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Reduced Cycle Times & Solvent Consumption for the Synthesis of $^{65\text{-}74}$ACP on the Symphony X®

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Introduction

High demand for peptides as research tools and lead compounds has increased the need for fast production of peptides in high purity. The challenge has been answered by the Symphony X, capable of high-throughput peptide synthesis of even difficult peptides with effective cycle times of less than one minute. New and optimized methods for rapid peptide synthesis, combined with instruments capable of parallel synthesis enable the production of peptide libraries with high throughput. Herein, optimization of synthesis protocols for $^{65\text{-}74}$ACP is explored (Figure 1), using the Symphony X parallel synthesis platform, to reduce cycle times and decrease solvent consumption and waste generation by removing DMF washes after coupling steps.

Val-Gln-Ala-Ala-Ile-Asp-Tyr-Ile-Asn-Gly-NH2

Fig. 1. Sequence of $^{65\text{-}74}$ACP peptide synthesized on the Symphony X® platform.

Results and Discussion

The synthesis of $^{65\text{-}74}$ACP was optimized by reducing the number of washes after coupling. Eliminating post-coupling washes reduced cycle times from 2.8 to 2.3 minutes and solvent consumption from 55 to 41 mL without significantly affecting the purity of the final peptides. Therefore, a 20% reduction in cycle times and a 25% reduction of solvent consumption were observed with very low impact on crude purity as shown in the HPLC analysis (Figure 2). Importantly, these findings suggested an overall improvement in time and cost of peptide synthesis when eliminating post-coupling washes.

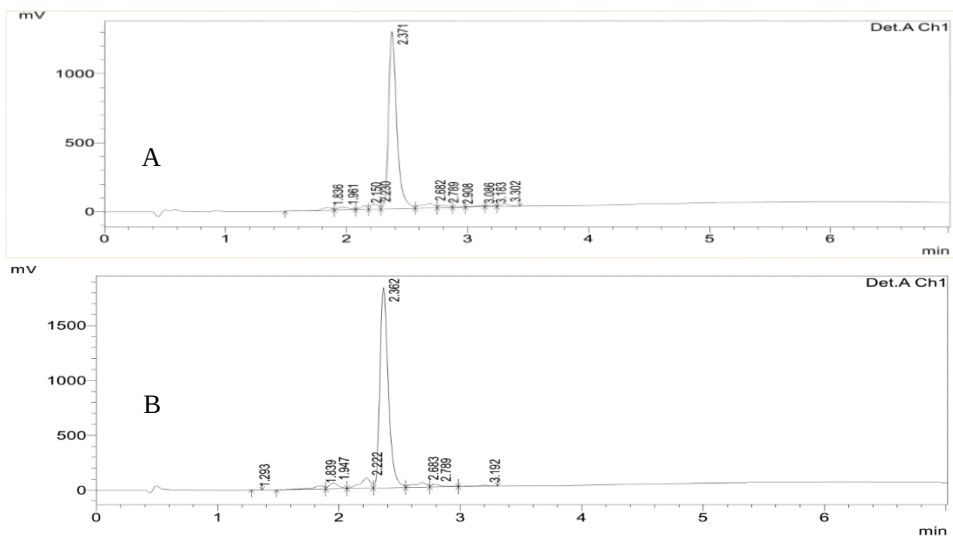

Fig. 2. HPLC traces of $^{65\text{-}74}$ACP peptide synthesized on the Symphony X® platform with A) no DMF washes after coupling steps and B) 3 DMF washes after coupling steps.