



BIOTENSIDON BACKGROUND INFORMATION

About Biotensidon

German biotech start-up Biotensidon GmbH is a subsidiary of Swiss Biotensidon International AG. Founded in 2011, the company has become a leading producer of biosurfactants. Its Head Office and R&D and production sites are based in Karlsruhe/Bruchsal (Germany). The company's team currently consists of 20 experts in the fields of microbiology & biochemistry, bio engineering, general management, accounting & controlling, as well as sales & marketing. Biotensidon was recently awarded second place in Germany's prestigious Next Economy Award 2016, in recognition of its groundbreaking research on industrial application of eco-friendly bio agents.

Biotensidon has achieved a major breakthrough in economically feasible mass production of rhamnolipids. Rhamnolipids are biosurfactants generated from non-pathogenic microorganisms through fermentation. Just as effective as chemical or petroleum-based surfactants, rhamnolipids are 100 percent biodegradable. With low production costs, they will gradually succeed chemical surfactants as standard key ingredients of various product categories. They can be used as emulsifiers and boosters in cosmetics and pharmaceutical products, significantly reducing the required amount of active substances. They are also natural de-greasing agents. Modern-day soil decontamination, in particular oil spills, also relies on biosurfactants. Furthermore, using biosurfactants as seed coating in crop-cultivation drastically reduces the need for toxic fertilizers. Used as animal-feed additives in livestock farming, biosurfactants can limit the use of synthetic antibiotics. Due to their foam-building characteristics, biosurfactants are also valuable ingredients of effective and eco-friendly fire-extinguishing foams.

As an industry-first, Biotensidon has developed a unique fermentation method that ensures sufficient output of Rhamnolipids on an industrial scale (> 30 g/liter). The new technology simplifies the entire production process and significantly reduces



costs. To become the world's leading mass producer of Rhamnolipids, the company has started a massive investment program and will have a full-scale production site ready in Germany by the end of 2019 (production volume 5,000 tons annually).

Biotensidon stands out as an innovative company in other fields as well. With its investment policy that emphasizes joint ventures in production over direct investments and Stock Market activity, the company offers flexibility in establishing production sites for various product groups and in various regions around the world.



Products

Rahmonolipid liquids and powder

Following its technological breakthrough in both the cultivation of effective bacteria strains that produce rhamnolipids and the development of economically feasible production methods of rhamnolipid-based biosurfactants, Biotensidon GmbH has started the build-up of mass-production capacity.

We will be able to deliver mass-volumes of rhamnolipid liquids and powders by mid 2017, aiming for a production volume of 200 tons. Producers of various products will thus be able to switch their surfactant ingredients to our biosurfactants within a matter of months.

In a two-year build up plan we will increase output to 5,000 tons annually by end of 2019, strengthening our position as the world's leading rhamnolipid biosurfactant producer.

Product categories / sector utilization

- **Pharmaceutical and cosmetic rhamnolipid emulsifiers / booster**

Vast numbers of consumers use cosmetics and pharma products every day.

Almost every product in these categories contains surfactants that are used, among others, as emulsifiers to soften products or to make them smooth.

Surfactants are also used as foam-building and cleansing agents in detergents.

Approximately 18 million tons of surfactants are utilized for such purposes every year. Most of them are chemical or petroleum-based, which have side-effects that are difficult for human health and the environment. Biotensidon's rhamnolipid-based biosurfactants are just as effective as chemical surfactants but health- and eco-positive. Moreover, rhamnolipids significantly reduce the required amount of active substances. Producers of pharmaceutical and cosmetics-products can thus clean and green their products by sourcing our rhamnolipid liquids and powders. Without adding costs, they will experience a much larger customer satisfaction.



- **Agriculture (Rhamnolipid Seed Coating & Rhamnolipid Fertilizer)**

We offer biological alternatives to chemical fertilizers and pesticides. Our products have proved to increase the crop yield per acre of land by up to 50 percent on even the most difficult soils. They also serve as effective bio-protection against plant pathogens and pests. We work with nature's very own tools, without contaminating soils: Our products are biodegraded in water and neutral CO₂ within a matter of days. Moreover, our customers benefit from the fact that no residues remain on the plants, thus there are no health risks for consumers as with chemical solutions.

- **Animal breeding nutrition**

Our rhamnolipid-based nutrition additives add value to our customers' meat products. Live stock breeding often entails the difficulty of maintaining animal health in an economically feasible manner. In the breeding process, nutrition plays a crucial role, not only in terms of feeding but also regarding animal health. Our rhamnolipid-based bio-additives preserve animal health, as they strengthen the immune system, thus limiting the need for synthetic antibiotics. Costs of biologically difficult additives are thus minimized. The positive marketing effects of meat improvements may further add to the value we bring to the farm.

- **Biological cleaning agents**

Soil contamination, in particular with oil spills, pose dangers to nature and human health. Using chemical agents to clean soils and beaches often worsens the biological impact of the spill. Our rhamnolipid solutions clean soils just as effective as chemical agents, without further damaging the environment.

Likewise, greases on machinery and in grease-intensive sectors, like the gastronomy, are mostly cleaned using chemical agents that damage the ecosystem and pose serious health-threats to humans. Here, too, rhamnolipid-based liquids offer a health- and ecologically neutral alternative, as our research for the Swedish government has proved.



- **Fire extinguishing foam**

Rhamnolipids have excellent foam-building properties. Together with fire fighting experts, we have developed foams that can extinguish fires within a matter of seconds. Our products are very effective when used to extinguish wild fires, fuel fires, water-resistant fires and fireworks.



Biotensidon sites

Karlsruhe / Bruchsal, Germany

- Headoffice Biotensidon GmbH
- Research & Development Unit
- Production Facility

Zurich, Switzerland

- Headoffice Biotensidon AG