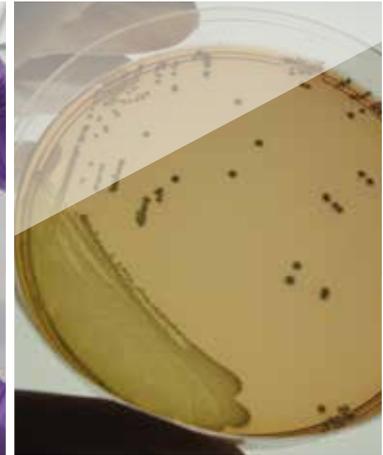




ILVO



SERVICES

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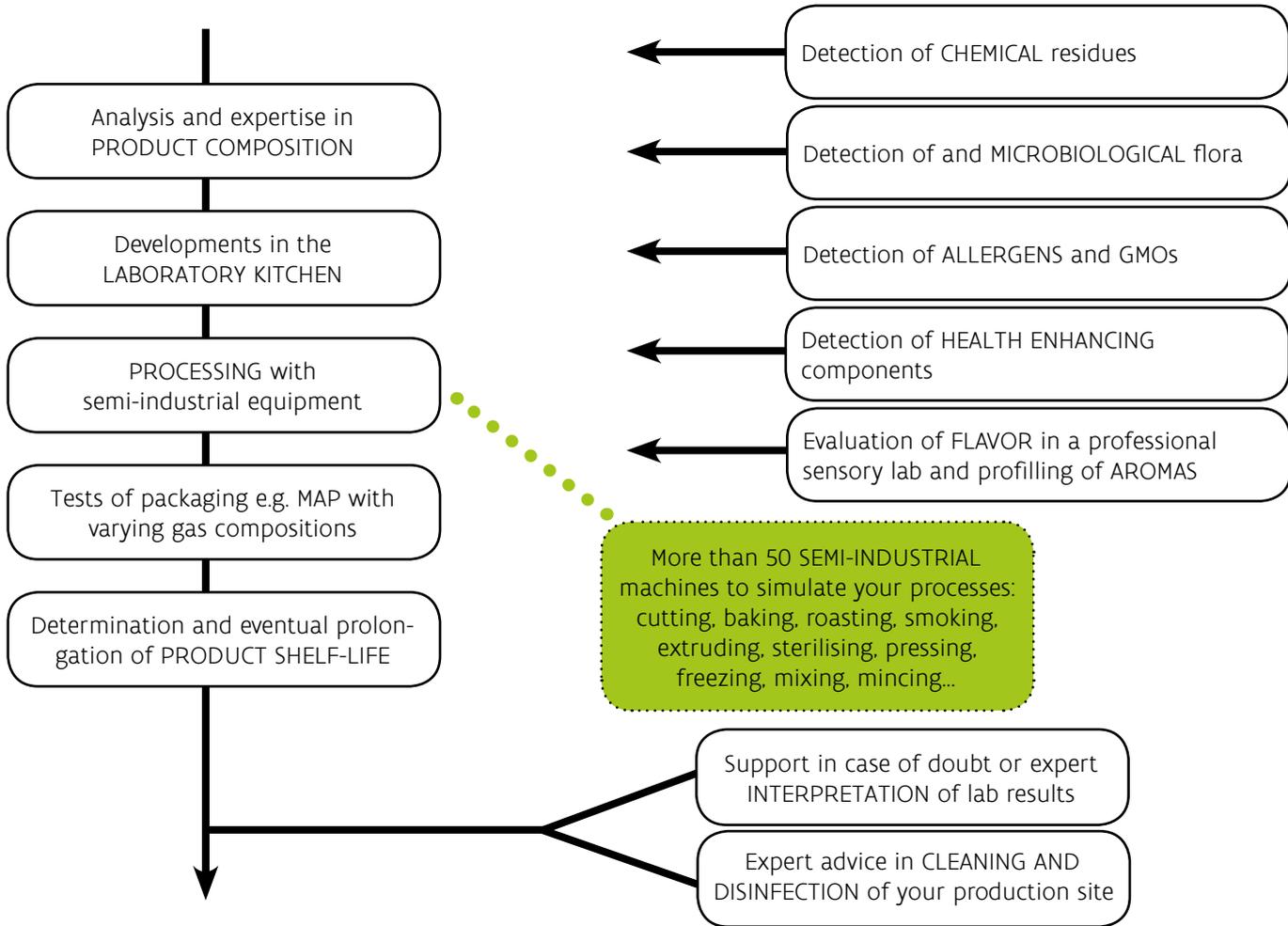
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1. Introduction

This brochure summarizes the technological, advisory and analytical services of the Food Pilot. The Food Pilot is the application and analysis center at the Flanders research institute for agriculture, fisheries and food (ILVO) and Flanders' FOOD. The Food Pilot supports food companies who wish to improve their products and processes. We offer fully customized pilot trials, laboratory analyses and advice (see figure on the next page). By working with expert scientists on issues of food safety, quality, and innovations regarding food processing, the Food Pilot guarantees a scientific basis for all of its services. Often a company can make use of subsidies.

The Food Pilot processing halls contain production lines built on a **semi-industrial scale**. Companies can test new ingredients, products or concepts in pilot trials without needing to invest in full-scale production before the process is optimized (www.foodpilot.be). **A range of analyses are available:** besides measuring fats, sugars and proteins, the Food Pilot also offers specific and thorough research on volatile aromas, fatty acids, polyphenols and other secondary metabolites. A wide range of physical, chemical, microbiological, flavor and odor analyses are also offered to solve complex issues such as shelf-life studies or scientific advice on cleaning and disinfection of the processing hall. Most of the analyses are done under BELAC accreditation. For all companies wishing to explore a new idea or who want some inspiration, the Food Pilot offers **advice** in product development and improvement and process technologies.



2. Practical information

2.1. Product and process improvement on a semi-industrial scale

How does process and product improvement work at the Food Pilot? First, just call or make an appointment (no obligation). We first analyze your question, give advice, and discuss which tests would be appropriate (www.foodpilot.be). For pilot tests or analyses, we first make a detailed quote. We also inform you about any possible subsidies. After we reach an agreement, the pilot trials are scheduled. When appropriate, we can also draw up an 'experimental design' and perform a statistical analysis on the test results. Our technicians handle the pilot installations while you watch to see how the product evolves. After finishing the pilot tests, the test samples can be taken back to your company. The parameters of the process teach you how to scale up the production in your production hall. Additional laboratory analyses can give more insight into the microbiological, chemical and physical quality of your product. Billing happens after the test is completed.

2.2. Lab analyses

The food industry always needs to guarantee good quality of its products, as shown by correct analytical results obtained by an expert lab. Food authorities also need reliable analytical assays. ILVO offers these high level analyses, with competence guaranteed by working under the ISO 17025 norm (which specifies the general recommendations about performing laboratory analyses). Each year, the Belgian Accreditation institution (BELAC) monitors the labs and thus ILVO earns the accreditation certificate with no. 033-TEST ISO 17025. Currently,

ILVO is accredited for more than 80 food related analyses. New ISO-accredited analyses are added regularly. In addition, ILVO offers a number of analyses that do not fall under the accredited scope but which are also executed in this accredited environment.

Ring trials or proficiency studies are also organized by the Food Pilot. Some of these ring trials are ISO 17043 accredited (certificate nr. 033-PT ISO 17043). The BELAC-accredited activities (TEST 033 and PT 033) are also ISO 14001 environmentally certified.

To make practical arrangements about laboratory analyses and ring trials, contact the lab managers (see list of services in the next chapters).

2.3. Advice

The food experts at the Food Pilot and the ILVO researchers are available to answer any questions about product development or improvement and process techniques. This service is free and is not binding; it is part of ILVO's mission as a public research center. To find the right contact person, see the appropriate section in the next chapters.





3. Pilot trials

3.1. Dairy products

The pilot facilities for dairy processing (www.foodpilot.be) include a UHT machine, an ice cream machine, an aerator, cheese tanks, freeze dryer, spray dryer, the new "Dry-on-Water®" dryer, evaporator, a ball mill and other mincing techniques, a magnets-for-emulsions (M4E) mixing unit, mixers, packaging machines and a great deal of peripheral equipment. A wide range of applications are possible on a pilot scale, such as the preparation of dairy desserts, yoghurt, drink yoghurt, dairy drinks, cheese, ice cream, horse milk powder, etc. The UHT machine is particularly multi-functional: it can heat in 5 different ways (using plates, tubes, scraped surface heat exchanger, steam injection and infusion) and needs only 30 L of a product to perform a test. Aseptic filling is possible under a laminar flow or using bag-in-box technology. In addition to pilot testing, the Food Pilot gives advice about recipes, processes and process parameters.

Contact

Katleen Coudijzer

T 09 272 30 19

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3.2. Meat, fish, soups and sauces

The Food Pilot has all of the equipment you may need to process meat and fish, such as a mincer, cutter, brine injector, ice maker, filling machine, cooking kettle, baking-, roasting-, drying- and smoking chamber, ripening chamber, steaming oven, freezer, freeze dryer, extruder, autoclave, mixing devices, packaging machines and a great deal of peripheral equipment. This make the Food Pilot a complete semi-industrial production line for most meat products, ranging from cooked ham, cooked sausage, salami, pâté, smoked sausage to chicken breasts, etc. The cutter is particularly multifunctional: it can apply a vacuum and/or direct or indirect heating or cooling of the product. The smoking chamber can smoke either traditionally or using liquid smoke. Packaging tests can be performed in trays or bags, applying a vacuum or gassing with N_2 , CO_2 and O_2 . The Food Pilot staff can also help you to figure out new recipes and optimize process parameters.

Contact

Geert Van Royen

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3.3. Vegetable products

The Food Pilot's many pilot-scale vegetable processing machines (www.foodpilot.be) include the oxygen-free spiral-filter press, UHT device, autoclave, freeze dryer, the new "Dry-on-Water®" dryer, freezer, mixing-, homogenization- and emulgation machine and a variety of peripheral devices. Pilot tests can be performed for many different goals, such as testing an innovative technology such as the spiral-filter press, optimizing processing parameters, valorizing side streams, or developing a new concept such as a juice, puree, smoothie or other product.

Contact

Nathalie Bernaert

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3.4. Bakery and chocolate

All of the basic bakery and chocolate processing equipment (www.foodpilot.be) can be found at the Food Pilot, including a spiral kneader, a dough sheeter, baking oven, batter, aerator, mixing-, homogenization- and emulsifying machine, a magnets-for-emulsions (M4E) machine, 3-roll walls and a coating pan. The Food Pilot has invaluable expertise in the preparation of chocolate, ganaches, chocolate mousse, crème patissier, dorure and whipped cream. If you want to reduce sugar or fat content or use fewer additives and preservatives, the Food Pilot experts can guide you in adjusting the recipes and processing.

Contact

Geert Van Royen

T 09 272 30 45

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3.5. Snacks and animal feed

To prepare snacks and feed (www.foodpilot.be), several different drying technologies can be applied, such as the air dryer, freeze dryer, spray dryer and the new Dry-On-Water® drying technology, as well as grinding technologies such as the milling machine with cutting module, hammer module, rotor module, ball mill, cutter and microcutter, and shaping technologies such as the filling machine and the extruder. The extruder is a co-rotating double screw extruder with 5 modules. It can be used to prepare pasta, cereals, meat substitutes, chips and feed. The co-extrusion unit makes it possible to insert fillings easily.

Contact

Katleen Coudijzer

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4. Product composition and authenticity

4.1. General product composition

Measurement of fat, proteins and other constituents can be done either alone or in tandem with improvements to the recipe. An optimized recipe can lead to a reduction in additives and preservatives, fat, sugar, and salt. An optimized production process can also help to retain health-promoting components such as vitamins, antioxidants, etc.

Contact

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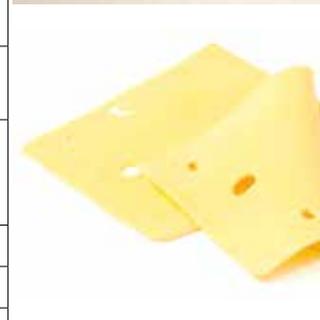
wim.reybroeck@ilvo.vlaanderen.be





Matrix	Parameter	Method	Accreditation
All food products	°Brix	Refractometer	No
	Distribution of particle size	Laser diffraction	No
	Density (liquid products)	DX/density meter	Yes/no
	Protein pattern	SDS-Page	No
	Physical stability during storage	Turbiscan	No
	Hardness/texture/TPA	Texture measurment (own method)	No
	Iodine number	AOAC 920 159	No
	Color	Reflection, transmission	No
	Sugars (lactose, glucose, fructose, saccharose...)	HPLC derived from ISO 22662/IDF 198	No
	Titratable acidity	Many standards	No
	Viscosity	Own method	No
	Moisture content (dry matter content)	Many standards	No
	Fatty acid analysis	GC-MS	No
Starch (non-modified)	Enzymatic-fotometric method	No	

Matrix	Parameter	Method	Accreditation
All dairy products	Authenticity parameters		
	Species detection - dairy cow milk protein	IEF (EC Regulation 273/2008 ANNEX IX) or ELISA	No
	Quality parameters		
	Proteolysis	TNBS (according Polychroniadou)	No
	Lipolysis	Derived from FIL Bulletin 265/1991 (BDI)	No
	Fat oxidation	Peroxid value (AOAC 965.33)	No
	Free fat	Derived from NIRO n° A10a 1973 or short Röse-Gottlieb	No
	Composition parameters		
	Ash content	ISO 936 derived	Yes
	Casein-whey ratio	Olieman CHEM/4016/2001 (derivative spectro photometry)	No
	Dry matter content	Gravimetry according to IDF norm	Yes/no
	Protein content (crude protein content)	Kjeldahl according to IDF norm	Yes/no



Matrix	Parameter	Method	Accreditation
All dairy products	Phosphorus	ISO 2962/IDF 33	No
	Lactic acid/D-lactate/L-lactate	IDF 69 2003 Enzymatic-spectrophotometric method	No
	Sodium, Calcium, Potassium	Atomic absorption	No
	Non-protein-nitrogen content	Kjeldahl according to IDF norm	Yes/no
	Nitrate and nitrite	IDF 197	No
	pH	Own method	No
	Ureum	Enzymatic-spectrophotometric method	No
	Fat content	Röse-Gottlieb, SBR or Weibull according to IDF norm	Yes/no
	Vitamine B2 (riboflavin)	According Havemose et al. (2004)	No
	Moisture content	Gravimetric according to IDF norm	Yes/no
Salt content	Chloride (titration) or sodium determination (Atomic absorption)	No	

Matrix	Parameter	Method	Accreditation
All dairy products	Heat parameters		
	Alkaline phosphatase	ISO 11816/IDF 155	Yes
	Furosine	ISO 18329/IDF 193	No
	Bond HMF	HPLC	No
	Total HMF	HPLC	No
	Free HMF	HPLC	No
	Lactulose	ISO 11285/IDF 175 (enzymatic-spectrophotometric method) or IDF 147B (HPLC)	No
	Lactoperoxidase	Derived from NBN V21-026	No
	Acid soluble β -lactoglobuline	Derived from ISO 13875/IDF 178A	No



Matrix	Parameter	Method	Accreditation
Specific dairy products			
Butter	Fat free dry matter	Gravimetric method according IDF 80	No
Milk	Heat stability	Own method	No
	Oxidizing disinfectants	MB 14 october 1994, attachment 11	Yes
	Turbidity	NBN V21-026	No
	Freezing point	Cryoscopy	Yes
Milk powder	Bulk density	IDF 134	No
	Heat classification	WPNI (ADPI)	No
	Hygroscopicity	Own method	No
	Glycomacropeptide A (rennet whey powder in milk powder)	EC Regulation 2426/90	No
	Instant properties	IDF 87	No
	Lactose crystallization	Polarimetry	No
	Lecithin	IDF 33C	No
	Un/solubility	IDF 129A or ADPI 2002	No
Scorched particles (filtration test)	ADPI 2002	No	
Cream	Whipping properties	Own method	No

Matrix	Parameter	Method	Accreditation
Ice cream	Melting characteristics	Own method	No
	Density/overrun	Own method	No
Honey	Invertase activity	Harm. Methods IHC 2009, p. 56-58	No
	Electrical conductivity	Harm. Methods IHC 2009, p. 16-18	No
	Moisture content	Harm. Methods IHC 2009, p. 10-15	No
	Specific rotation	Harm. Methods IHC 2009, p. 61-62	No
	Diastase activity	Derived from Harm. Methods IHC 2009, p. 39-41 (Phadebas)	No
	HMF content	Harm. Methods IHC 2009, p. 29-31 (method White)	No
Meat and meat products	Moisture content	ISO 1442	Yes
	Protein content	ISO 937	Yes
	Free fat content	ISO 1444	Yes
	Hydroxyproline	ISO 3496	Yes
	Collagen (via hydroxyproline)	ISO 3496	Yes
	Ash content	ISO 936	Yes
	Salt content	Chloride (titration) or Sodium determination (Atomic absorption)	No





Matrix	Parameter	Method	Accreditation
Fish and fish products	Moisture content	ISO 1442	No
	Protein content	ISO 937	No
	Ash content	ISO 936 derived	No
	Salt content	Chloride (titration) or Sodium determination (Atomic absorption)	No
Fruits and vegetables	Determinations of 44 polyphenols	LC-MS/MS	No
	Determination of the antioxidant capacity	Spectrophotometry (ORAC)	No
Vegetables and fruit juices	Determination of vitamin C	Titration with DPI	No
Other food products			
Non-alcoholic foods	Water activity	Chilled mirror method	No
Alcoholic foods	Water activity	Humidity sensor method	No
UHT products	Sterility control	ATP determination	No

4.2. Food allergens and (species) authenticity

To detect food allergens of vegetable origin (soy, nuts, mustard, etc.) and animal origin (milk, eggs, fish and shellfish) in a variety of samples, a PCR based method (polymerase chain reaction) and/or an ELISA (enzyme-linked immunosorbent assay) based method are used. Authenticity determination (species origin of meat or dairy products) can be performed on many different matrices.

Contact

Isabel Taverniers

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Matrix	Parameter	Method	Accreditation
Various (food, feed, rinsing fluid, etc.)	Detection of food allergens of plant based and animal based origin	Plant-specific PCR (DNA detection); official accepted and if available (international validated) and/or published methods	Depends on species
	Semi-quantitative detection of food allergens of plant based and animal based origin	ELISA (protein detection): commercial kits and/or published methods	No
Various plant products	Plant species detection (authenticity)	Plant-specific PCR or ELISA	No
Various animal products	Species detection (authenticity)	Species-specific PCR or ELISA	No

Note: according to Directive 2007/68/EC of the European Commission (27th November 2007), all ingredients included in Annex III bis shall be indicated on the label of prepackaged foods. This concerns the following ingredients: cereals containing gluten, crustaceans, eggs, fish, peanuts, soy, milk, nuts, celery, mustard, sesame seeds, sulphur dioxide, lupine, molluscs and products derived thereof. Exceptions are also mentioned in the list in Annex III bis of Directive 2007/68/EC.

4.3. GMOs

Food and feed samples are analyzed for the presence of genetically modified organisms (GMOs; “screening”), the identity of GMOs (“identification”) as well as the relative content of the GM events per ingredient (“quantification”).

GMO analyses are divided in three groups:

- In a screening PCR, we search for common, regulatory DNA sequences in GMOs, such as the *Cauliflower Mosaic Virus* promotor 35S (p-35S), the *Agrobacterium tumefaciens* nopaline synthase terminator (t-NOS), and the *Figwort Mosaic Virus* promotor 35S (p-FMV). This is done in combination with a detection of one or more plant species (species-specific PCR).
- If one or more of the species-specific DNA targets and/or GMO-screening elements are positive, then qualitative analysis is done to look for the presence of EU-authorized GMOs, depending on the crop that was detected (identification PCR).
- Finally, the individually identified GMO events are quantified (quantitative PCR) in order to determine whether or not the sample conforms with the regulations (mandatory labeling threshold of 0.9% GMO per crop of EU authorized events).





Generally, a GMO analysis procedure starts with a screening and identification for GMOs, followed by relative quantification of the positively detected EU-authorized events or events that are in the approval pipeline (so-called “LLP events” or Low Level Presence events). In the case of an unexplainable screening signal, further analyses can be done to detect potentially present non-authorized (unknown GMOs or UGMs) might be necessary. Such an analysis is more time consuming and will be done in agreement with the client, following a technically feasible strategy in the laboratory.

GMO analyses are carried out on a variety of matrices, from sowing seeds (also ISTA accredited of GMOs) to various processed products.

Contact

Isabel Taverniers

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Matrix	Parameter	Method	Accreditation
Pure raw materials and derived, processed solid products	Qualitative detection of plants (soy, maize, rapeseed, linseed, cotton, sugar beet, potatoes, rice)	EURL official methods	Yes
	Screening elements (p-35S, t-NOS, p-FMV)	EURL official methods: literature	Yes
	Qualitative detection of GMO events (EU-authorized events)	EURL official methods	Yes
	Quantification of GMO events (EU-authorized events)	EURL official methods	No





5. Chemical food safety

Analyses of the presence of residues of veterinary drugs (e.g. antibiotics, chemotherapeutics, anti-inflammatories, anthelmintics, steroid hormones, β -agonists, etc.) and contaminants (e.g. mycotoxins) are performed using either screening methods (microbiological, immunological and receptor tests) and/or chromatographic methods (LC-MS/MS, LC-fluorescence).

5.1. Screening for residues

In the laboratory for antibiotic screening, foodstuffs can be screened using microbiological tests for the presence of inhibitory substances (mainly antibiotics and chemotherapeutics). Foods can also be analysed group specifically using immunological, Charm II and receptor tests for the presence of residues of β -lactam antibiotics, (penicillins and cephalosporines), tetracyclines, sulfonamides, streptomycines, macrolides & lincosamides, quinolones, chloramphenicol, etc.

In addition, commercial screening tests for the detection of antibiotics in milk, honey, meat, or other food products can be validated according to norm 2002/657/EC of the Commission and the CRL guidelines for the validation of screening methods for residues of veterinary drugs.

Contact

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Sigrid Ooghe
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Matrix	Parameter	Method	Accreditation
Milk, milk powder, cream	Screening for inhibitory substances- (mainly antibiotics and chemotherapeutics)	Delvotest SP-NT (broad spectrum microbiological inhibitory test)	Yes
	Screening for inhibitory substances- (mainly antibiotics and chemotherapeutics)	Delvotest T (broad spectrum microbiological inhibitory test)	Yes
	Screening for inhibitory substances- (mainly antibiotics and chemotherapeutics)	CMT (Copan Milk Test) (broad spectrum microbiological inhibitory test)	Yes
	Screening for tetracyclines	<i>B. cereus</i> -test (microbiological inhibitory test)	Yes
	Screening for quinolones	<i>E. coli</i> -test (microbiological inhibitory test)	Yes
	Screening for β -lactam antibiotics	Beta-s.t.a.r. (receptor test)	Yes
	Screening for streptomycines	Streptomycin ELISA (immunological test)	Yes



Matrix	Parameter	Method	Accreditation
Milk and milk powder	Screening for β -lactam antibiotics	SNAP Beta-Lactam Test (receptor test)	Yes
	Screening for β -lactam antibiotics	Charm MRL Beta-Lactam Test (receptor test)	Yes
	Screening for β -lactam antibiotics and tetracyclines	BetaStar Combo (receptor test)	Yes
Milk, milk- and dairy powder, cream, butter and cheese	Screening for chloramphenicol	CAP ELISA (immunological test)	Yes
Milk	Screening for inhibitory substances- (mainly antibiotics and chemotherapeutics)	Eclipse Farm 3G (broad spectrum microbiological test)	No
	Screening for β -lactam antibiotics	Charm MRLBL3 (receptor test)	No
	Screening for β -lactam antibiotics	Charm MRLBL1 (receptor test)	No
	Screening for β -lactam antibiotics	SNAP ST (receptor test)	No
	Screening for β -lactam antibiotics	Betaxpress Milk (receptor test)	No
	Screening for β -lactam antibiotics and cephalixin	SNAP ST Plus (receptor test)	No

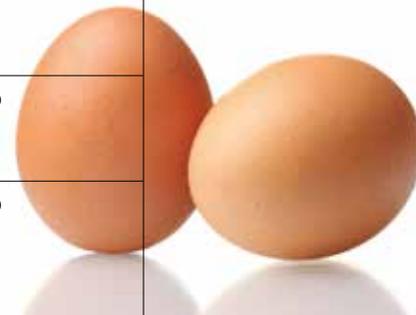
Matrix	Parameter	Method	Accreditation
Milk	Screening for β -lactam antibiotics and tetracyclines	TwinSensor Milk (receptor test)	No
	Screening for β -lactam antibiotics and tetracyclines	SNAPduo ST (receptor test)	No
	Screening for β -lactam antibiotics, tetracyclines and cephalosporins	SNAPduo ST Plus (receptor test)	No
	Screening for β -lactam antibiotics, tetracyclines and sulphonamides	Trisensor Milk (receptor test)	No
	Screening for tylosin	Tylosensor Milk (receptor test)	No
	Screening for aminoglycosides (neomycin, kanamycin, gentamycin and streptomycins)	4-Aminosensor Milk (receptor test)	No
	Screening for fluoroquinolones	Quinosensor Milk (receptor test)	No
	Screening for β -lactam antibiotics, tetracyclines, streptomycins and chloramphenicol (RF)	4SENSOR Milk (receptor test)	No





Matrix	Parameter	Method	Accreditation
Milk	Screening for melamine	MelamineSensor (receptor test)	No
	Screening for aflatoxine M1	Charm MRLAFMQ Test (receptor test)	No
	Screening for aflatoxine M1	Ridascreen Aflatoxin M1 (immunological test)	No
	Screening for flumequine	Flumequine ELISA (immunological test)	No
	Screening for nitrofurantoin (furazolidone)	Ridascreen Nitrofurantoin (AOZ) (immunological test)	No
	Screening for nitrofurantoin (AMOZ)	Ridascreen Nitrofurantoin (AMOZ) (immunological test)	No
	Screening for colistin	Colistin ELISA Test Kit (immunological test)	No
	Screening for sulfonamides	Charm II Sulfonamides Milk (receptor test with radioactive labeling)	No
	Screening for macrolides and lincosamides	Charm II Macrolides Milk (receptor test with radioactive labeling)	No
	Screening for aminoglycosides (streptomycin & gentamicin)	Charm II AG Streptomycin & Gentamicin Milk (receptor test with radioactive labeling)	No

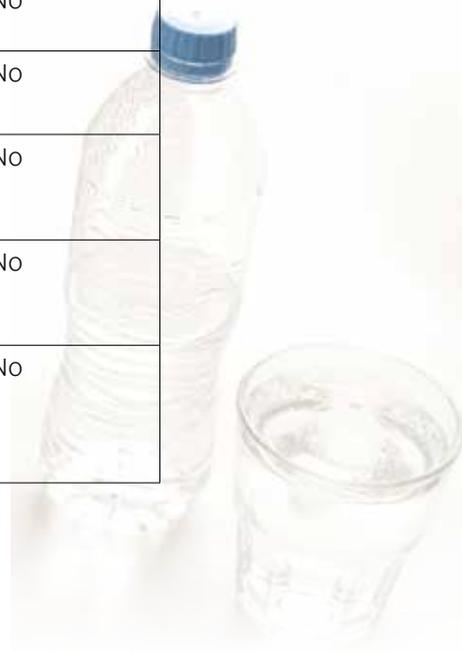
Matrix	Parameter	Method	Accreditation
Eggs	Screening for tetracyclines	Tetrasensor Tissue (receptor test)	Yes
	Screening for flumequine	Flumequine ELISA (immunological test)	Yes
	Screening for fluoroquinolones	Fluoroquinolone II ELISA (immunological test)	Yes
	Screening for sulfonamides	Charm II Sulfonamides Eggs (receptor test with radioactive labeling)	Yes
	Screening for inhibitory substances (mainly antibiotics and chemotherapeutics)	Premi-test Egg (broad spectrum microbiological test)	No
	Screening for chloramphenicol	CAP ELISA (immunological test)	No
	Screening for streptomycins	Streptomycin ELISA (immunological test)	No
	Screening for macrolides and lincosamides	Charm II Macrolides Eggs (receptor test with radioactive labeling)	No
	Screening for aminoglycosiden (streptomycines)	Charm II Streptomycins Eggs (receptor test with radioactive labeling)	No
	Screening for aminoglycosides (gentamycin & neomycin)	Charm II AG Gentamycin & Neomycin Eggs (receptor test with radioactive labeling)	No

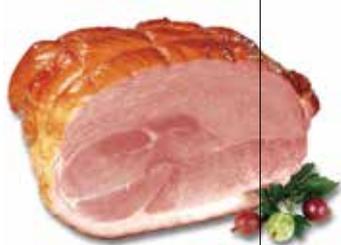




Matrix	Parameter	Method	Accreditation
Honey	Screening for chlooramphenicol	CAP ELISA (immunological test)	Yes
	Screening for tetracyclines	Tetrasensor Honey (receptor test)	Yes
	Screening for streptomycins	Charm II Streptomycins Honey (receptor test with radioactive labeling)	Yes
	Screening for macrolides & lincosamides	Charm II Macrolides Honey (receptor test with radioactive labeling)	Yes
	Screening for sulfonamides	Charm II Sulfonamides Honey (receptortest with radioactive labeling)	Yes
	Screening for fluoroquinolones	Fluoroquinolones Generic ELISA (immunological test)	No
	Screening for streptomycines	Streptomycin ELISA (immunological test)	No

Matrix	Parameter	Method	Accreditation
Water	Screening for inhibitory substances (mainly antibiotics and chemotherapeutics)	Delvotest SP-NT (broad spectrum microbiological inhibitor test)	Yes
	Screening for inhibitory substances (mainly antibiotics and chemotherapeutics)	Delvotest T 5 Pack (broad spectrum microbiological inhibitor test)	Yes
	Screening for β -lactam antibiotics	β ta-s.t.a.r. (receptor test)	No
	Screening for β -lactam antibiotics and tetracyclines	Twinsensor Milk (receptor test)	No
	Screening for sulfonamides	Charm II Sulfonamides (receptor test with radioactive labeling)	No
	Screening for macrolides and lincosamides	Charm II Macrolides (receptor test with radioactive labeling)	No
	Screening for aminoglycosides (streptomycins and gentamycin)	Charm II AG Streptomycins & Gentamycin (receptor test with radioactive labeling)	No





Matrix	Parameter	Method	Accreditation
Meat, fish and aqua culture	Screening for inhibitory substances (mainly antibiotics and chemotherapeutics)	Premi test after solvent extraction (broad spectrum microbiological inhibitor test)	Yes
	Screening for quinolones	<i>E. coli</i> -plate test (microbiological inhibitor test)	Yes
	Screening for tetracyclines	Tetrasensor Tissue (receptor test)	Yes
	Screening for chloramphenicol	CAP ELISA (immunological test)	Yes
	Screening for inhibitory substances (mainly antibiotics and chemotherapeutics)	Explorer v2.0 + e-reader (broad spectrum microbiological test)	No
	Screening for tetracyclines	<i>B. cereus</i> -plate test (microbiological test)	No
	Screening for β -lactam antibiotics	β eta-s.t.a.r. (receptor test)	No
	Screening for β -lactam antibiotics, tetracyclines and sulfonamides	Trisensor Milk (receptor test)	No
	Screening for tylosin	Tylosensor Milk (receptor test)	No
Screening van β -lactam antibiotics, tetracyclines, sulfonamides and tylosin	Charm QUAD KIWI Tissue (receptor test)	No	

Matrix	Parameter	Method	Accreditation
Meat, fish and aqua culture	Screening for fluoroquinolones	Fluoroquinolones Generic ELISA (immunological test)	No
	Screening for flumequine	Flumequine ELISA (immunological test)	No
	Screening for streptomycins	Streptomycin ELISA (immunological test)	No
	Screening for nitrofuran AOZ (furazolidone)	Ridascreen Nitrofuran (AOZ) (immunological test)	No
	Screening for nitrofuran AMOZ (furaltadone)	Ridascreen Nitrofuran (AMOZ) (immunological test)	No
	Screening for sulfonamides	Charm II Sulfonamides Tissue (receptor test with radioactive labeling)	No
	Screening for macrolides and lincosamides	Charm II Macrolides Tissue (receptor test with radioactive labeling)	No
	Screening for aminoglycosides (streptomycins)	Charm II Streptomycins Tissue (receptor test with radioactive labeling)	No
Screening for aminoglycosides (gentamycin and neomycin)	Charm II AG Gentamycin & Neomycin Tissue (receptor test with radioactive labeling)	No	





Matrix	Parameter	Method	Accreditation
Kiwi	Screening for streptomycin	Streptomycin ELISA (immunological test)	Yes

Matrix	Parameter	Method	Accreditation
Feed	Screening for β -lactam antibiotics	Beta-s.t.a.r. (receptor test)	No
	Screening for β -lactam antibiotics en tetracyclines	Twinsensor Milk (receptor test)	No
	Screening for sulfonamides	Charm II Sulfonamides Feed (receptor test with radioactive labeling)	No
	Screening for macrolides and lincosamides	Charm II Macrolides Feed (receptor test with radioactive labeling)	No

5.2. Chromatographic confirmation of residues

In the chromatographic laboratory, residues of veterinary drugs and contaminants are analyzed in several matrices such as milk, eggs, meat, honey and feed. The analysis technique LC-MS/MS is mainly used.

Contact

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Matrix	Parameter	Method	Accreditation
Milk, milk powder, cheese and yoghurt	Aflatoxine M1	ISO 14501 & IDF 171 HPLC-fluorescence	Yes
Milk	Avermectins	HPLC-fluorescence	Yes
	Anthelmintics	LC-MS/MS	Yes
	Non-steroidal anti-inflammatory agents	LC-MS/MS	Yes
	Inhibitory agents (antibiotics + chemotherapeutics)	LC-MS/MS	Yes
	Nitro-imidazoles	LC-MS/MS	No

Matrix	Parameter	Method	Accreditation
Egg and/or egg products	Inhibitory agents (antibiotics + chemotherapeutics)	LC-MS/MS	No
	Anthelmintics	LC-MS/MS	No
Eggs	Coccidiostats	LC-MS/MS	Yes
	Mycotoxins	LC-MS/MS	No

Matrix	Parameter	Method	Accreditation
Honey	Sulfonamides	LC-MS/MS	Yes

Matrix	Parameter	Method	Accreditation
Meat and meat products	Coccidiostats	LC-MS/MS	Yes
Meat	Non-steroidal anti-inflammatory agents	LC-MS/MS	Yes
Meat and injection place meat	Compounds with anabolic effects and prohibited compounds (groups A1, A2, A3, A4, A5, A6-96/23/EG Annex I) (androgens, gestagens, estrogens, stilbens, β -agonists, thyreostatics, nitro-imidazoles, antibacterial growth promoters, resorcylic lactones) Veterinary medicines (groups B1, B2a, B2b, B2d, B2e, B2f – 96/23/EC Annex I) (antibiotics, anthelmintics, anti-inflammatory agents, coccidiostats, sedatives, corticosteroids)	LC-MS/MS	Yes
Meat	Mycotoxins	LC-MS/MS	No
Liver, kidney, fish and/or fish products	Anthelmintics	LC-MS/MS	No
Silage	Mycotoxins	LC-MS/MS	No



6. Microbiological food safety

The analyses for microbiological food safety concern spoilage organisms, hygienic indicators, pathogenic and toxin-producing bacteria.

Most microbiological analyses are performed on all types of food matrices using standardized ISO reference methods. The following enumeration methods are performed: total (an)aerobic bacteria and spore forming bacteria, coliforms, β -glucuronidase positive *E. coli*, Enterobacteriaceae, *Staphylococcus aureus*, yeasts and molds, *Listeria* spp., *Listeria monocytogenes*, sulphite reducing anaerobic bacteria, *Clostridium perfringens* and *Bacillus cereus*. The following pathogens can also be detected in this lab: *Salmonella*, *E. coli* O157, *Campylobacter*, *Listeria* spp. en *Listeria monocytogenes*. In yoghurt the characteristic bacteria *Lactobacillus bulgaricus* and *Streptococcus thermophilus* are enumerated. Enterotoxins of *Staphylococcus aureus* are detected in milk and milk products.

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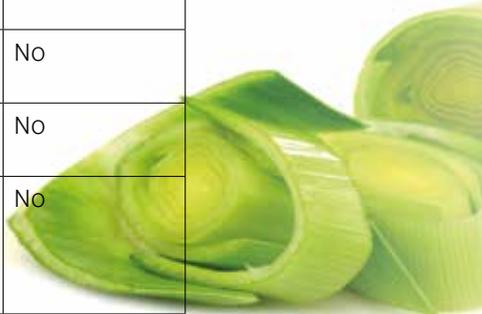
Matrix	Parameter	Method	Accreditation
Foodstuffs	Enumeration of aerobic bacteria at 30°C Enumeration of anaerobic bacteria at 37°C Enumeration of aerobic spore forming organisms at 30°C Enumeration of anaerobic spore forming organisms at 37°C	ISO 4833 SPVG M005 SP-VG M008 SP-VG M007	Yes
	Enumeration of coliforms at 30 or 37°C Enumeration of thermo tolerant coliforms	ISO 4832 Afgeleid van ISO 4832	Yes
	Enumeration of β -glucuronidase positive <i>Escherichia coli</i> at 44°C	Rapid'E. coli 2 - AFNOR BRD-07/1-07/93	Yes
	Enumeration of Enterobacteriaceae at 30 or 37°C	ISO 21528-2	Yes
	Enumeration of moulds and yeasts at 25°C	ISO 7954	Yes
	Enumeration of sulphite-reducing anaerobes at 37°C (clostridia) Enumeration of <i>Clostridium perfringens</i> at 37°C	AFNOR XP V 08-061 ISO 7937	Yes
	Enumeration of <i>Staphylococcus aureus</i>	ISO 6888-2	Yes





Matrix	Parameter	Method	Accreditation
Foodstuffs	Detection of <i>Salmonella</i>	ISO 6579 en VIDAS SLM AFNOR BIO 12/1 –04/94	Yes
	Detection of <i>Listeria</i> spp. Detection of <i>Listeria</i> spp. Detection of <i>Listeria monocytogenes</i> Detection of <i>Listeria monocytogenes</i> Enumeration of <i>Listeria monocytogenes</i>	ISO 11290-1/Amd 1 VIDAS LIS AFNOR BIO-12/2-06/94 ISO 11290-1/Amd 1 VIDAS LMO2 AFNOR BIO-12/11-03/04 ISO 11290-2/Amd 1	Yes
	Enumeration of presumptive <i>Bacillus cereus</i> at 30°C	ISO 7932	Yes
	Detection of thermo tolerant <i>Campylobacter</i>	ISO 10272-1	Yes
	Detection of <i>E. coli</i> O157	ISO 16654	Yes
	Bifidobacterium	Own culture method	No
	Butyric acid bacteria	Own culture method (ILVO-T&V-NG1)	No
	Contaminants	Own culture method (ILVO-T&V-NG5)	No
	<i>Enterococcus</i> spp.	Own culture method	No
	Lactic acid bacteria	Own culture method	No
	<i>Lactobacillus</i> spp.	Own culture method	No
	<i>Streptococcus</i> spp.	Own culture method	No

Matrix	Parameter	Method	Accreditation
Foodstuffs	Enumeration of Gram-negative bacteria	Own culture method (ILVO-T&V-NG4)	No
	Osmotolerant yeasts	Own culture method ISO 21527/02	No
	Propionic bacteria	Own culture method (ILVO-T&V-NG2)	No
	Shigatoxin-producing <i>Escherichia coli</i> or STEC	Derived from ISO/TS 13136:2012; rt-PCR, Verstraete et al (2014)	No
	Xerophilic molds	Own culture method (ISO 21527/02)	No
	<i>Bacillus sporothermodurans</i> spores	Scheldeman, J. Appl. Microbiol., 2002, 92, 983-991	No
	<i>Clostridium tyrobutyricum</i>	Herman, Appl. Environ. Microbiol., 1995, 61, 4141-4146	No
	Phenotypic identification of bacterial strains	Biotyping	No
	Molecular identification of bacterial strains	16S rDNA sequencing (partiëel)	No
	Molecular serotyping of <i>Salmonella</i>	Rasschaert, J. Clin. Microbiol., 2005, 43, 3615-3623	No
	Molecular high resolution typing of bacterial strains	Based on PFGE (2 restriction-enzymes); RAPD (4 primers), rep-PCR, plasmid analysis and/or AFLP	No



Matrix	Parameter	Method	Accreditation
Milk and milk products	Enumeration of characteristic micro-organisms in yoghurt (<i>Lactobacillus bulgaricus</i> and <i>Streptococcus thermophilus</i>)	ISO 7889	Yes
	Detection of enterotoxins produced by <i>Staphylococcus aureus</i>	ELISA Vidas set 2 (bioMérieux)	Yes

7. Advice on cleaning and disinfection in the production site

To give advice about cleaning and disinfection, ILVO experts come to your site to take samples, measure the microbiological presence and give advice about how to improve the cleaning and disinfection procedure. In addition, the effectiveness of cleaning, disinfection, and other hygienic products can be evaluated under laboratory, pilot and field conditions. Current standards such as ISO and AFNOR are applied. This research and analyses are performed in many types of locations (food processing companies, primary sector, machine construction, etc.).

Contact

To optimize the cleaning and disinfection of your production site

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To study the efficiency of cleaning and disinfection products
(e.g. for registration)

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8. Sensory and aroma research

Food Pilot has a professional sensory lab with a trained taste panel. Recently the facilities were extended to include in-depth chemical odor analyses. Research on flavor and odor is frequently performed during product development. The equipment in the standardized sensory lab allows the tasters to detect and describe small differences in flavor in an objective way. Chemical analysis using GC-MS makes it possible to identify aroma components and to achieve profound insight into the flavor composition and deviation in flavor of products. Insight into the molecular basis of flavor and aromas of products can lead to successful innovations in products and processes.

Contact

Taste

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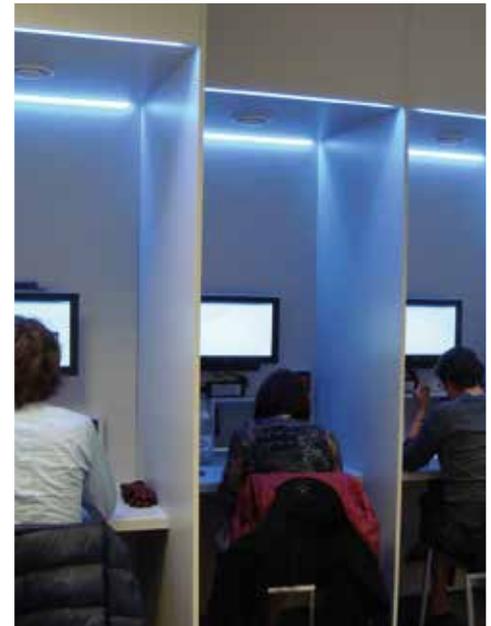
Aroma profiling

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Matrix	Parameter	Method	Accreditation
Foodstuffs	Sensory evaluation: Triangle test	ISO 4120	No
	Sensory evaluation: comparative test	Own method	No
	Aroma profiling	GC-MS	No
Milk powder	Organoleptic evaluation	IDF 199C	No



9. Study of shelf-life

The Food Pilot has high-level expertise and a complete infrastructure to answer all of the industry's questions about shelf-life. Using the Food Pilot production lines, new ingredients, recipes or processes can be evaluated on a semi-industrial scale. Packaging food under modified atmosphere can also be studied at the Food Pilot. After packaging, the microbiological, (bio)chemical, physical, and sensory quality is studied in the laboratories described above. Finally, the Food Pilot has a large collection of isolates of pathogenic or spoilage organisms which can be used in challenge tests where microorganisms are deliberately inoculated into the food products.

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10. In vitro screening and gastro-intestinal simulations

To determine antibacterial activity (Minimal Inhibitory Concentration (MIC) and the Minimal Bactericide Concentration (MBC)) of components or organisms, the Food Pilot performs tests in vitro (plating method) or in gastro-intestinal simulations (fermentor). These analyses are particularly valuable for questions about additives in food and feed.

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11. Ring trials, reference series and control samples

A **ring trial** makes it possible to independently measure the quality of analyses. Ring trials are inter-laboratory studies where results of analyses from different analysts, institutes and/or machines are mutually statistically compared. Participation in ring trials allows participants to evaluate aspects such as precision, repeatability, and reproducibility, as well as the correctness of their results. In addition, participants get insight into the stability of their analytical results over time by identifying trends. Systematic deviations of a laboratory can be detected either between methods or between equipment. In addition a laboratory can compare its performance with these of other laboratories. When the results are good, the company can use the ring trial to demonstrate its expertise for performing certain analyses. The results can also be used to optimize the quality control system.

ILVO often organizes ring trials, most of which focus on physical-chemical analyses. ILVO demonstrates the good organization of these ring trials by working according to norm ISO 17043. The table on the next page shows the most prominent subjects of the ring trials.

Matrix	Parameter(s)	ISO 17043 accredited
Raw, whole milk	Fat and protein content	Yes
	Freezing point	Yes
	Somatic cell count	Yes
	Total bacterial count	Yes
	Coliforms	Yes
	Enterobacteriaceae	No
	<i>E. coli</i>	No
	Inhibitory substances	Yes/No
Cream	Fat content	Yes

In addition to ring trials, ILVO produces **reference series**. Using reference series, laboratories can evaluate their calibration programs and adjust them as needed. The table below shows all reference series produced by ILVO.

Matrix	Parameter
Skimmed milk	Fat, protein and dry matter content
Condensed milk	
Hard cheese	
Raw whole milk	
Cream	

Finally ILVO produces **control samples**, which are antibiotic standards (positive control samples) or blanks (negative control samples). Control samples can be used to evaluate the good functioning of test methods.

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