

Baker's Yeast



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Process Technology

## VOGELBUSCH YEAST PLANTS

### Know-how and technology licensing

Yeast is the name for a variety of naturally growing unicellular fungi. For industrial use individual species are carefully selected based on their individual abilities.

For the food industry yeast is an indispensable ingredient. Industrial processes for yeast production have been steadily improving since the early 20th century. Over the years Vogelbusch's design philosophy, which focuses on cost efficiency and top product quality, has inspired major advances in yeast technology. Backed up by the company's long experience and in close cooperation with our clients, we provide customized solutions for reliable production facilities all over the world.

## UNRIVALLED EXPERIENCE

Vogelbusch has a long track record of plant engineering for the yeast industry. The many Vogelbusch designed yeast plants at work around the globe are testimony to the excellence of our technology.

Recent reference projects include:

- | Pakmayeh, Iran
- | Sugar Cane By-Products Corp., Iran
- | AgroChemical Food Co, Kenya
- | Special Yeast, Sweden
- | Deutsche Hefewerke, Germany
- | Hefe Schweiz, Switzerland

## OUR SERVICES FOR YEAST PLANTS

Vogelbusch is a one-stop shop for process engineering, services and supplies, including:

- | Design, engineering and construction of turnkey production plants for wet yeast and iADY
- | Modernisation and revamping of existing yeast production plants
- | Installation of complete or sectional process control systems
- | Introduction of the iADY process
- | Consultancy services including strain supply and optimisation, and laboratory and pilot plant testing

## FEEDSTOCK

Yeast can be produced from a variety of raw materials containing sugar or starch. Cane and beet molasses have traditionally been used, but other sugar sources, such as starch derived hydrolysates, are gaining ground. Under some local conditions, hydrolysates produced from cassava or maize, or mixtures of hydrolysates and molasses are low-cost alternatives to pure molasses.

Vogelbusch can give its clients the benefit of its profound understanding of trace elements and vitamin supplementation requirements for different feedstocks.

	wet (30% DMS)	iADY (96% DMS)
Sugar consumption*	625 kg	2,250 kg

\* fermentable monosaccharide per 1,000 kg yeast

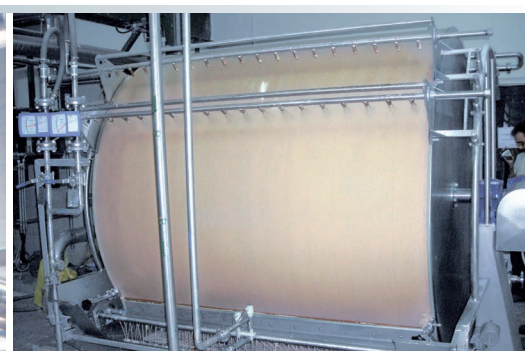
### YEAST STRAIN SELECTION

Our yeast culture collection contains hundreds of different baker's yeast strains. Whether you are looking to produce wet or active dry yeast, we have the right strain for each type of feedstock, meaning that you can switch to make the most of the current market situation.

**Choosing the ideal yeast strain for your application is key to producing a leavening agent with superior performance.**



Main fermentor

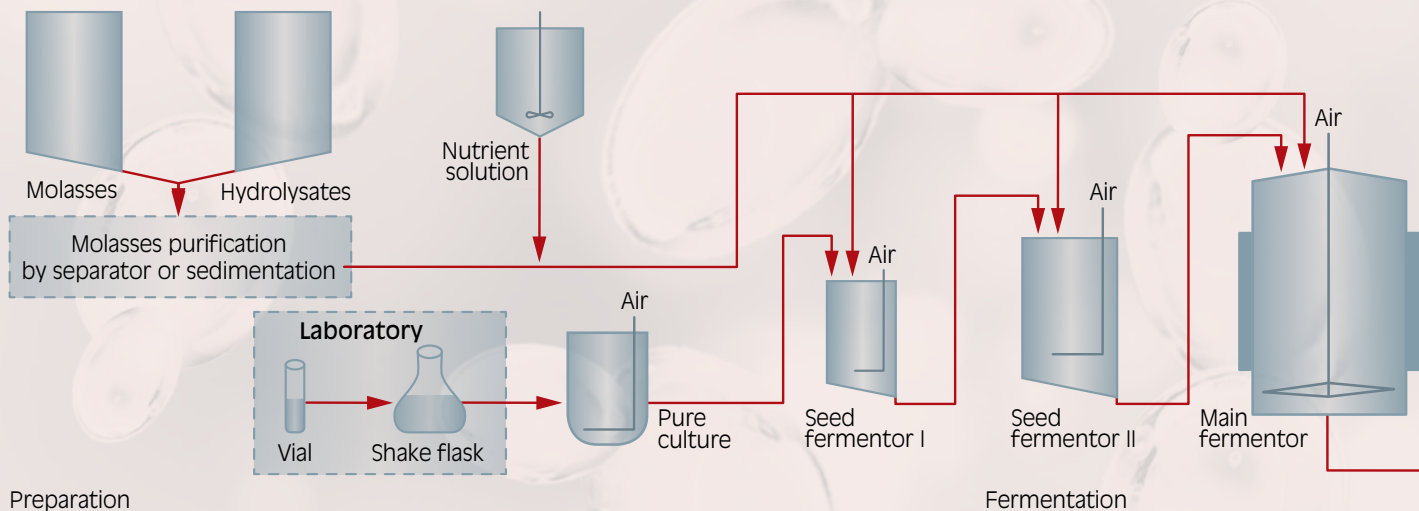


Filtration separates water from the yeast



Filtered yeast passes through an extruder

# THE VOGELBUSCH BAKER'S YEAST PROCESS



Molasses is purified by sedimentation or mechanically, by separators. The purified molasses is mixed with nutrients in the fermenter.

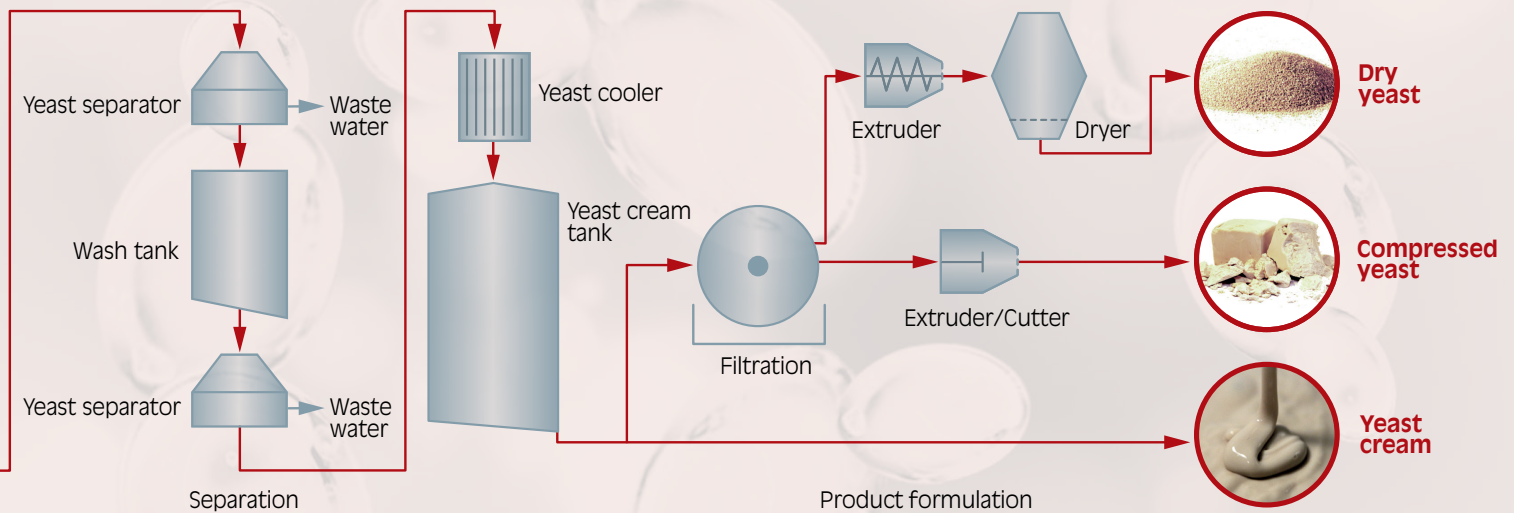
To start a new batch, a yeast inoculum is cultivated in the laboratory. The inoculum is used to seed a small fermenter (10 litres). The yeast in the latter is then used to seed the next-largest fermenter (100 litres) until sufficient yeast has been produced to start fermentation in the production fermenter (100,000 litres). This first batch, called **seed yeast**, is separated in separators, washed and stored.

The seed yeast is used to start **commercial yeast** fermentations. One batch of seed yeast can be split into up to six portions, each of which can be used to seed a commercial scale yeast fermentation process. When all the seed yeast has been consumed a new batch of seed yeast must be produced, starting with a fresh inoculum from the lab.

The commercial yeast is separated from the fermentation broth by nozzle separators. The yeast is washed with process water and filtered to increase the dry matter content of the yeast.

To produce wet yeast, the filtered yeast passes through an extruder, and is pressed and cut into wet yeast blocks. These are packed, and need to be cold stored until use. To produce iADY, the wet yeast is processed in a different extruder and carefully dried with hot air. A packing machine packs dried yeast airtight.





## VOGELBUSCH EQUIPMENT

Like our advanced technologies, our custom apparatus reflects our longstanding yeast expertise. Our special production equipment includes:

- | Molasses clarification lines
- | Media preparation and sanitisation lines
- | Fermentation stations based on a variety of fermenter types
- | Biomass separator stations (nozzle type)
- | Filtration stations
- | Extruders and packaging equipment
- | Yeast dryer (batch and continuous)

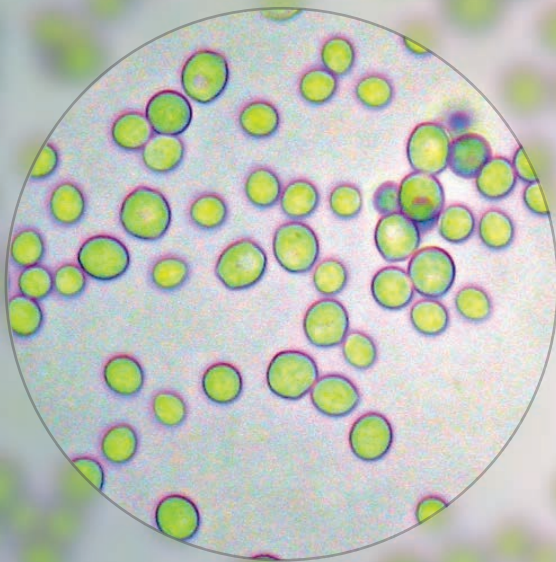
Proprietary Vogelbusch equipment that can greatly enhance process efficiency includes:

### Ultra-efficient fermenter aeration systems

The most suitable aeration system is chosen based on fermentor size, production capacity and available utilities. Four types of tried and tested industrial aeration systems are available for specialised applications.

### Alcohol sensors for process automation

Sensor-equipped analysers continuously measure the alcohol concentration in the fermenting mash. Gas phase measurement using semiconductor sensors is normally recommended for baker's yeast, but liquid-phase measurement with custom retractable probes is also available.



*Microscope image of yeast cells*



*Yeast fermenter operated by DHW Hamburg, Germany*

## DESIGN FOCUS

Our plants are designed to create the perfect environment for high yeast growth and yeast quality. Measures include balancing stress-related process conditions in the fermenter such as oxygen and nutrition supply, and pH and temperature control.

Different types of highly efficient aeration systems tailored to specific applications are available.

We pay close attention to process economics, with low energy and utility consumption, and high yields, to optimize the long-term cost-benefit ratio of the plant.

## PRODUCT TYPES

Baker's yeast, as a leavening agent, converts sugar in the dough into carbon dioxide (CO<sub>2</sub>) and ethanol. Selected strains of *Saccharomyces cerevisiae* which develop the high raising forces needed for top quality are used to produce bread and other baked goods.

Baker's yeast products manufactured with Vogelbusch technology include wet (cream or compressed) and active or instant active dry yeast (iADY), with different characteristics:

	wet	iADY
Dry matter content	28 - 32 %	92 - 96 %
Shelf life	2 weeks	> 2 years
Storage	refrigerated	room temperature

iADY granulate produced in a Vogelbusch plant has considerably improved raising power and stability, meeting top quality standards

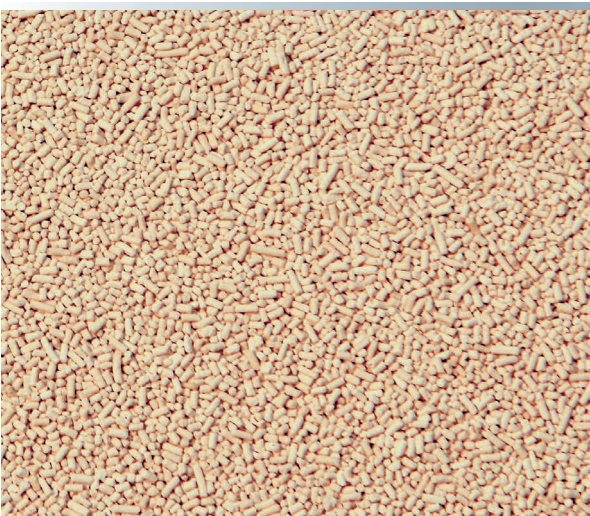
## ALTERNATIVE PRODUCTS

Other products that can be produced by your baker's yeast plant include the special yeast strains used in:

- | Winemaking
- | Bioethanol production
- | Probiotics ingredients
- | Nutritional supplements

And your plant's output can be used to make yeast based products such as:

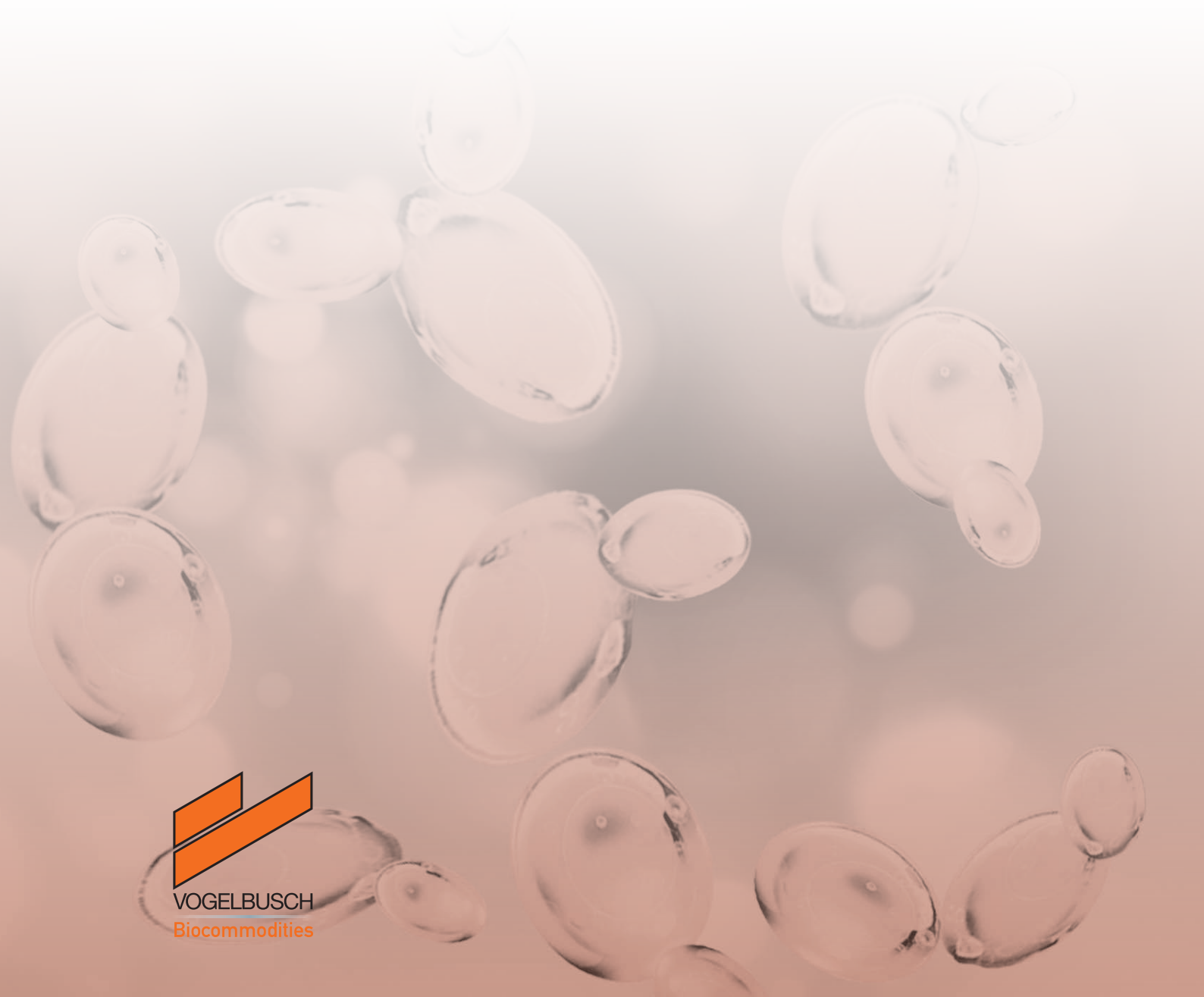
- | Yeast extract food additive
- | Glucan and mannan (components of yeast cell walls) for use as animal feed supplements



Instant active dry yeast (iADY)



Packaging line



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