

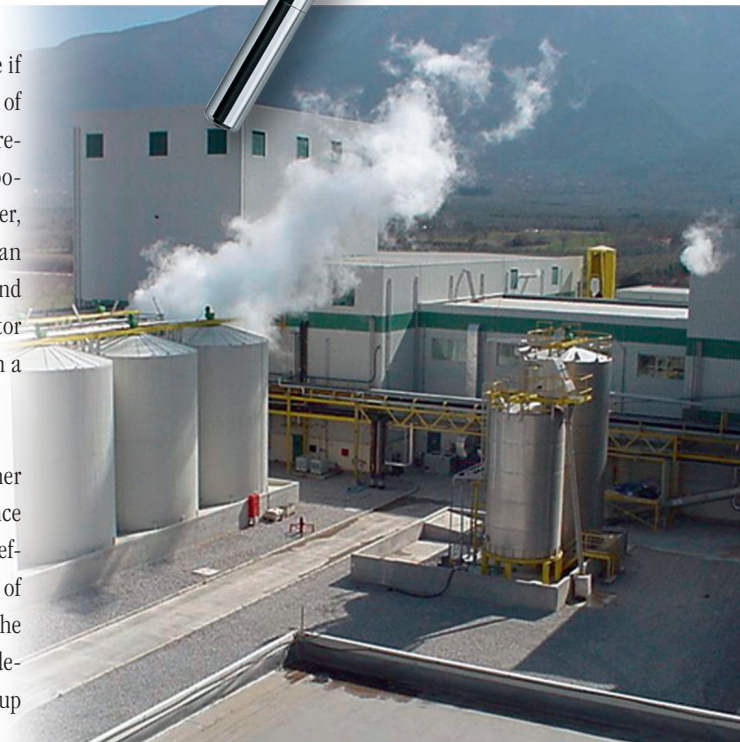
In-line Oxygen Measurement During Yeast Fermentation

Nowadays, yeast is generally produced on an industrial scale. The necessary biotechnological plant (bioreactors) must be fully suited to the physiological requirements of yeast metabolism in respect of substrate feed, aeration, temperature, and pH control. The basic substrate used in the production of yeast is molasses, a byproduct of sugar manufactured from cane and beets.

The influence of aeration

Optimal process utilization of the substrate is only possible if the supply of oxygen is adequate. Too rapid the addition of substrate (e.g. molasses) can lead to so-called catabolite repression and a "switch" to anaerobic fermentative metabolism, with an unintentional formation of ethanol. However, even correct dosing of molasses does not rule out such an effect, since inadequate supply of oxygen is the most sure and direct way to alcohol fermentation. What is a welcome factor in breweries is detrimental to yeast production, resulting in a substantial loss in yield.

Inadequate oxygen supply is also responsible for a higher level of pollution in the (fermentation) waste liquor, since during subsequent downstream separation processes, the effluent fraction contains a substantially higher proportion of (aerobically) non-degraded nutrients. "Over-aeration" of the fermenter would certainly be one way of ensuring an adequate supply of oxygen, on the other hand it would drive up energy costs considerably.





Continuous in-line monitoring of the oxygen supply helps the plant operator to optimize the yeast fermentation process both relative to product yield and to effluent pollution load. Oxygen measurement systems from METTLER TOLEDO are able to provide important real time data concerning the oxygen supply situation. First, it is possible to take direct measurements of the oxygen concentration (dissolved oxygen) level in the fermentation broth, and second, the oxygen uptake rate can be calculated on the basis of measurement and comparison (differential) of the oxygen content in the feed air and in the exhaust gas.

Result

Through online oxygen measurement in yeast fermentation, yield rates can be optimized, effluent pollution load reduced, and energy costs saved.

For more information:

► www.mt.com/o2-gas



The low-maintenance InPro 6800 G – a new generation of oxygen sensors for fermentation processes.