Nederlandse Biotechnologische Vereniging

Yearly report 2010, NBV working party on downstream processing (product isolatie en –zuivering, PZ).

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In 2011, the working party on product isolation and purification organized two mini symposia.

On April 7th the Working Party organized a mini-symposium on the Developments and Challenges in Separation Technologies in Biorefineries. It was attended by around 50 scientists from academic and industrial research in life sciences sectors.

Prof. Johan Sanders (WUR) explored the potentials and drivers for a biobased economy in a wider context. In a few case studies, he presented opportunities to replace fossil fuels by biomass as raw material to produce bulk chemicals for a variety of applications. He showed that further integration of biomass conversion at the source (e.g. the farm) should be implemented, in order to exploit the potentials of a biobased economy. This would minimize costs associated with logistics and it would allow the farmer to generate higher revenues.

According to Jaap de Slegte (FrieslandCampina), biorefinery in Dairy Industries have embraced the concepts of biorefineries already decades ago, In his presentation he showed the implementation challenges of a manufacturing process for transgalactooligosaccharides (GOS), a novel prebiotic ingredient derived from whey. Domo, a business unit of FrieslandCampina, is the worldwide market leader for GOS and has been producing this ingredient since the late nineties. Apart from the technological implementation challenges, Domo also had to cope with regulatory hurdles. An additional challenge was presented by the fact that the final process included ion exchange, a technology that was not common in the Domo manufacturing organization. Once these challenges were overcome, the new manufacturing process was implemented in 2005 and has been operated satisfactorily since then.

A novel Centrifugal Technology for harvesting algae Jan Koning (NL-GUTS) introduced the NL-GUTS platform for supporting innovations in separation technologies prior to third contribution to the mini-symposium. Marco Brocken (Evodos) presented the Evodos centrifugal spiral plate technology for separating algae. The Evodos spiral plate technology (SPT) was presented as a promising centrifugal technology for harvesting algae at very high biomass concentration.

At November 3th (2010) the working parties of “Downstream Processing”, “Bioreactors” and “Animal and Plant Cell Culture” of the NBV organized a mini-symposium with as topic “High Throughput Screening Technologies in Upstream/Downstream Processes” Approximately 50 people attended this mini-symposium with presentations of Technical University of Delft (Marcel Ottens), Kalsruhe Institute of Technology (Juergen Hubbuch), Enzyscreen (Wouter Duetz) and Genmab (Jolanda Gerritsen). The presentations were a mixture on new Technologies in the high throughput screening area of Upstream/Downstream for fast developments whereby the Upstream talks, as performed by companies, focuses more on applied technologies whereas the Downstream talks were more fundamental with some applications were presented by universities.

The first upstream talk of Wouter Duetz from Enzyscreen focused on mixing principles with special designed micro titerplates for ideal transfer of gasses (e.g. O_2) and preventing denaturation of cells for prokaryotic as well as eukaryotic organisms. With this technology prokaryotic as well as eukaryotic cell culture fermentations could be performed on a high throughput scale. In the second talk, carried out by Jolanda Gerritsen from Genmab, she explained the use of high throughput screening in mammalian cell culture development for selection of high producing clones of specific proteins (e.g. monoclonal antibodies) and decreasing lead time and manpower. The main message of these talks was the implementation of high throughput technologies for fermentation processes.

The first downstream talk, given by Marcel Ottens from TU Delft, showed an overview on how to use microfluidics technologies in cell culture fermentations for optimal diffusion transport and using thermodynamic properties of proteins for fast purification process development. In the second talk, given by Juergen Hubbuch from Kalsruhe Institute of Technology, it was shown how robotics in high throughput screening technologies emerged from approx. 2003 up to 2010 with usage in industrial processes and in the second part how modelling will become more important for predicting downstream process steps. The main message of the Downstream talks was that modelling tools will be step by step implemented in the coming years by the industry next to the implemented robotic high throughput systems.

The programs and reports of the mini symposia can be found on the website of the working group (http://www.nbv-pz.nl) which is also accessible via the NBV site (http://nbv.kncv.nl/). In 2010 we successfully used the webform for registration of our symposia. In 2011 the workgroup on downstream processing will organise a session on to the working group day on April 21st. In our session young professionals will present their view on bioprocess development and design. In the autumn we intend to organise a mini-symposium.