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(54) Title: METHODS FOR THE SYNTHESIS OF ETHYLFUMARATES AND THEIR USE AS INTERMEDIATES

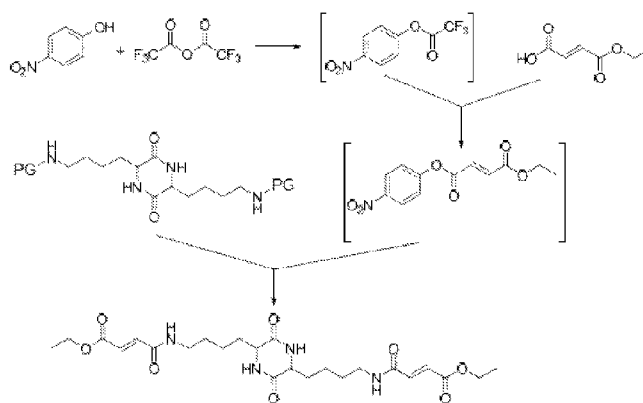


Figure 11

(57) Abstract: Disclosed embodiments relate to improved methods for the synthesis of activated fumarate intermediates and their use in chemical synthesis. Disclosed embodiments describe the synthesis of activated fumarate esters including those derived from activating groups including: 4-nitrophenyl, diphenylphosphoryl azide, pivaloyl chloride, chlorosulfonyl isocyanate, p-nitrophenol, MEF, trifluoroacetyl and chlorine, for example, ethyl fumaroyl chloride and the subsequent use of the activated ester in situ. Further embodiments describe the improved synthesis of substituted aminoalkyl-diketopiperazines from unisolated and unpurified intermediates allowing for improved yields and reactor throughput.