COMPANY PROFILE

PARTNER FOR COOPERATION

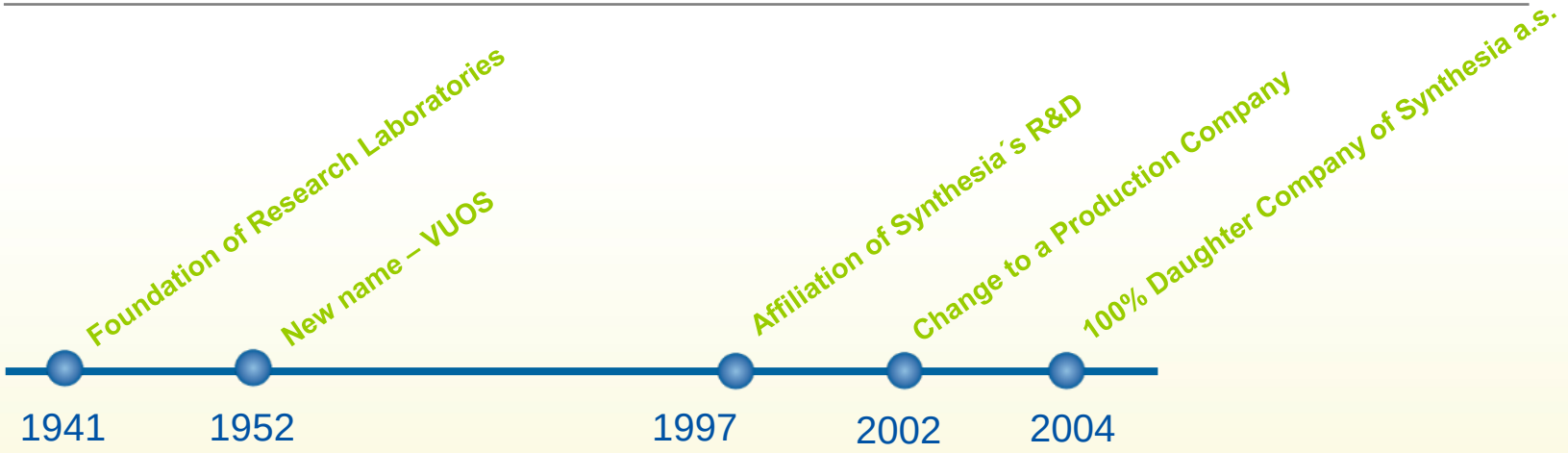
VUOS

Where you can find us

VUOS ownership

AGROFERT, a.s. → **100%** → SYNTHESIA, a.s. → **100%** → VUOS a.s.

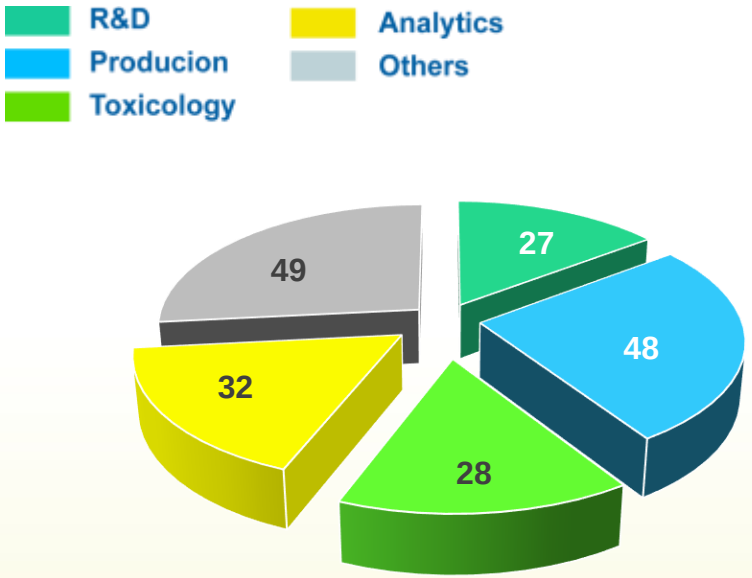
History


Foundation of Research Laboratories
New name – VUOS
Affiliation of Synthesia´s R&D
Change to a Production Company
100% Daughter Company of Synthesia a.s.
1941
1952
1997
2002
2004

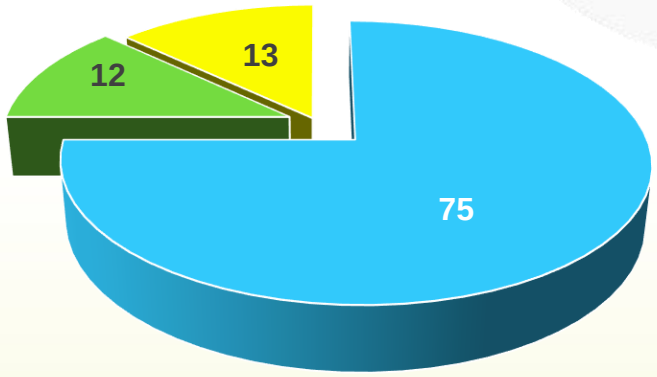
VUOS main businesses

1. R&D and Production of Fine Chemicals

2. Toxicology and Analytics



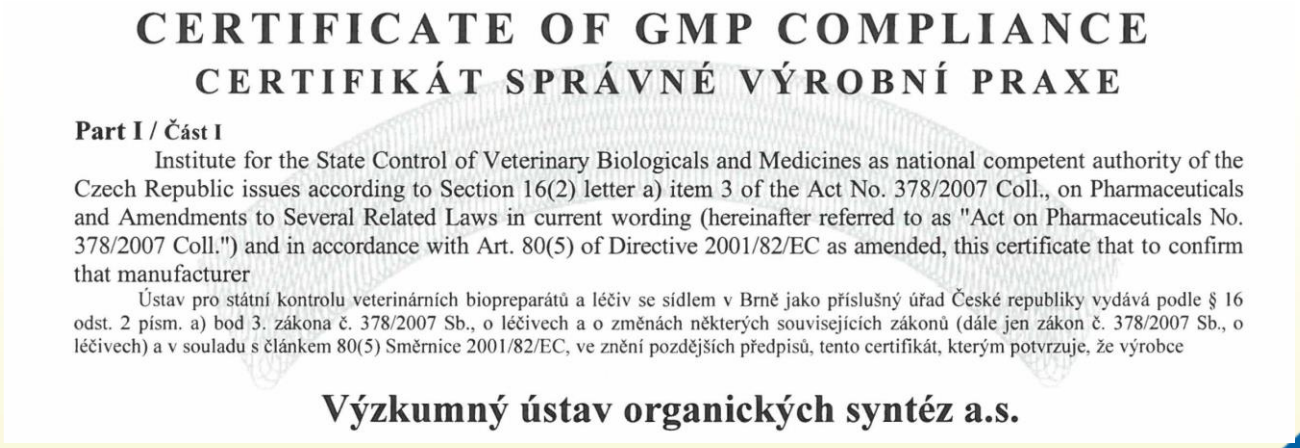
Employees



Sales in %

The Certificates of VUOS

- **Certificate ČSN EN ISO 9001: 2016 (Organic chemicals syntheses development and manufacture)**
- **Certificate of Good Manufacturing Practice (GMP)**
- **Certificates of Good Laboratory Practice in Test Facility (OECD GLP Principles)**



CERTIFICATE OF GMP COMPLIANCE

CERTIFIKÁT SPRÁVNÉ VÝROBNÍ PRAXE

Part I / Část I

Institute for the State Control of Veterinary Biologicals and Medicines as national competent authority of the Czech Republic issues according to Section 16(2) letter a) item 3 of the Act No. 378/2007 Coll., on Pharmaceuticals and Amendments to Several Related Laws in current wording (hereinafter referred to as "Act on Pharmaceuticals No. 378/2007 Coll.") and in accordance with Art. 80(5) of Directive 2001/82/EC as amended, this certificate that to confirm that manufacturer

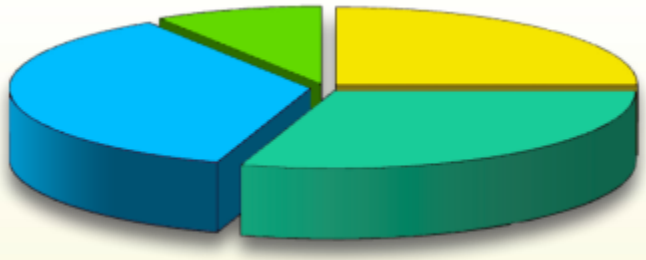
Ústav pro státní kontrolu veterinárních biopreparátů a léčiv se sídlem v Brně jako příslušný úřad České republiky vydává podle § 16 odst. 2 písm. a) bod 3. zákona č. 378/2007 Sb., o léčivech a o změnách některých souvisejících zákonů (dále jen zákon č. 378/2007 Sb., o léčivech) a v souladu s článkem 80(5) Směrnice 2001/82/EC, ve znění pozdějších předpisů, tento certifikát, kterým potvrzuje, že výrobce

Výzkumný ústav organických syntéz a.s.

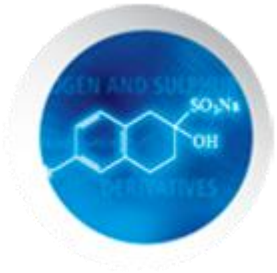
Strong Points

- **Education structure of employees**

- **VUOS is located in area of long-lasting chemical tradition and complete infrastructure**
- **Cooperation with University of Pardubice**



- **Skilled – 25 %**
- **Secondary – 30%**
- **University degree – 36%**
- **Ph.D. degree – 9%**



R&D, upscaling

- **Pharmaceutical intermediates**
  also under GMP standard

- **Intermediates for microelectronics**
- **Dyes and pigments for special application**
- **Custom syntheses of chemical specialities**

R&D, upscaling

Wide range of quantities

Grams	–	in laboratory
Kilograms	–	in kilolab unit
Metric tons	–	in VUOS production plant
Hundreds of MT	–	Synthesia

VUOS key chemistry

Adamantane derivatives

N-Heterocycles

API Building Blocks

VUOS ’s key technology

Hydrogenation

Phosgenation

VUOS technology/manufacture expertise includes:

Organometallic and Cryogenic Chemistry

- Organolithium Chemistry
- Organozinc Chemistry
- Grignards

Transition-Metal Catalysis

- Homogeneous and Heterogeneous Transition-Metal Catalysis
- Cross Couplings (Suzuki, Kumada, Heck, etc.)

Hazardous and Unpleasant Chemistry

- Phosgenation
- Halogenation (PCl_3, $POCl_3$, $SOCl_2$, BCl_3, BBr_3, etc.)
- Rections with Nitroalkanes
- Nitration (in small scale)
- Sulfonation

Reduction and High-Pressure Hydrogenations

- Reduction with Sodium borohydride, Red-Al, Superhydride, etc.
- Reductive Alkylation
- Reductive Amination
- Hydrogenolysis
- Dehalogenation

Kilolab and Production Unit

Phosgenation

- Reactors up to 1 600 l
- 2x High performance rectification columns
- Laboratory phosgenation units from 1 to 30 l

Kilolab and Semi-Pilot Unit

Hydrogenation

- 3x autoclaves 100 l each, 60, 120 and 130 bar, up to 200 ˚C, Hastelloy C clad
- 1x autoclave 300 l, 120 bar, 140˚C, Hastelloy C clad
- 1x autoclave 700 l, 100 bar, 200 ˚C, stainless steel
- 2x autoclaves 1 000 l, 10 and 60 bar, 140 ˚C, stainless steel
- many small autoclaves up to 10 l

Kilolab and Production Unit

Low temperature, RLi, RMgX, R_2Zn

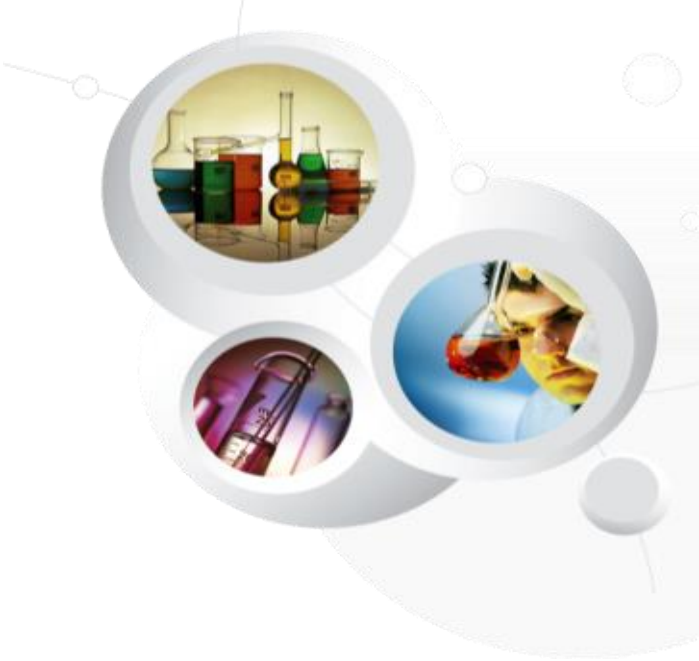
- 1x Glass-lined reactor 63 l cooled down to -80°C
- 1x Glass-lined reactor 400 l cooled down to -80°C
- 1x Glass reactors 630 l cooled down to – 60°
- 3x Glass reactors 100 l cooled down to – 40°C

Kilolab and Semi-Pilot Unit

Multipurpose chemistry

- 4x glass reactors, 100 l each
- 6x glass lined reactors (200–1 500 l)
- 2x evaporators 50 l / h
- 4x stainless steel reactors (300–1 500 l)
  sufficient filtration and distillation capacity

GMP Production Line



Production of API, advanced intermediates, controlled finalization

- Glass-lined vessels 400 and 630 l
- Stainless steel vessels 400 and 630 l
- Filtration, Centrifuging and Drying

Production Unit

Production Equipment

- 52x glass lined reactors, total vol. 85 000 l (500 – 6 000 l)
- 16x stainless steel reactors, total vol. 29 000 l (1 000–6 000 l)
- 8x High performance rectification columns
- sufficient filtration capacity (nutsches, centrifuges)
- computer controlled

New

Pharma Intermediates Production Unit

Purpose

- Dedicated for the production of pharma intermediates under GMP standard
- 5 reactors , total volume 10 000 l, stainless steel and glass lined
- Filtration, distillation, drying
- In operation from March 2021
- Investment cost 4 mil. EUR

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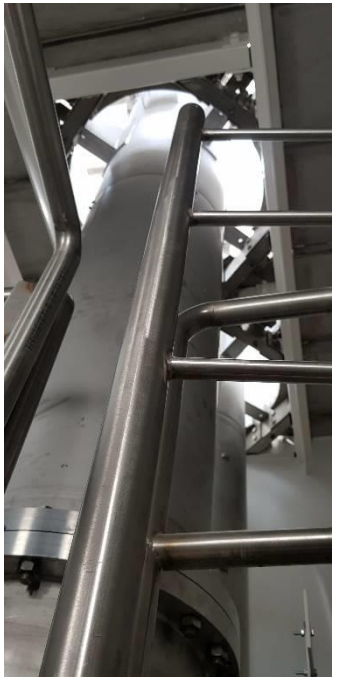

Pharma Intermediates Production Unit

New **Final Operations Unit** dedicated for grinding, drying and blending of dry materials

Purpose

- Dedicated for the for grinding, blending and drying of pharma intermediates under GMP standard
- 3 tray dryers in separate rooms with separate ventilation
- Equipment for grinding and blending
- Investment cost 1.5 mil. EUR

New **Final Operations Unit**
will be in operation in

4Q. 2021

Toxicology, Ecotoxicology and Analytics

Toxicology, Ecotoxicology and Analytics

REACH and CLP Services

- Literature search
- Preparation of dossiers in IUCLID 5
- Preparation of Chemical Safety Report
- Non-testing approaches
  - (Q)SAR
  - Grouping/Read-across
- Preparation of SDS
- Classification of substances and mixtures

Toxicology, Ecotoxicology and Analytics

Analytical methods

- NMR Spectrometry, Mass Spectrometry (LC/GC-MS)
- ICP-AES, IR Spectrometry, Chromatography (HPLC, GC), UV-VIS

GMP control laboratory

- Servis for Customers: Validation, IPC, Quality Control

Toxicology, Ecotoxicology and Analytics

Toxicological tests

In vivo and in vitro tests according to the OECD or EU methods:

- **Acute toxicity**
- **Skin and Eye irritation**
- **Sensibilisation**
- **Repeated dose toxicity**
- **Reproductive toxicity**
- **Carcinogenicity**
- **Mutagenicity**

Toxicology, Ecotoxicology and Analytics

Ecotoxicological tests

- Aquatic toxicity
- Biotic degradation
- Abiotic degradation
- Adsorption/desorption

Physico-chemical tests

- Information on physicochemical properties of substance

Contacts

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