on request)	real-time PCR

VITAMINS °	
<b>Fat-soluble vitamins</b>	
Retinol (vitamin A) °	HPLC
β-carotene (pro-vitamin A) °	HPLC
Vitamin A, total (retinol, β-carotene) °	HPLC
Vitamin E, total (α-β-γ-δ-tocopherol) °	HPLC
Vitamin D2 (ergocalciferol) °	HPLC
Vitamin D3 (cholecalciferol) °	HPLC

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Vitamin K1 (phylloquinone) °	HPLC
Vitamin K2 (menaquinone) °	HPLC
<b>Water-soluble vitamins</b>	
Vitamin B1 (thiamine) °	HPLC
Vitamin B2 (riboflavin) °	HPLC
Vitamin B3 (niacin) °	HPLC
Vitamin B5 (pantothenic acid) °	HPLC
Vitamin B6 (pyridoxine) °	HPLC
Vitamin B7 (biotin) °	HPLC
Vitamin B9 (folic acid) °	HPLC
Vitamin B12 ° (cyanocobalamin, hydroxocobalamin, methylcobalamin, adenosylcobalamin) °	HPLC
Vitamin C °	LC-MS/MS

### 1.3 Microbiological tests

DETERMINATION OF BACTERIA, YEASTS, MOULDS	
Aerobic mesophilic bacterial count (total bacterial count)	ASU L 00.00-88/2
Yeasts/moulds	ISO 1527-1/ -2
Enterobacteriaceae	ASU L 00.00-133/2
Coliform bacteria	ISO 4832
Escherichia coli	ASU L 00.00-132/2/3
Bacillus cereus	ASU L 01.00-33
Staphylococcus aureus	ASU L 00.00-55
Listeria monocytogenes	ASU L 00.00-32/1 00.00-22
Salmonella spp.	ASU L 00.00-20
Sulphite-reducing clostridia	ASU L 00.00-57
Lactic acid bacteria	ISO 15214
Aerobic spore formers	ASU L 00.00-88/2 mod.
Osmotolerant yeasts/moulds	ISO 21527-2

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IDENTIFICATION	
Bacteria	MALDI-TOF/MS
Rope spoilage bacteria	MALDI-TOF/MS

DETERMINATION AND VERIFICATION OF THE MINIMUM SHELF LIFE (MSL)	
Best before date determination	DIN 16779

HYGIENE CONTROLS (PRODUCTS, PROCESSES, STAFF)	
Contact samples	DIN 10113-3
Swab samples	DIN 10113-1 / DIN 10113-2

#### 1.4 Sensory Testing

Descriptive examination with/without quality assessment	ASU L 00.90-6/-12/-14
Sensory testing (5-point test scheme) of baked goods, foodstuffs, pasta and confectionery	

#### 2. Microbiological testing of cosmetics in accordance with DIN & Ph. Eur.

MICROBIAL COUNT DETERMINATIONS	
Aerobic microorganisms (TAMC)	DIN EN ISO 21249
Yeasts/moulds (TYMC)	DIN EN ISO 16212
Candida albicans	DIN EN ISO 18416
Bile salt-tolerant, Gram-negative bacteria	Ph. Eur. 2.6.31 (Ph. Eur. 2.6.13)
Escherichia coli	DIN EN ISO 21150
Salmonella	Ph. Eur. 2.6.31 (Ph. Eur. 2.6.13)
Pseudomonas aeruginosa	DIN EN ISO 22717
Staphylococcus aureus	DIN EN ISO 22718
Pluralibacter gergoviae	ASU L 00.00-133/2 mod.

PRESERVATION STRESS TEST	
Preservation stress test	Ph. Eur. 5.1.3, DIN EN ISO 11930

° Subcontracting

## IMPRESSUM

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The information presented is correct at the time of going to press. Printing errors, mistakes and changes reserved.

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