Scale-up of and mixing in bioreactors

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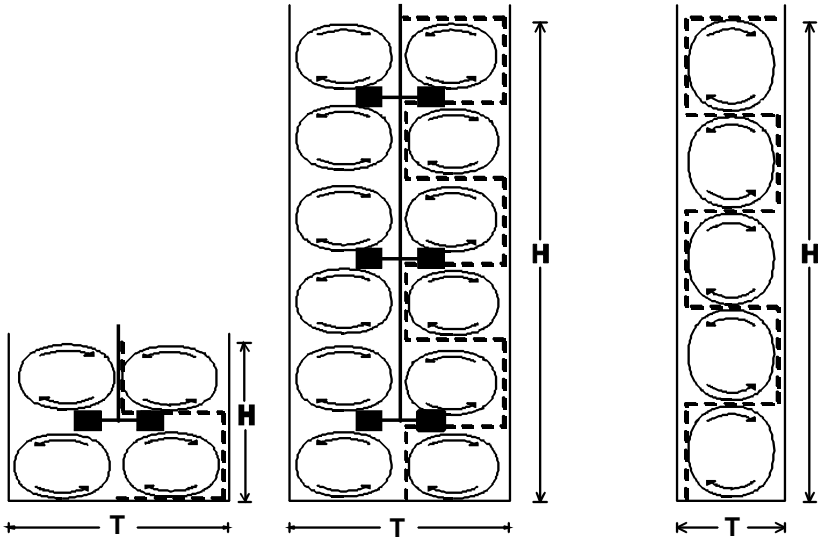
Description

At the start of the project little is known on mixing behaviour in large-scale bioreactors during fermentation. Aim is to develop a dedicated measuring method for mixing (mixing time) useful and reliable for fermentations. The hypothesis is that mixing by turbulence is independent of the geometry of the common types of large-scale bioreactors, multi-impeller stirred vessels and bubble columns. However, convective flow patterns in these bioreactor types are different, resulting in mixing dependent on geometry.



A model is developed to describe mixing by integrating both mixing processes resulting in a 'universal' mixing time relation. The measuring method developed is based on very low concentrations of fluorescent tracers. Data on several types of large-scale fermentations obtained by this method are used to substantiate the relation.

Dissertation

D.J. Groen, Macromixing in Bioreactors. PhD Thesis, Delft University of Technology, 1994. https://repository.tudelft.nl/islandora/object/uuid%3A3ac019f1-d19a-4853-9a29-554f1149bd5b?collection=research

Publications from the dissertation

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