

## Biological building blocks and bioprocess development

Biobased and biodegradable materials become more and more important. We develop and produce biobased monomers, proteins, biocatalysts and biopolymers for all application areas.

Based on customer requirements we carry out strain developments, fermentation processes, biocatalytic conversions and product processings.

### Application areas

chemicals, food, feed, agriculture,  
cosmetics, packaging, textiles,  
medical materials, pharma

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### Services

- strain development/metabolic engineering
- protein engineering
- process development for fermentation and biocatalysis
- process scale-up from lab to technical scale
- utilization of biomass and biobased residues

### Selected products

#### Proteins

- enzymes
- functional proteins
- structural proteins

#### Additives

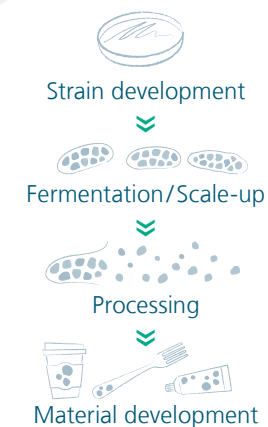
- flame retardants
- surfactants

#### Monomers

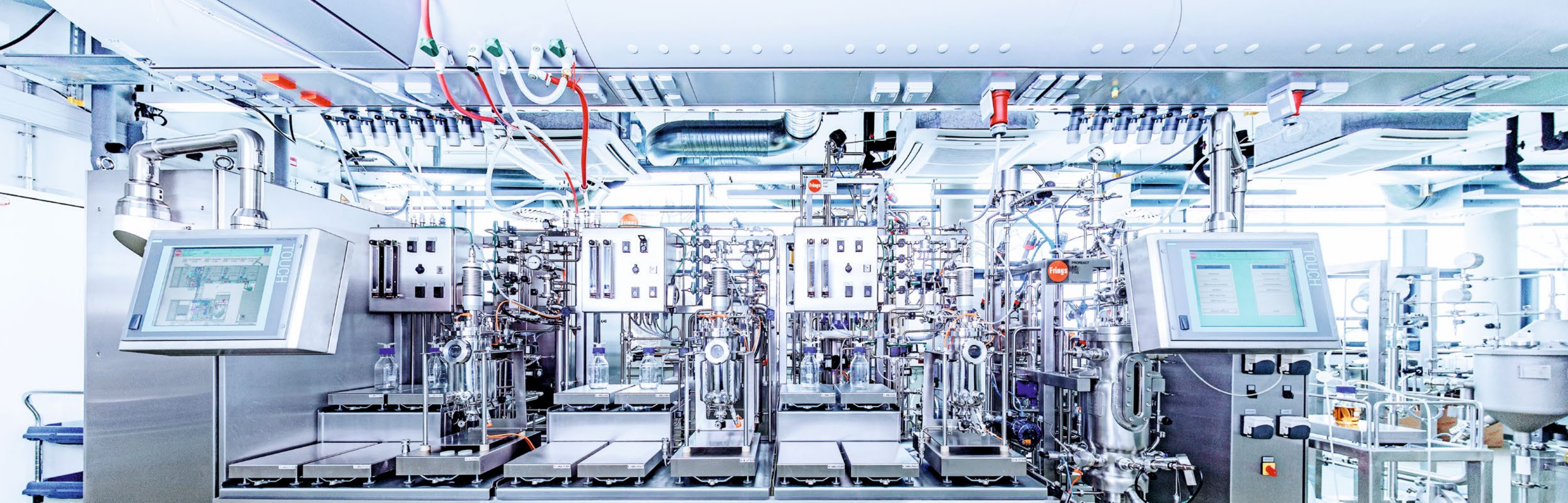
- diamines
- dicarboxylic acids

#### Biopolymers

- PHA
- polysaccharides







## Strain development

- *in silico* gene analysis and selection of candidate genes
- site directed mutagenesis
- heterologous gene expression
- activity assays (fluorescence, UV-VIS)
- biocatalytic conversions
- microscopy (fluorescence, EM, AFM)
- chemical analytics

## Fermentation and scale-up

- automated stainless-steel bioreactor cascade (2, 10, 100 L)
- monitoring of pH, T, p, air flow, DO, feed, vital biomass
- methanol feed
- off-gas analysis
- wild type and GMO strains (S1, S2)
- batch and fed batch cultivation

## Cell homogenization and separation

- high pressure homogenization of bacteria, yeasts, fungi and algae (max. 2000 bar)
- continuous disk separation
- centrifugation

## Purification and concentration

- continuous micro- and ultrafiltration (0,2 µm to 1 kDa)
- preparative chromatography
- continuous rotary evaporation
- lyophilization (20 L)