



Bio-based (R)-10-Hydroxystearic Acid

(R)-10-Hydroxystearic acid ((R)-10-HSA) is increasingly valued in dermatological and cosmetic applications due to its moisturizing, thickening, and stabilizing properties. Traditionally produced via chemical synthesis, acib now offers sustainable, biotechnological alternatives based on enzyme catalysis and microbial fermentation.

BACKGROUND

(R)-10-Hydroxystearic acid (R-10-HSA) is a high-value hydroxylated fatty acid with proven moisturizing, thickening, and stabilizing properties – ideal for skin care formulations. Its bioactivity has gained industry attention, highlighting growing market demand. Often synthesized through chemical processes, R-10-HSA can now be produced via sustainable biotechnology, offering a greener alternative for the cosmetics sector.

TECHNOLOGY

acib offers two flexible, scalable biotech routes to (R)-10-HSA:

🌱 **Biotransformation of Oleic Acid:** Using a specialized oleate hydratase enzyme, oleic acid can be directly converted to (R)-10-HSA in a single-step bioconversion. acib's has access to already existing, robust oleic acid hydratases, but could also offer to discover new enzymes from special microorganisms known to acib with unique activities, generating novel IP.

🌱 **Fully Fermentative Production from Sugars:** Leveraging acib's microbial strain development platform, we can engineer microorganisms to produce (R)-10-HSA directly from sugar-based feedstocks. This involves creating oleic-acid-overproducing host strains (such as engineered yeast or *E. coli*) and introducing the oleate hydratase pathway into them. The engineered microbes convert glucose (or other renewable carbon sources) through their fatty acid biosynthesis pathway, internally form oleic acid, and subsequently hydrate it to (R)-10-HSA. This one-pot fermentation approach yields (R)-10-HSA in the broth, which can be extracted after cultivation. acib's expertise in yeast metabolic engineering and *E. coli* fermentation should enable high-titer production. This integrated process is ideal for partners looking to exploit carbohydrate-rich feedstocks and fermentation infrastructure.

OFFER

acib invites industrial partners to co-develop and scale these technologies according to your needs:

- 🌱 Biotransformation for rapid implementation
- 🌱 Fermentation for a fully sugar-based, green process from scratch

You gain access to acib's full R&D toolbox – from enzyme and strain engineering to lab-scale development. IP generated during the collaboration can be fully transferred to you.

EXPERTS

Prof. Dr. Harald Pichler

Prof. Dr. Anton Glieder

DEVELOPMENT STATUS:

Status of the project proposal – Technology Readiness Level 2-3 (concept formulated - proof-of-concept)

KEYWORDS

- R-10-hydroxystearic acid
- Oleate hydratase
- Biotransformation
- Fermentative production
- Cosmetic ingredients
- Enzyme engineering
- Microbial fermentation
- Sustainable bioprocess

CONTACT

Dr. Martin Trinker

Director Business Development & Fundraising
Austrian Centre of Industrial Biotechnology (acib)
Krenngasse 37 • A-8010 Graz

martin.trinker@acib.at

+43 316 873 9316

www.acib.at