



US005130438A

United States Patent [19]

[11] Patent Number: **5,130,438**

Hsiao et al.

[45] Date of Patent: **Jul. 14, 1992**

[54] **BIS-METHYLENE ETHER PYRIDINIUM COMPOUND PREPARATION**

4,352,810 10/1982 Benschop et al. 514/332

[75] Inventors: **Luke Y. Y. Hsiao, Getzville, N.Y.; Hikmat A. Musallam, Damascus, Md.**

[73] Assignee: **The United States of America as represented by the Secretary of the Army, Washington, D.C.**

[21] Appl. No.: **825,711**

[22] Filed: **Nov. 20, 1985**

[51] Int. Cl.⁵ **C07D 213/44; C07D 213/36**

[52] U.S. Cl. **546/262; 546/264**

[58] Field of Search **514/332; 546/262, 264, 546/266**

[56] **References Cited**

U.S. PATENT DOCUMENTS

- 3,962,447 6/1976 Higuchi et al. 514/332 X
- 4,128,651 12/1978 Hagedorn 514/332

OTHER PUBLICATIONS

Burness et al., "Bis(methylsulfonylmethyl)ester" J. Org Chem vol. 42, No. 17, 1977, pp. 2910-2913.

Primary Examiner—John S. Maples
Attorney, Agent, or Firm—Anthony T. Lane; Werten F. W. Bellamy

[57] **ABSTRACT**

An illustrative embodiment of the invention substitutes solid, non-carcinogenic bis(methanesulfonylmethyl) ether for bis-chloromethyl ether in a low temperature reaction of about 0°-5° C. for the production of bis-methylene ether pyridinium quaternary compounds. In this way, the production of important nerve agent antidotes (toxogonin, HI-6 and HGG-12) by a method of synthesis using the reactant bis-mesylylmethyl ether, is carried out in appreciably greater safety.

4 Claims, No Drawings