



## Südzucker

**Südzucker is an internationally operating corporate group. The Südzucker AG, headquartered in Mannheim, is the parent company of the Südzucker Group. The group comprises five segments: Sugar, Specialties, CropEnergies, Starch, and Fruit. Thus, Südzucker is much more than just a pure sugar producer.**

We process agricultural raw materials into high-quality products, especially into food for industrial customers and end consumers, but also into feed and other products for the food and non-food sectors, like biofuels and bio-based chemicals.

Since July 2022 Südzucker has been a member of the Renewable Carbon Initiative supporting the activities driving the transformation from fossil carbon to renewable alternatives.



### Interview

with **Dr.-Ing. Jens Angermann**  
**New Business Development,**  
**Head of Biobased Chemicals**  
**Südzucker Group, Germany**



Jens Angermann is a trained process engineer and holds a doctorate in energy process engineering. Since 2004, he has held various positions in engineering, ethanol technology and research and development at Südzucker Group.

Since 2021, he has been responsible for biobased chemicals in Südzucker Corporate New Business Development.

Jens Angermann has been appointed as Südzucker representative. The interview reflects the position of the team involved.

***Is your beet-based sugar also used for the production of renewable chemistry, and what developments has Südzucker itself made to produce chemical intermediates in addition to food and feed?***

Indeed, amongst other carbohydrate sources sucrose seems to be a perfect candidate for the production of renewable chemicals and derived materials. But as Südzucker is processing much more than sugar beets, we consider also other agricultural raw materials to be used for those kinds of applications. This is what we call our carbohydrate platform. E.g. CropEnergies produces renewable ethanol and CO<sub>2</sub> from starch-based carbohydrates. Both these products are as well applicable as raw materials for further downstream processing towards a broad range of chemical intermediates like ethyl acetate, ethylene, or green methanol to name some.

Südzucker has a long tradition of developing processes and technologies for converting agricultural raw materials into valuable products. The access to the above-mentioned raw materials platform is one of the drivers for our past and ongoing developments and biotechnology as well as chemical catalysis are key technologies used here. The topic of bio-based chemicals is firmly anchored in Südzucker's Group Strategy 2026 PLUS.

Certainly, not all projects are our own developments. In early 2022, CropEnergies, a member of Südzucker Group has entered into an engineering, license and technical services agreement with Johnson Matthey to produce renewable ethyl acetate from sustainable ethanol near its production site in Zeitz, Germany. The ground breaking ceremony is planned for April 2024.

***What is your stand-point in the discussion of using food-crops as industrial feedstock?***

Agricultural raw materials have always been used for more than food covering the demand of a wide range of various applications. This concept is still valid today and with regard to a functioning agronomic system there is no reason to limit the use without

need. The debate shouldn't only be about food vs. non-food application, rather it is about land use efficiency and how or for what available land is used today. Basically, there is enough land available to replace a significant share of chemically used fossil carbon by biomass without limiting food security. But without any doubt it needs the combination with other renewable carbon sources like CO<sub>2</sub> and recycling of materials to defossilize the carbon demand for chemical and material industries.

Certainly, in the event of scarcity one needs to respect the hierarchy of use, meaning food requirements first, followed by material use and for energy utilisation. This is without any discussion. However, biorefineries are not intended to produce only one product and the products are not food or feed or chemicals, but the intention is always a sustainable and efficient combination of such products. A good example in this context is the biorefinery Zeitz of Südzucker Group (see publication in "Chemie Ingenieur Technik, Biorefinery Zeitz of the Südzucker Group – Status Quo and Future Perspectives", 2020).

A further important aspect is a detailed view on the raw materials that are used. For our bioethanol production CropEnergies does not use high quality food crops as feedstock. Here inferior, low-grade grains (C wheat, feed grains) are utilized that are not intended for human consumption. As the quality of agricultural products are very much dependent on environmental influences and are not always predictable, alternative applications are even welcome to market such products of lower quality. In this respect, the question "food crops as industrial feedstock?" is misleading as from low quality products at the same time high-quality components (e.g. proteins) are obtained to be used in the food and animal feed sector.

***How do you assess sugar beet as a competitor to other raw materials?***

Based on land needed and next to sugar cane, sugar beet is one of the most efficient plant to transform CO<sub>2</sub> from the atmosphere into carbohydrates and by

this binding much more CO<sub>2</sub> per hectare and year than any other plant, including woody biomass. The whole plant is utilized, and crystalline sucrose is certainly the most important, but just one of the products. Sucrose basically is a very attractive chemical molecule with very high purity and therefore suitable for a variety of further chemical and biotechnological processes. But on the other hand sucrose is not a cheap product. That's why it will be considered for processes only where it makes sense economically.

Besides sucrose the remaining sugar beet pulp can be used as feed, for material application or energy utilisation. The lime produced during sugar juice clarification is used as a high-quality lime fertiliser to keep the soil healthy. As said sugar beet is a highly efficient root crop. As such, it requires relatively little water and nutrients. Sugar beet has a long growing period until harvest. It therefore covers the soil for a relatively long time and absorbs nitrate-nitrogen from the soil for a long time, thus ensuring one of the lowest nitrate loads among arable crops. Over 40 years, the Südzucker Group has been carrying out its own soil testing and quality-related fertiliser advice via the Bodengesundheitsdienst GmbH on the basis of the EUF method, which is recognised under fertiliser law. This is available for all possible crops and for all customers worldwide. Sugar beets are part of the field crop rotation and therefore an important part of a sustainable agronomy.

***How do you see the future of biofuels in view of the fact that e-mobility is currently massively promoted?***

In the light of decarbonizing the industry it seems obvious that the transportation sector will become partially electrified where it is possible, here especially in road and rail transport. However, there will always be areas that cannot be electrified or where electrification does not appear to make economic or technical sense yet. This is the case for application areas where a sufficient energy density is crucial. Here sustainably produced renewable fuel alternatives are indispensable and will therefore be part of the

future's fuel mix. This includes air- and sea transport in particular, but also parts of road transport (e.g. heavy goods transport, off-road). In these areas, biofuels of different kinds will continue to play an important role in ensuring climate-friendly transportation.

***Is your bioethanol used or will be used for other products in the future?***

Our bioethanol is already used in many applications. Currently, the main application is still biofuels, but it is also applied in different qualities for chemicals, pharmacy, in beverages and for food applications. Especially as a raw material for chemistry, ethanol is a perfect molecule to produce a large product family of interesting biochemicals, which are currently based on fossil resources. That's why the range of possible applications will become even wider in the future.

It is obvious that there is no chemistry without carbon. The challenge is to replace the fossil source of carbon by non-fossil alternatives and by this to also reduce the dependency on today's fossil resources. Utilization of renewable ethanol is a suitable and sustainable alternative to support this transformation. As a very first step – and this was already mentioned above – CropEnergies is going to build a plant for the production of ethyl acetate from renewable ethanol. Ethanol is also the raw material to produce renewable ethylene. CropEnergies has started a collaboration with Syclus B.V., a Dutch start-up targeting to realize large ethylene plants based on ethanol.

***Are there any plans to make use of your own CO<sub>2</sub> resources, e.g. is your R&D competence centre working on technologies in order to produce renewable chemicals or materials out of it?***

Our own CO<sub>2</sub>, namely the biogenic CO<sub>2</sub> from ethanol fermentation is a concentrated point source of high purity, suitable for a variety of different applications. Groupwide we already use approx. 500,000 t of biogenic CO<sub>2</sub> per year to replace fossil CO<sub>2</sub>, especially in the food and beverage sector. Our biogenic CO<sub>2</sub>

is a renewable, sustainable carbon source of high quality, therefore it can be used as raw material for both fermentation and chemical processes. We explored already the production of green methanol from biogenic CO<sub>2</sub> and green hydrogen as well as the biotechnological path to produce organic acids (Bundesministerium für Bildung und Forschung funded ZeroCarb FP project). Such methanol can basically be used for chemistry but due to the current cost level it will be more likely to be used as synthetic fuel for marine transportation or as raw materials for the production of sustainable aviation fuels (SAF).

***What additional value for your company and also for the promotion and development of renewable chemistry and materials do you expect from the RCI?***

The renewable carbon initiative is a widely recognized and respected organization with a science-based approach. Südzucker sees itself as a connector between agriculture and chemistry aiming to prolong our own value chain by producing intermediates and by this offering solutions for the chemical and processing industries able to support their scope 3 emission reduction targets. That actively contributes to the transformation to renewable carbon from all types of biomass as a raw material. Consequently, the addressed topics by RCI are highly relevant for Südzucker. This is on the one hand to promote our targets and to increase understanding and acceptance and on the other hand to learn from the experiences of the other stakeholders participating in the initiative. Currently we are not recognized yet in all dimensions. With our membership we are targeting also to get more visibility and creating awareness.

***How can the RCI profit from your membership?***

Südzucker owns deep and comprehensive experience and know how in the agricultural sector, in process technologies of very different kind as well as in R&D in the food and non-food sector and by this can contribute with expertise in working groups or other

activities. Solid arguments and positions regarding the urgently needed transformation process can be provided hereto and thus support the achievement of the overarching goal.

***What are the sustainability goals for Südzucker Group?***

With our group-wide Sustainability Strategy “Growing in Balance”, we as Südzucker Group aim to contribute to an enjoyable, healthy and sustainable world. That is why we have committed to reducing our absolute GHG emissions from our own business operations (Scope 1) and from the purchase of energy (Scope 2) by 50 percent by 2030 – based on 3.7 million tonnes of CO<sub>2</sub> in the base year 2018 used for comparison – in the impact area of “emissions reduction”. We have also committed to reducing at least 30% of the emissions in our value chain (Scope 3) by 2030. In the impact area “attractive workplace”, we want to achieve a 25% share of women at the top two management levels by 2027. In addition, as Südzucker Group, we have set ourselves the goal of reducing the accident rate for the entire Group by more than half from 11.1 in 2021 to 5.0 by 2026 in the key area of “safe operations”.

In February 2022, Südzucker Group joined the Science Based Targets initiative (SBTi) and thus made a demonstrable commitment to reduce its own greenhouse gas (GHG) emissions in line with the latest climate science findings. Only one year later, in February 2023, the SBTi confirmed the Group’s short-term GHG emission reduction targets for 2030 as being science-based and in line with the Paris Agreement of the United Nations. Südzucker Group was thus the first European sugar producer with validated emission reduction targets (Scope 1 and 2) in line with the 1.5 degree target.