Opportunities for the production of pharma grade amino acids by side stream preparation

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Amino acids play an imported role in all biochemical processes and accordingly in the nutritional and pharmaceutical industry. For the application of amino acids in these fields a high purity is mandatory (pharma grade, 99.5X %).

Today, amino acids are typically produced via a biotechnical route. Besides the desired target product, the fermentation broth includes a complex mixture of other amino acids and impurities which have to be removed. These steps can e.g. be performed by a chromatography. Subsequently, the remaining aqueous amino acid solution is concentrated via vacuum evaporation followed by the crystallization of the amino acids. In these steps the pH-value is the key parameter to manipulate amino acid solubility. In the following centrifugation step the amino acid crystals are separated from the mother liquor. However, in the remaining mother liquor, a significant amount of the target and other amino acids as well as a high salt concentration remain present, which results from the used pH-adjustment and limits process yield.

To increase the recovery reprocessing of the liquid stream is integrated into the process, comprising a second evaporation, crystallization and a recycling of the corresponding mixture of amino acid and salt crystals. Due to the corrosive character of the mother liquor all equipment utilized has to be glass-lined or made out of other corrosion resistant material (e.g. titanium).

The research project Mi^{2}Pro focuses on the integration of an alternate and/or additional step for the selective removal of salts from the mother liquor. On one hand, this gains a better process handling of the mother liquor and on the other hand a direct production of amino acids in pharma quality can be achieved.

For the realization of this aim various unit operations, such as chromatography, nanofiltration or electrodialyses, are known and have to be evaluated. Experimental

investigations are complemented with a flowsheet simulation to reduce the experimental effort and to support the following scale up of the process. This contribution presents the current state, the opportunities and first experimental and simulation results for the integration of a selective salt removal operation.