

Magnetic Field Enhanced Centrifugation for Selective Separation

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Biotechnological production processes using genetically modified bacteria have established as a standard method. As a result of intensive and expensive preconditioning of the fermentation broth product yield is dropping heavily in each processing step and price even skyrockets for some products. Therefore classical downstream processing is considered to be a bottleneck. By utilizing magnetic carrier particles with specific surface treatments a selective separation due to specific interactions of the target product out of the gross bio broth is possible. This approach allows highly efficient product recovery at a minimum of process steps. However this new technology has not been transferred into industrial application yet. Apart from industrial reservation in the utilization of this novel technology not yet existing large scale magnetic separation equipment inhibits the transfer into industrial application. A novel magnetic separator utilizing a rotating magnetic matrix within an external magnetic field is introduced. The combination of the HGMS principle with its high separation efficiency at low particle sizes with continuous centrifugation allows for large scale selective separation. The capacity limitation of classical HGMS filters is avoided by continuous cleaning of the magnetic matrix due to centrifugal forces. The proposed paper will present the basics of selective magnetic separation strongly focused on the novel separator design as well as experimental results for separation studies using academic products. The work will be complemented by theoretical considerations

Short Bio:

Since Dec. 2008	Research Engineer DuPont DuET-Particle Technology-Separation <u>Key Projects:</u> <ul style="list-style-type: none">- Cellulosic Ethanol – Solid-liquid separation- Pilot scale decanter implementation in bioseparation- Economic Evaluation of Dynamic Cross-Flow Filtration- Upstream – Downstream interaction
Jun. 2004 – Nov. 2008	Research Assistant at the Institute of Mechanical Process Engineering and Mechanics, University of Karlsruhe Process Engines Group <u>Key Projects:</u> <ul style="list-style-type: none">- Magnetic Field Enhanced Separation- Solid Liquid Separation
Oct. 1997 – Feb. 2004	University of Karlsruhe (TH); Diploma (equivalent to Master of Science) in Process Engineering <u>Specialization:</u> <ul style="list-style-type: none">- Thermal Process Engineering (Separation, heat- and mass transfer)- Chemical Process Engineering (Reaction kinetics, catalysis, multiphase reactors)