

Vinegar

Vinegar is an important acidifier and preservative commonly used in the food processing industry and in cooking for salad dressings, vegetable pickling and sauces. It has also traditionally been used for medical and cleaning purposes.

The process

The VOGELBUSCH vinegar plant employs submerged fermentation in which the vinegar bacteria homogeneously scatter in the fermenting mash and no carrier material is used.

▫ *Raw Material Treatment*

Ethanol is mixed with process water and filtered vinegar in the injection tank. Instead of ethanol and water also wine or fruit wine can be used. Nutrient is added and diluted by mixing. This mash preparation is carried out in batches once or twice a week in one of the injection tanks while the other is used as feed tank for the fermentation.

▫ *Fermentation*

The fermentation is carried out semi-continuously in a fermenter equipped with a highly efficient VOGELBUSCH aeration system. Upon completion of a fermentation batch about a third of the fermenter content is pumped to into the ejection tank, where the raw vinegar is allowed to mature for several weeks. Then the fermenter is re-filled with fresh mash from injection tank to start the next fermentation batch.

▫ *Filtration*

The mature vinegar passes a micro-filter module to remove sedimented solids (proteins and other substances causing turbidity). The filtered vinegar is diluted to the desired concentration (5 % for domestic use) in the mixing tank, pumped to the daily bottling tank and finally filtered over a de-germination filter before bottling.

The process is fully automated, reducing the need for supervision to a minimum. The process is directly controlled by an inline alcohol measurement system.

The semi-continuous VOGELBUSCH vinegar fermentation process has been developed to provide optimal, cost-effective technological solutions which result in consistent product quality, addressing bioengineering issues such as oxygen transfer, mash circulation, cooling requirements and foam formation.

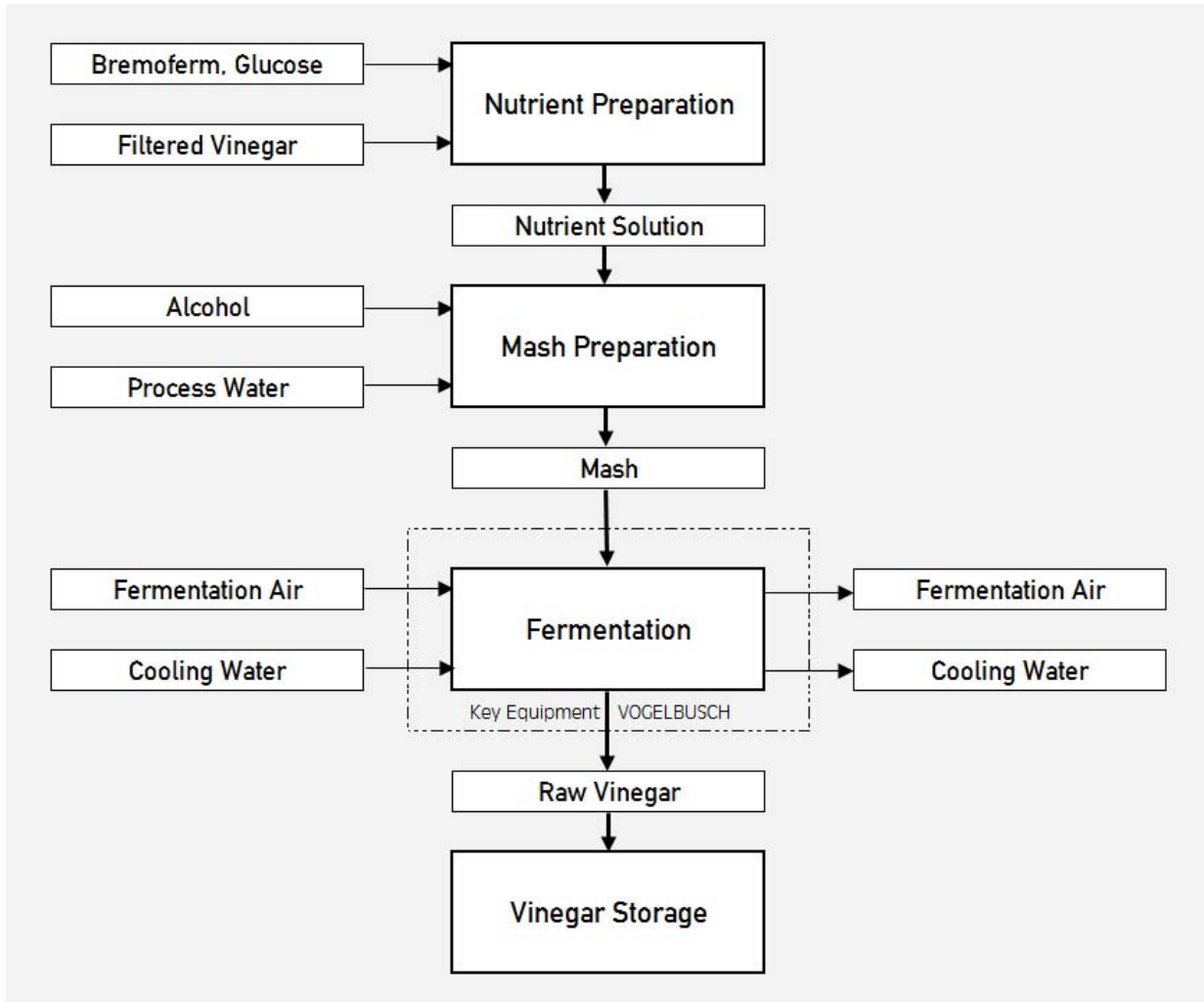
Product types

The submerged fermentation process allows the use of any kind of alcohol containing raw materials such as pure alcohol or fruit wines from grape, apple, dates or other.

Standard product concentration is between 5 and 14% acetic acid. For domestic use, the vinegar is diluted to a concentration of 5%.



Process flowsheet



Aeration system

The major benefit of the VOGELBUSCH vinegar fermentation system is the highly efficient and well proven aeration system.

The rotating self-priming turbine produces tiny, uniformly-sized air bubbles, generating the high oxygen transfer rates necessary for high vinegar production rates. Easy to operate and with very low energy consumption, it maintains the optimal conditions for the growth of vinegar bacteria in the fermentation tank.

Services by VOGELBUSCH

Vogelbusch provides the following services for vinegar production plants:

- Process know-how and basic engineering for the process plant
- Equipment layout for process units, basic data for civil works
- Delivery of equipment such as mash preparation, fermentation, filtration, measuring and control
- Mechanical and technological documentation
- Inspection of plant installation and supervision of start up

Full service includes the turnkey installation of the complete production plant.