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customized competence

Introduction to Saltigo

Chemical Expertise and Process Development Capabilities

SOCMA Manufacturing Solutions Day – June 9, 2021

Steve Aderman – New Business Development Manager

Saltigo – A leading custom manufacturing organization for the agro and fine chemicals market

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Overview



- Part of LANXESS AG in segment Consumer Protection
- Globally recognized in agro & fine chemical custom synthesis
- 1200 employees, 10 manufacturing plants

Products & brands



- Complex multi-step custom syntheses at almost any scale
- **Saltidin®**: Effective insect repellent with outstanding properties
- **Fine Chemical Intermediates**: Quality for various applications

Facts & figures



- Outstanding production network with 10 plants in Germany
- World-class R&D center in Leverkusen to develop efficient chemical processes
- Batch processes up to 5,000 t/a for ~150 customers

Products with broad range of applications in agrochemicals, fine chemicals and pharmaceuticals

Project business and chemicals for various purposes



Insecticides



Fungicides



Repellents



Cosmetics



Heart Disease



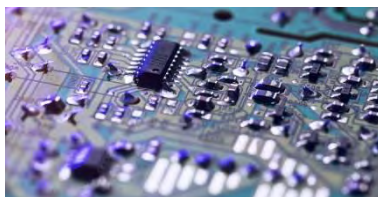
Renal Care



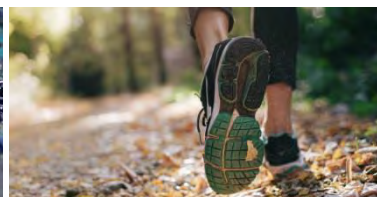
Herbicides



Nematicides



Electronics



Polymers



Anti-Thrombosis



Anti-Mycotics

Agrochemicals

Non-Life Science Fine Chemicals

Pharmaceuticals

Animal Health

Global procurement focusing on quality, competitive raw material costs, innovation and sustainability

Project based

- Involved in all project phases & entire product life cycle
- Important value lever (~400 new raw material inquiries p.a.)
- Short internal decision processes



Global network

- Extensive international market knowledge with decades of experience
- “Boots on the Ground” India & China, Saltigo Procurement
- Auditing suppliers according to ISO, GMP and TfS standards



Location advantage

- Chempark Leverkusen easily accessible (road, river, railway)
- Availability of multiple basic raw materials via pipeline
- Close collaboration with LANXESS (global procurement and lead buyer network)



Technology integrated into site infrastructure

Integrated Sites

- Strong Chempark infrastructure in Leverkusen and Dormagen
 - Pipeline network:
 - > Basic raw materials & solvents
 - > Cl_2 , POCl_3 , PCl_3 , PCl_5 , SOCl_2 , MeCl , H_2
 - Backwards integration to:
 - > Hydrazine, HF, phosgene, triazole, SO_2Cl_2
- Concentration of assets, know-how & services in close proximity
- Short distances foster efficient project management
- Production units to support 1 – 8 synthetic steps



Challenging chemistries and technologies in process development and manufacturing

Challenging reagents

- Phosgene
- Hydrazine, methyl hydrazine
- Hydroxylamine, Methyl nitrite
- PCl_3 , POCl_3
- HF
- Hydrogen peroxide (oxidations)



Basic technologies



- Hydrogenation, Amination
- Friedel-Crafts reactions
- Grignard reagents
- Chlorination, Bromination
- Halex reactions
- Ethylene oxide

Cutting edge

- Cross-coupling technologies
- Buchwald C-N coupling
- Asymmetric catalytic hydrogenation
- Transfer hydrogenation
- Enzyme catalyzed reactions
- Metathesis



Saltigo convinces with outstanding & powerful network



Versatile technology base

- Broad permits, versatile technology
- Complex syntheses in many scales
- Wide-ranging equipment and material mix

Chemical park integration

- Excellent infrastructure
- Broad recycling capacities
- Waste water treatment, incineration and landfill on site

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Excellent network

- 10 connected plants in Germany
- Integrated in LANXESS group
- Process Development & Analytics located next door

HSEQ

- ISO certified
- Reliable quality
- High safety standards



Saltigo's integrated production network is a key asset

Phosgenation



Agrochemicals



Chlorination



Fine Chemicals



Distillation



Pharma Intermediates



Hydrogenation



Almost no Limitations



Multi-Step AI's



Pilot Production and Scale-up



Saltigo production network – Detailed view

Plant 1



“The Phosgenators”

- Phosgene chemistry
- Mono- & Multi-purpose assets
- Units 8-20 m³

“The Multi-Purpose Plant”

- High-potency herbicides
- Multi-purpose plant
- Units 6-20 m³

Plant 2



“The Chlorination Plant”

- Reactions with Cl₂, PCl₃, POCl₃
- Mono- & Multi-purpose assets
- Units 6-25 m³

“The Multi-Purpose Plant”

- Agro & Fine chemicals market
- Multi-purpose plant
- Units 6-25 m³



“Distillation Pros”

- Columns for all separation challenges
- 20-120 plates
- Units 12-40 m³

“Intermediates for Pharma”

- Recipe operation mode
- Modules from 2.5-8 m³



“High Pressure Hydrogenation”

- Hydrogenation, Alkylation and Amination
- Units 1.8-5 m³, conti, batch
- Reactions up to 200 bars

“The Versatile Plant”

- From chill to high temperature
- From Grignard to Fluorination
- Units from 4-12 m³

Plant 4



“The Multi-Purpose Plant”

- Multi-purpose plant
- Multi-step syntheses of AI's
- Units 6-16 m³

“Pilot Production and Scale-up”

- From laboratory to production
- Flexible plant concept
- Units from 0.3-16 m³

Plant 3



Plant 5



Dedicated pilotation equipment to support increasing customer demand

Pilot production at Saltigo

- Increased demand for pilotation observed in the market
- Three separate interconnected production lines generate speed & flexibility
- Sizes offered are in 500kg – 2t range



Vessel 1



Vessel 2



Filter dryer 1



Vessel 3



Vessel 4



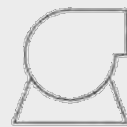
Filter dryer 2



Vessel 5



Vessel 6



Centrifuge 1



Strong track record in all essential areas makes Saltigo a sustainable outsourcing partner

Technology & assets

- Broad chemical expertise and technology base
- Tailor-made solutions
- Scale from kg's to 100(0)'s of tons

- Strictest HSEQ compliance
- State-of-the art effluent treatment
- Ability to handle challenging material
- Meeting high quality requirements

Health, safety, environment, quality

Sustainability at competitive costs

- Continuous improvements
 - Smart processes, yield increase, raw material savings
 - Waste reduction, recycling
- Economy of scale

- Supply chain resilience
 - Backwards integration
 - Balanced procurement strategy
- Financial Stability

Stability

Pharma custom manufacturing is integral part of Saltigo's business model

Key facts

- Broad technology toolbox for complex ISO intermediates and registered starting materials
- Solutions for variety of applications, including cardiac medications, anti-thrombosis and anti-mycotics
- Successful realization of pharma development projects from toxicological studies to commercialization
- Long standing experience in process development and scale-up based on 150 years of experience in chemistry
- Supplier awards for pharma custom manufacturing underline Saltigo's track record
- Impeccable inspection history by customers and authorities



Saltidin®: Effective insect repellent with outstanding properties

Efficacy

- Extremely long-lasting
- Against broad spectrum of insects

Formulation

- Good solubility
- High stability
- Non-corrosive and colorless

Safety

- Non-toxic
- Non-irritating for skin
- Low dermal penetration

Cosmetic properties

- Non-sticky
- Non-greasy
- Almost odorless

Compatibility

- Appropriate for use with
 - plastics
 - coatings
 - sealants



Saltidin® (Icaridin or Picaridin) effective, safe and user-friendly

Fine Chemical Intermediates made by Saltigo – Reliable quality for various applications

Triazole

- 1,2,4-Triazole

Special reagents

- Emulsifier W
- Iron(III)-acetylacetonate
- *N*-Ethylpiperidine
- Methyl carbazate

Phosgene derivatives

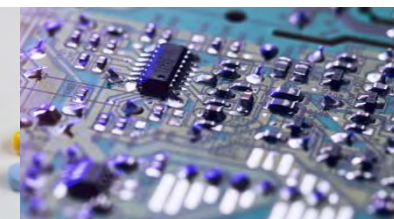
- Ethyl CF
- Methyl CF
- Propyl CF
- Phenyl CF
- Isopropyl CF
- 1,1'-Carbonyl-diimidazole (CDI)
- *CF = Chloroformate

Building blocks

- 4-*tert*-Butylcyclohexanone
- 2-Methylcyclohexanol
- Dimethylsulfamoyl chloride
- Tristyrenated phenol

Toluidine derivatives

- *N,N*-Bis(2-hydroxypropyl)-*p*-toluidine
- *N,N*-Bis(2-hydroxyethyl)-*m*-toluidine
- *N,N*-Bis(2-hydroxyethyl)-*p*-toluidine
- Accelerator PT25E/2



Applications & Industries

Coatings

Catalysts

Corrosion Inhibitors

Pharmaceuticals

Plastics

Adhesives

Agrochemicals

Polyurethanes

Construction

Flavors & Fragrances

Electronics

Curing Agents

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150 years of chemistry heritage

Supply chain management



Backwards integration to LANXESS Building Blocks



Multi Step Synthesis (1-8) of kgs – 1,000's mt solids/liquids



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BACK UP

Saltigo is a subsidiary of LANXESS, a globally operating specialty chemicals company

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**LANXESS -
Specialty
chemicals
company**



- Spin-off from Bayer in 2004
- Specialty chemicals portfolio: chemical intermediates, additives, specialty chemicals and plastics

**LANXESS -
Global
success
story**



- Approximately 14,200 employees in 33 countries
- Global sales of EUR 6.1 billion in 2020

**LANXESS -
Strategy of
profitability
and resilience**



- Strengthening of leading position in medium-sized markets
- Consolidation in Europe, expansion in USA and Asia

LANXESS business units are divided into four segments – Saltigo is part of Consumer Protection

Advanced Intermediates	Specialty Additives	Consumer Protection	Engineering Materials
			
<ul style="list-style-type: none">▪ Advanced Industrial Intermediates▪ Inorganic Pigments	<ul style="list-style-type: none">▪ Lubricant Additives Business▪ Polymer Additives▪ Rhein Chemie	<ul style="list-style-type: none">▪ Liquid Purification Technologies▪ Material Protection Products▪ Saltigo	<ul style="list-style-type: none">▪ High Performance Materials▪ Urethane Systems

Group functions and countries

Business unit set up fosters dedication and entrepreneurship

High quality standards are proven by global certifications

ISO certificates

- ISO 9001
- ISO 14001
- ISO 50001
- ISO 17025



Feed & food certificates

- Halal
- HACCP concepts



Compliance

- REACH standards (Registration, Evaluation and Authorization of Chemicals)
- FDA approved
- EPA certified



Saltigo commits to sustainability

Responsible Care

Implementing RC is our everyday business, meaning we are working continuously to improve our processes and our services in terms of environmental and climate protection, health, safety and quality



EcoVadis – TfS

Together for Sustainability: Global supplier engagement program focusing on sustainability sourcing practices, including ecological and social aspects. Gold status “Advanced” – Level since 2014-04



FTSE4Good

Listed since 2011, following the criteria for: Environmental Management, Climate Change, Human and Labor Rights, Countering Bribery and Corporate Governance



CHEMIE³

Guidelines for Sustainability in the Chemical Industry in Germany



DJSI

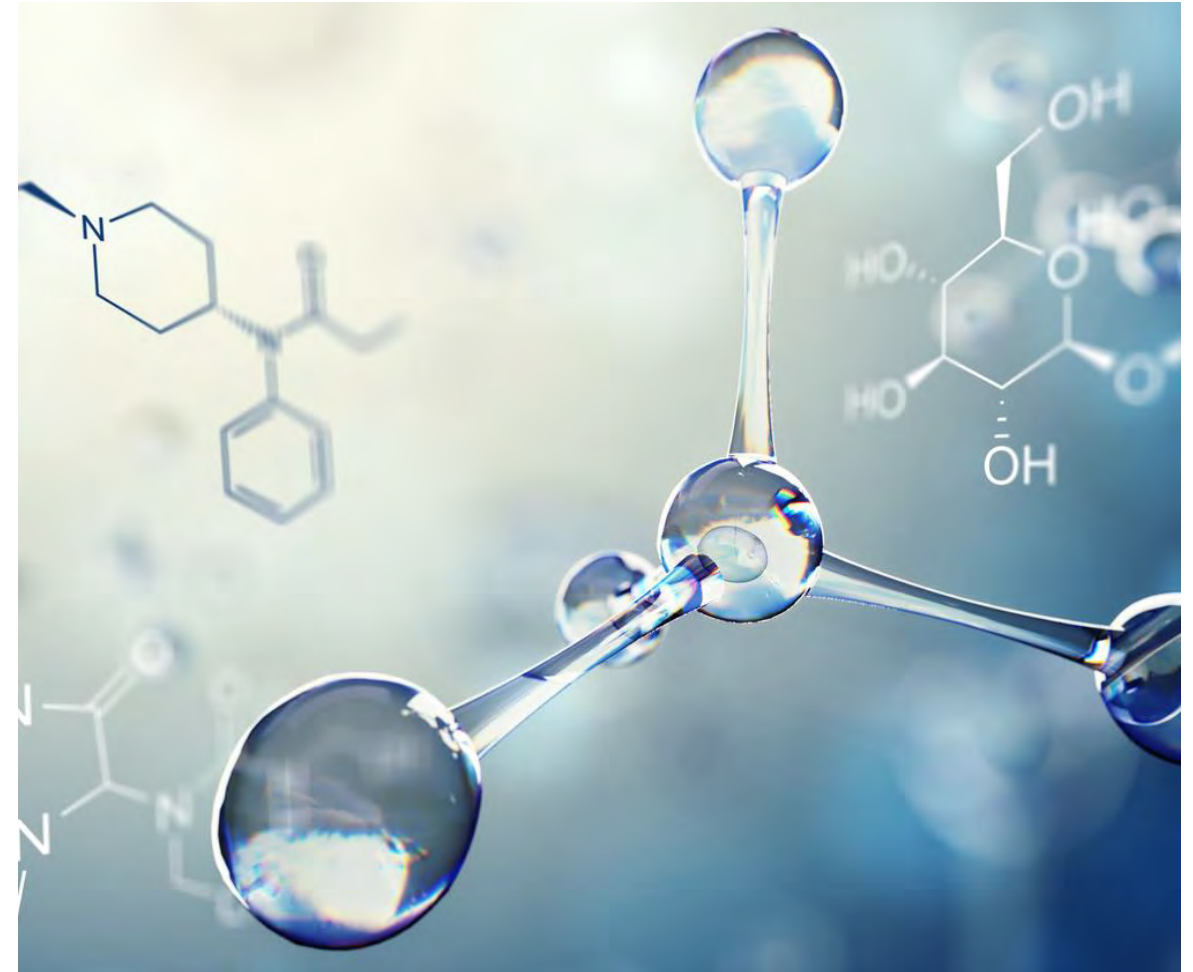
LANXESS one of 11 chemical companies worldwide with an outstanding rating



Process development with strong roots and a versatile, future-oriented technology base

Chemical expertise in process development

- Strong process development with 13 labs & analytics
- Heritage of 150 years in chemical manufacturing
- Broad access to special technologies on lab scale, e.g.
 - pressure reactions, hydrogenations (200 bar/200°C)
 - flow-chemistry
 - phosgene
 - fluorination with HF / KF
 - metathesis
 - Mini plants
 - etc.



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