UNIVERSAL AND IN-PROCESS ANALYTICAL TOOL FOR INFLUENZA QUANTIFICATION USING A LABEL-FREE TECHNOLOGY

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Virus-like particles (VLPs) have become a promising solution for influenza pandemics, leading to an increasing interest on the development of VLP purification processes. However, the analytical methods used to detect and quantify VLPs are not yet able to keep up with the downstream progress. Currently, quantification relies on traditional methods such as hemagglutination (HA) assay, Single Radial Immunodiffusion (SRID) assay or Neuraminidase (NA) enzymatic activity assays. However, these analytical technologies are time-consuming, cumbersome and are only reliable for final product quantification and characterization, posing challenges for efficient downstream process development and monitoring. [1]

Here we report a label-free tool that uses Biolayer interferometry (BLI) technology applied on an octet platform to detect and quantify Influenza VLPs at all stages of downstream processing (DSP). Human (α2,6-linked sialic acid) and avian (α2,3-linked sialic acid) biotinylated receptors associated with streptavidin biosensors were used, in order to quantify HA content [2] in several mono- and multivalent Influenza VLP strains. The applied method was able to detect and quantify HA from crude sample up to final VLP product. The resulting concentration values are similar to HA quantification method.

BLI technology showed promising results as a high throughput analytical method with high accuracy and improved detection limits, when compared to traditional approaches. Moreover, it eliminates the need of fresh erythrocytes and reduces user variations on the quantitation. This simple and fast tool allowed for robust real-time results, which is crucial for in-line monitoring of DSP. Since the main goal of the work performed is to improve process control as well as monitoring, it may be used as a PAT (process analytical technology) tool.

[1] THOMPSON et al., Virology Journal, 10:141, 2013.
[2] CRUSAT et al., Virology, 447, 326-337, 2013.