



Biotech

Lohtragon®

Crystallizing Solutions

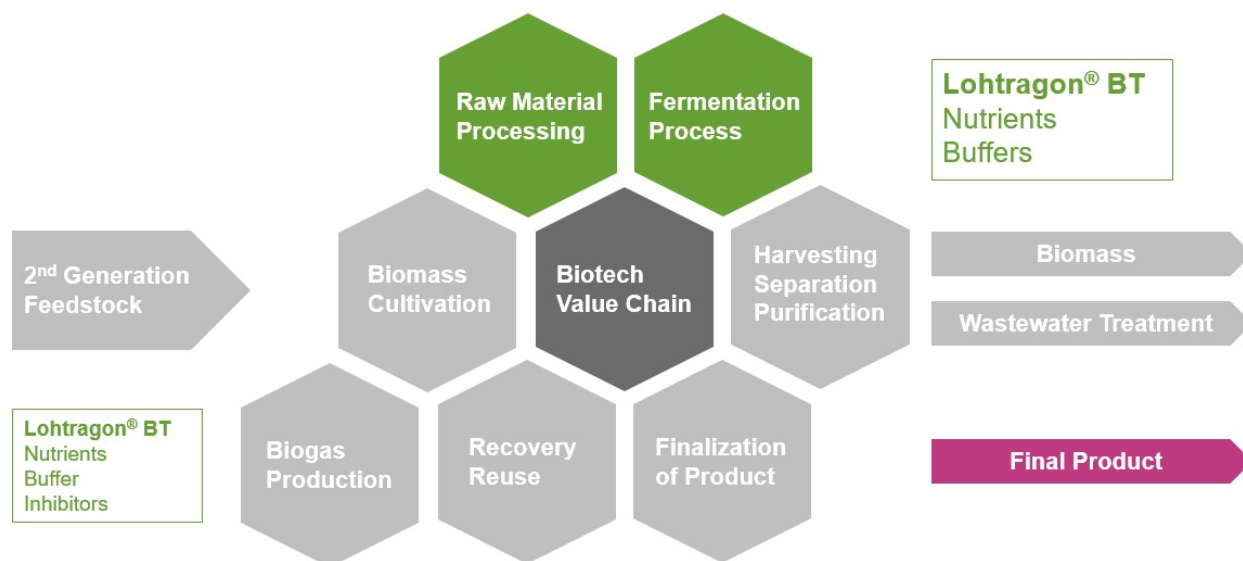
## Info Sheet Lohtragon®

### Inorganic Ingredients for Targeted Fermentation Processes

Biotechnology is one of the future-oriented segments of Dr. Paul Lohmann®. The increasing role of this technology is linked to the sustainable approach of producing value-added products from renewable sources with reduced waste, energy consumption and greenhouse gas emission, avoiding fossil resources and hazardous intermediates – to name a few advantages. Dr. Paul Lohmann® has established an overarching “Center of Competence Biotechnology“, covering the segments of [BioPharma](#) (Brochure: [Innovative Salts for Biopharma](#)), Food Biotech (e.g. [Cultured Meat](#)) and Industrial Biotech.



In this context the **Lohtragon® BT product range for industrial biotechnology** focuses on large-scale fermentation processes considering all the steps along the biotechnological value-chain. The Lohtragon® BT competence is inorganic chemistry. We thereby permanently support the formulation of defined synthetic fermentation media. Our experts are keen to adjust our Lohtragon® BT inorganic components and their blends (Premixes) in order to meet your requirements – providing your tailor-made solution. Our broad range of metal salts combined with expertise in the modification of these pure substances and their manifold compositions contribute to properly defined culture media.



For targeted fermentation processes the Lohtragon® BT inorganic components are essential for:

- ◆ Ensuring highest possible growth rates
- ◆ Enhancing titers resulting in optimum yields of the desired final product
- ◆ Improving efficiency from the beginning of the fermentation by optimum process conditions
- ◆ Steering the process by controlled variations



## Lohtragon® BT – What can we offer?

Lohtragon® BT inorganic components are specified. Any Premixes of these products, solid or aqueous solutions, are also specified. The Lohtragon® BT Premixes are sophisticated mixtures, considering interactions between the components. All this leads to defined fermentation media and a target fermentation process.

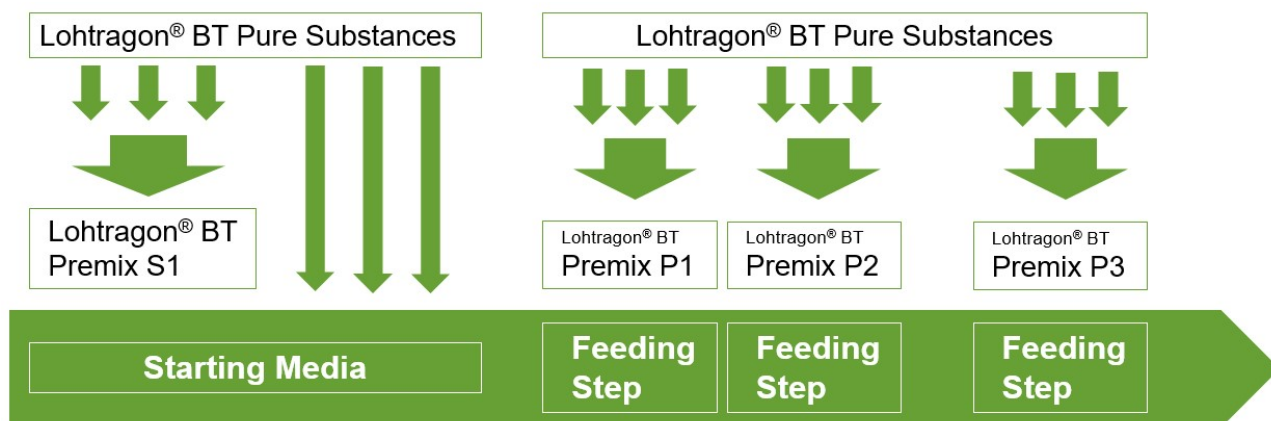
Lohtragon® BT inorganic components make sure your microorganism feel comfortable!

If not: we can adjust the Lohtragon® BT inorganic components as well as the Premixes in a defined and reproducible way: to make the microorganism feel good and productive!



## Lohtragon® BT Concepts to Ensure a Targeted Fermentation Process

There are various fermentation methodologies and all require starting media containing certain inorganic components. Additionally, for fed-batch and continuous processes we recommend sophisticated feed strategies which typically require an adjustment of the defined media because of the specific needs and consumption of the inorganic components throughout the fermentation process. Tailor-made Lohtragon® BT process Premixes ensure a targeted fermentation process.



Lohtragon® BT plays a crucial role along the targeted fermentation process:

- ◆ Ideally a tailor-made Lohtragon® Premix S1 for starting media is designed based on specific requirements
- ◆ The same approach leads to tailor-made Lohtragon® Premixes P1, P2, P3 for the various feeding steps:
  - ◆ Each added at a defined point during the process
  - ◆ Each having individual composition and varying concentrations – if required
- ◆ All pure substances and Premixes can be offered in individual packaging
- ◆ We support scale-up requirements related to these concepts



## Your benefit from the Lohtragon® BT Pure Substances and Premixes

For your defined media in your targeted fermentation processes you can rely on high quality products. The pure Lohtragon® BT substances are:

- ◆ Chemically defined, documented and reproducible regarding:
  - ◆ The level of purities
  - ◆ Chemical properties
- ◆ Physically analyzed and optimized regarding various parameters:
  - ◆ Particle size distribution, flowability and other characteristics for solids
  - ◆ pH value, concentration for aqueous solutions
- ◆ Available as solids or aqueous solutions in individual packaging



The defined framework conditions of these inorganic components independently if pure or blended, solids or aqueous solutions allow highest possible efficiency, by:

- ◆ Optimum supply of nutrients and buffers
- ◆ Adjustable and individually optimizable compositions and concentrations
- ◆ Best possible solubility behaviors and bioavailability

As the formulation of media in general and specifically of defined media is a dynamic area of research we contribute to an efficient fermentation process based on our far reaching expertise in metal salts:

- ◆ Avoid immobilization of nutrients which reduce their bioavailability:
  - ◆ Precipitation
  - ◆ Complexation
- ◆ Provide formulation know-how

Precipitation always is an unwanted effect with negative impact on efficiency, growth rates and yields. While complexation (addition of chelates) can be beneficial there are cases in which the complexation reduces the availability of essential nutrients.



The Dr. Paul Lohmann® R&D and application team in charge of developing the Lohtragon® BT range has extensive experience in chemical and physical properties of the pure substances as well as their interactions.

When developing pure Lohtragon® BT inorganic substances or solid Premixes properties like solubility, free-flowing behavior are relevant. For the Lohtragon® BT aqueous solutions the knowledge around solubility product calculations and trails is essential. The prediction of the precipitation behavior and how to avoid is crucial:

- ◆ Lohtragon® Premixes are optimized
- ◆ Process water potentially has an impact
- ◆ Other components of the media need to be evaluated

In addition, the control the osmotic pressure of the cell is highly dependent on the inorganic components of the media as well as the redox potential. The more obvious parameter is the pH value during the fermentation process and the Lohtragon® BT buffers provide optimum pH stability.

To complete the service we give advice about how to mix and combine the various inorganic components.

## Lohtragon® BT Inorganic Components for Defined Fermentation Media

Inorganic components are essential ingredients of fermentation media and predominantly act as:

- ◆ Nutrients
  - ◆ Macronutrients (N, K, Ca, Mg, P, S, Fe)
  - ◆ Micronutrients (Fe, Cl, Mn, B, Zn, Cu, Mo, Ni, Co, ...)
- ◆ Buffers

These are the basis for Lohtragon® BT inorganic components for both defined media in the starting and the process phase though the composition and concentration might vary significantly.

The advantages of such Lohtragon® BT components in defined media are:

- ◆ Optimum (and minimal) concentration
- ◆ Known and constant properties of the pure substances
- ◆ Constant composition of Premixes
- ◆ Supply chain control and transparency
- ◆ Optimum supply of nutrients and buffers
- ◆ Adjustable and individually optimizable

Our Lohtragon® BT offering is a shortlist of the broad portfolio of pure substances. The classification into nutrients and buffers is only indicative as most substances can act as both nutrient and buffer. They also determine properties like osmotic and redox behavior.

Lohtragon® BT Nutrients	CAS no.
Ammonium Sulfate	7783-20-2
Calcium Chloride 2-hydrate	10035-04-8
Copper(II) Sulfate 5-hydrate	7758-99-8
Ferric Ammonium Citrate	1185-57-5
Ferric Choline Citrate	1336-80-7
Ferric Citrate	3522-50-7
Ferric Pyrophosphate with Sodium Citrate	85338-24-5
Ferrous Sulfate 7-hydrate	7782-63-0
Magnesium Chloride 6-hydrate	7791-18-6
Magnesium Sulfate 7-hydrate	10034-99-8
Manganese(II) Sulfate 1-hydrate	10034-96-5
Potassium Chloride	7447-40-7
Sodium Chloride	7647-14-5
Sodium Sulfate, anhydrous	7757-82-6
Zinc Sulfate 7-hydrate	7446-20-0

Lohtragon® BT Buffers	CAS no.
Ammonium Acetate	631-61-8
Ammonium Formate	540-69-2
Potassium Acetate	127-08-2
Calcium Acetate	62-54-4
Calcium Formate	544-17-2
Monopotassium Phosphate	7778-77-0
Dipotassium Hydrogen Phosphate	7758-11-4
Sodium Acetate anhydrous	127-09-3
Sodium Acetate 3-hydrate	6131-90-4
Sodium Bicarbonate	144-55-8
Sodium Carbonate	497-19-8
Trisodium Citrate 2-hydrate	6132-04-3
Sodium Formate	141-53-7
Sodium β-Glycerophosphate	819-83-0
Monosodium Phosphate, anhydrous	7558-80-7
Monosodium Phosphate 1-hydrate	10049-21-5
Monosodium Phosphate 2-hydrate	13472-35-0
Disodium Phosphate anhydrous	7558-79-4
Disodium Phosphate 2-hydrate	10028-24-7
Disodium Phosphate 7-hydrate	7782-85-6
Disodium Phosphate 12-hydrate	10039-32-4
Sodium Propionate	137-40-6
Sodium Succinate 6-hydrate	6106-21-4

## Contact

Connect directly with our Lohtragon® experts in our German headquarter.



+49 5155 63-5888  
contact@lohtragon.com  
www.lohtragon.com

## Lohtragon® – A Brand of Dr. Paul Lohmann®

For over 135 years, the company Dr. Paul Lohmann has been able to establish and maintain its leading position as an international manufacturer of mineral and metal salts that meet the highest quality standards. The product range includes over 400 different salts, from Aluminum to Zinc, in a total of over 7,000 different specifications.

Dr. Paul Lohmann® supplies its specialty salts worldwide to customers in the pharmaceutical industry, food sector, food supplements, cosmetics and – under the Lohtragon® brand – to customers in industrial applications.

Lohtragon® stands for unique competences in manufacturing, optimizing and developing metal salts for a broad variety of industrial market segments. Established in diversity, tailor-made for you, your application and your process - our solution for your challenges!