

Purification of Synthetic Oligodeoxynucleotides via Catching by Polymerization

Alexander Apostle, Suntara Fueangfung, and Shiyue Fang

Abstract:

Oligodeoxynucleotide (ODN) synthesis produces short single-stranded synthetic DNA, obtainable through an automated synthesizer. Following synthesis, and after cleavage from solid support, and deprotection, full-length ODN and failure sequences are mixed together. Purification, which requires expensive instruments and materials for high-throughput purification, is needed to retrieve pure full-length ODN. To solve this problem, we propose two non-chromatographic methods for ODN purification: catching failure, and full-length, sequences by polymerization. The capping step in the synthetic cycle will be used to apply methacrylamide phosphoramidites. Failure sequences will be capped with methacrylamide phosphoramidite 1 after incomplete coupling. Full-length sequences will only be capped with methacrylamide phosphoramidite 2 at the last step of the cycle. Full-length sequence purification will be achieved through water extraction from the subsequent gel. Using these methods, we demonstrate (Using MALDI-TOF) effective purification of ODN at high yields. Furthermore, these methods are simple, convenient, and inexpensive.