With an aim to shorten start up time of an Anaerobic Hybrid Reactor (AHR), initial biofilm development was studied, particularly at different upflow feeding velocities. At a low (0.01 m.h\(^{-1}\)) upflow velocity, initial biofilm was found to develop via the attachment of suspended biomass in the packed zone, while microbial growth on the film was insignificant. Contrarily, with higher (1.0 m.h\(^{-1}\)) upflow velocity, initial biofilm development was from both microbial attachment and growth on supporting media.

Biofilm thickness was determined using confocal laser scanning microscopy (CLSM), which indicated that the biofilm developed faster with the higher velocity, due to the contribution of the microbial growth on supporting media. When operated beyond the initial biofilm development with the lower velocity, both the activity of acetogens and the methanogens increased, although, there was a lower amount of attached biomass on the supporting media. Whereas, both groups were found to decrease with higher upflow velocity, but acidogenic activity increased. It can be concluded that higher upflow velocity positively affected the initial stage of biofilm development and has the potential to accelerate attached biomass on supporting media during the initial phase. Subsequently, the upflow velocity should be reduced to normal rate to enhance the methanogenic activity.