Abstract

Polystyrene derived sulfonyl chloride resin (PS-TsCl) is a resin bound (polymer supported) equivalent of tosyl chloride. The PS-TsCl resin is susceptible to nucleophilic attack and can be used as a linker. The polymer has numerous applications in organic synthesis. The goal of this research was to synthesize PS-sulfonyl chloride resin which can be compared by quality to commercially available resins obtained from Argonaut Technologies. There are several different synthetic methods to produce this polymer but none of them gives experimental details about reaction conditions or quantitative evaluation of sulfonyl chloride reaction groups. In this research we quantitatively evaluated those methods and concluded that none of them gave resin which could compete with the quality of PS-sulfonyl chloride resin from Argonaut Technologies. By optimizing reaction conditions and solvents we were able to synthesize the resin of equal quality like one from Argonaut Technologies.

Later in this research, PS-sulfonyl chloride resin was employed in synthesis of new Indole linker, polymer supported sulfonyl indole-3-carboxyaldehyde. Upon reduction of aldehyde functionality of this resin with NaBH₄ pellets, the polymer supported sulfonyl indole-3-carbinol was synthesized which is Wang-analogue resin. In addition to synthesis, characterization and application of PS-sulfonyl chloride resin, we synthesized small libraries of hydantoins, amides and sulfonamides. The libraries of compounds were screened against *E. coli*, *S. aureus*, *K. oxytoca*, group B *Streptococcus sp.*, *C. albicans*, *C. tropicalis*, *C. parapsilosis*. The inhibition of growth was monitored by measuring the diameter of clear zone around 5 mm paper disk which was soaked in DMSO solution of potentially active compound. Biological screening was performed by our colleague graduate student Ike Northern from Department of Biology.