

Think – deaeration

A novel mixing technology revolutionizes deaeration systems.

Rotary jet heads (RJH) are very efficient for mixing of liquids. Recently, the technology has also proved to be efficient for gas dispersion, and especially for deaeration of liquid products manufactured in the beverage, beer and food industries.

The technology

The technology in its basic form consists of a RJH mixer mounted inside a tank. Liquid is recirculated from the bottom of the tank and reinjected through the nozzles of the RJH, thereby causing mixing. Stripping gas (e.g. nitrogen or carbon dioxide) is introduced in the recirculation loop and the RJH will ensure that the finely dispersed gas drives out the oxygen from the liquid.



When continuous production is required two tanks are fitted with rotary jet head mixers (see figure 1). While one tank volume is being deaerated, the deaerated volume from the other tank is used for production.

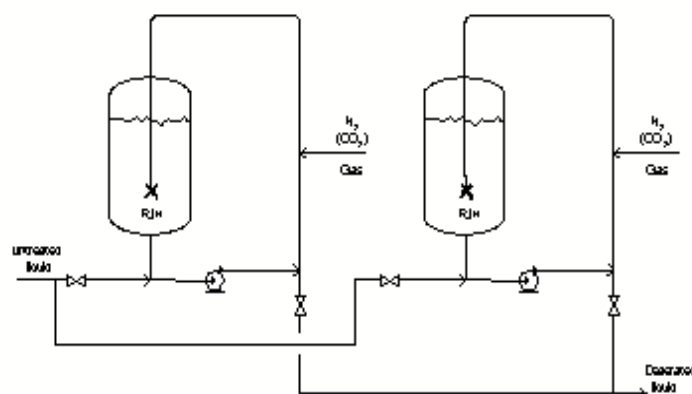


Fig. 1

In addition to the simple system lay out the system also benefits from being extremely sanitary and fast and easy to clean since the RJH mixer also acts as an efficient tank cleaner.

The applications

Many liquid products like fruit juices, soft drinks, and water used in high-gravity brewing, are presently being deaerated to extend the shelf life of the final product. A number of other food products like milk and vegetable oils can also benefit from being deaerated. In almost any liquid food product oxygen is undesirable due to multiple negative effects including oxidation of vitamins and deterioration of taste. In Scandinavia, some wholesale dealers are now specifying that the oxygen content in various cold-pressed vegetable oils should be less than 0.2 ppm. This will extend the shelf life by delaying the processes resulting in rancidity.

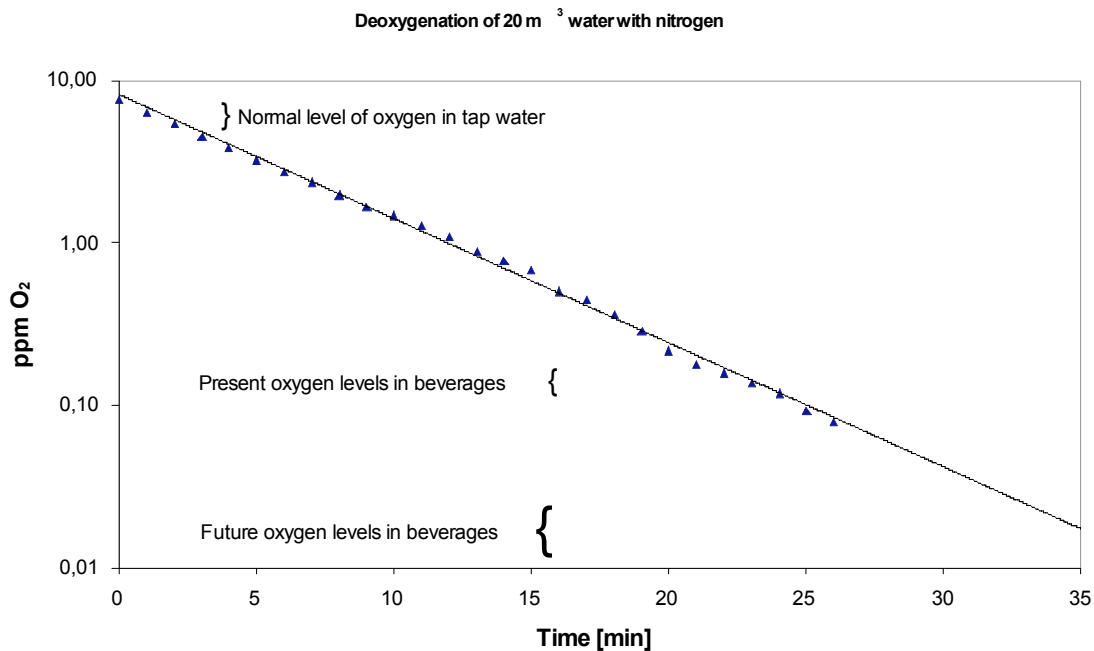


Fig. 2

The specified maximum oxygen level in for instance beer and other beverages has until recently been in the range 0.1 to 0.2 ppm. However, the demand for lower oxygen concentration is pronounced pushing the acceptable limit downwards towards 10-50 ppb. An example of how fast the deaeration is taking place in a 20 m³ tank is shown in fig. 2.

Plant costs and operating costs

The present technologies for deaeration involve either heating, vacuum, gas stripping or a combination of these technologies and has a typical cost of Euro 200,000-300,000 for 20 to 25 m³/h capacity. A deaeration plant with same capacity based on RJH technology will cost 25 to 75% less. As Jean Marie Rock, Brewmaster from the Orval Brewery, Belgium, says "*The Rotating Jet Head system for deaeration of water is a very effective way of producing deaerated water with very low investment cost*".

The total costs for a traditional deaeration plant will be influenced by the cost of investment, depreciation policies, cost of energy and industrial gases. Everything else being equal, the total costs of a RJH (ISO-MIX) plant can be 30 to 50% less than the total costs of a traditional plant.

Engineering design

The very simple layout of the system leads to low investment costs amongst other things. The Danish company ISO-MIX A/S has patented and developed the rotary jet head technology. In France, ISO-MIX has a close cooperation with Pierre Guerin SAS, who is responsible for introducing this new exciting and promising technology to the French and Spanish markets.

Conclusion

With the introduction of the rotary jet head mixing technology by ISO-MIX A/S a new, simple and more sanitary deaeration technology is now available to the food and beverage industries. It offers lower investment and lower annual costs than traditional systems.