



US005922761A

United States Patent [19][11] **Patent Number:** **5,922,761****Lai**[45] **Date of Patent:** **Jul. 13, 1999**[54] **METHODS FOR IN VIVO REDUCTION OF IRON LEVELS AND COMPOSITIONS USEFUL THEREFOR**[75] Inventor: **Ching-San Lai**, Encinitas, Calif.[73] Assignee: **Medinox, Inc.**, San Diego, Calif.[21] Appl. No.: **08/708,552**[22] Filed: **Sep. 6, 1996**[51] **Int. Cl.**^o **A61K 31/27; A61K 31/40**[52] **U.S. Cl.** **514/476; 514/479; 514/480; 514/481; 514/484; 514/423**[58] **Field of Search** **514/423, 476, 514/479, 480, 481, 484**[56] **References Cited****U.S. PATENT DOCUMENTS**

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Primary Examiner—Theodore J. Criares
Attorney, Agent, or Firm—Gray Cary Ware & Freidenrich LLP; Stephen E. Reiter

[57] **ABSTRACT**

In accordance with the present invention, there are provided methods for the in vivo reduction of free iron ion levels in a mammalian subject. The present invention employs a scavenging approach whereby free iron ions are bound in vivo to a suitable physiologically compatible scavenger. The resulting complex renders the free iron ions harmless, and is eventually excreted in the urine of the host. Further in accordance with the present invention, there are provided compositions and formulations useful for carrying out the above-described methods. An exemplary scavenger contemplated for use in the practice of the present invention is a dithiocarbamate-containing composition. This material binds to free iron ions, forming a stable, water-soluble dithiocarbamate-iron complex. The present invention relates to methods for reducing in vivo levels of free iron ions as a means of treating subjects afflicted with iron overload and non-iron overload diseases and/or conditions, such as thalassemia, anemia hereditary hemochromatosis, hemodialysis, stroke and rheumatoid arthritis. Dithiocarbamate-containing scavengers are administered to a host in need of such treatment; these scavengers interact with in vivo forming a stable dithiocarbamate-metal complex, which is then filtered through the kidneys, concentrated in the urine, and eventually excreted by the subject, thereby reducing in vivo levels of free iron ions.

40 Claims, 3 Drawing Sheets

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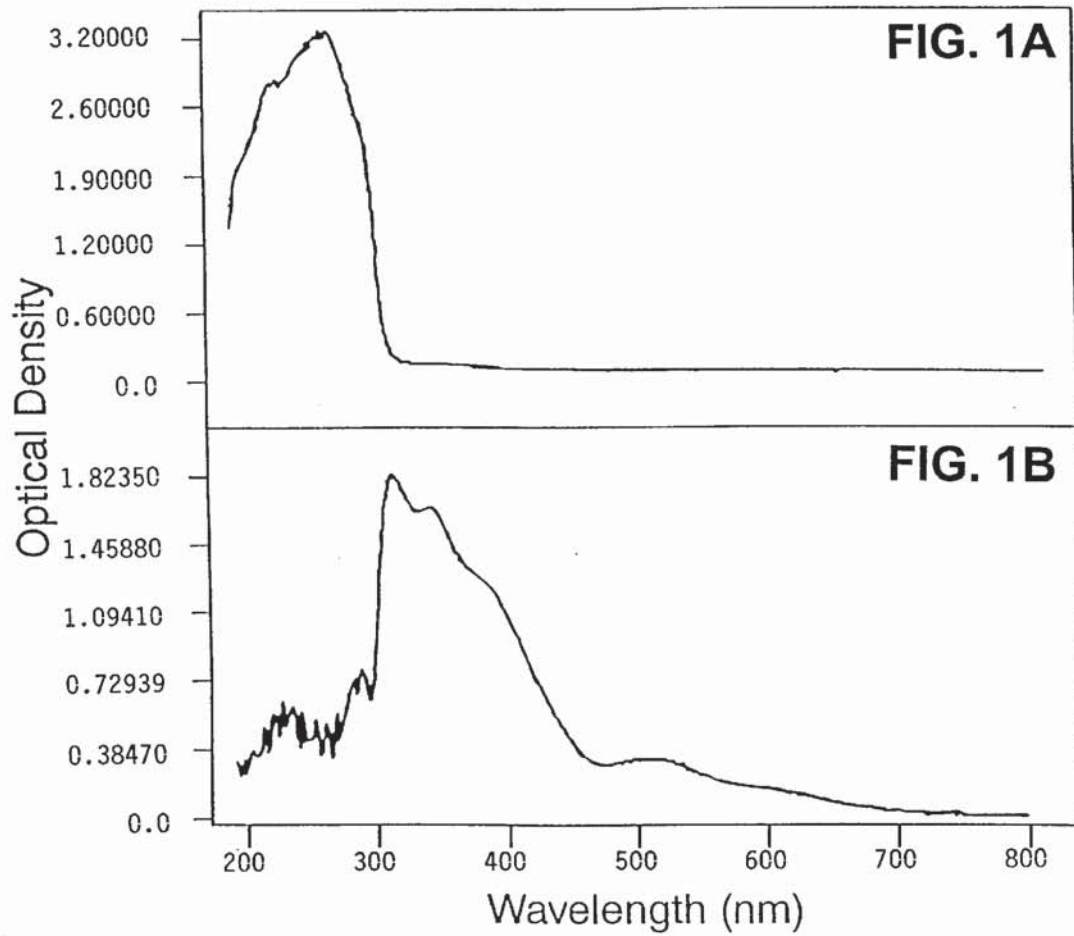
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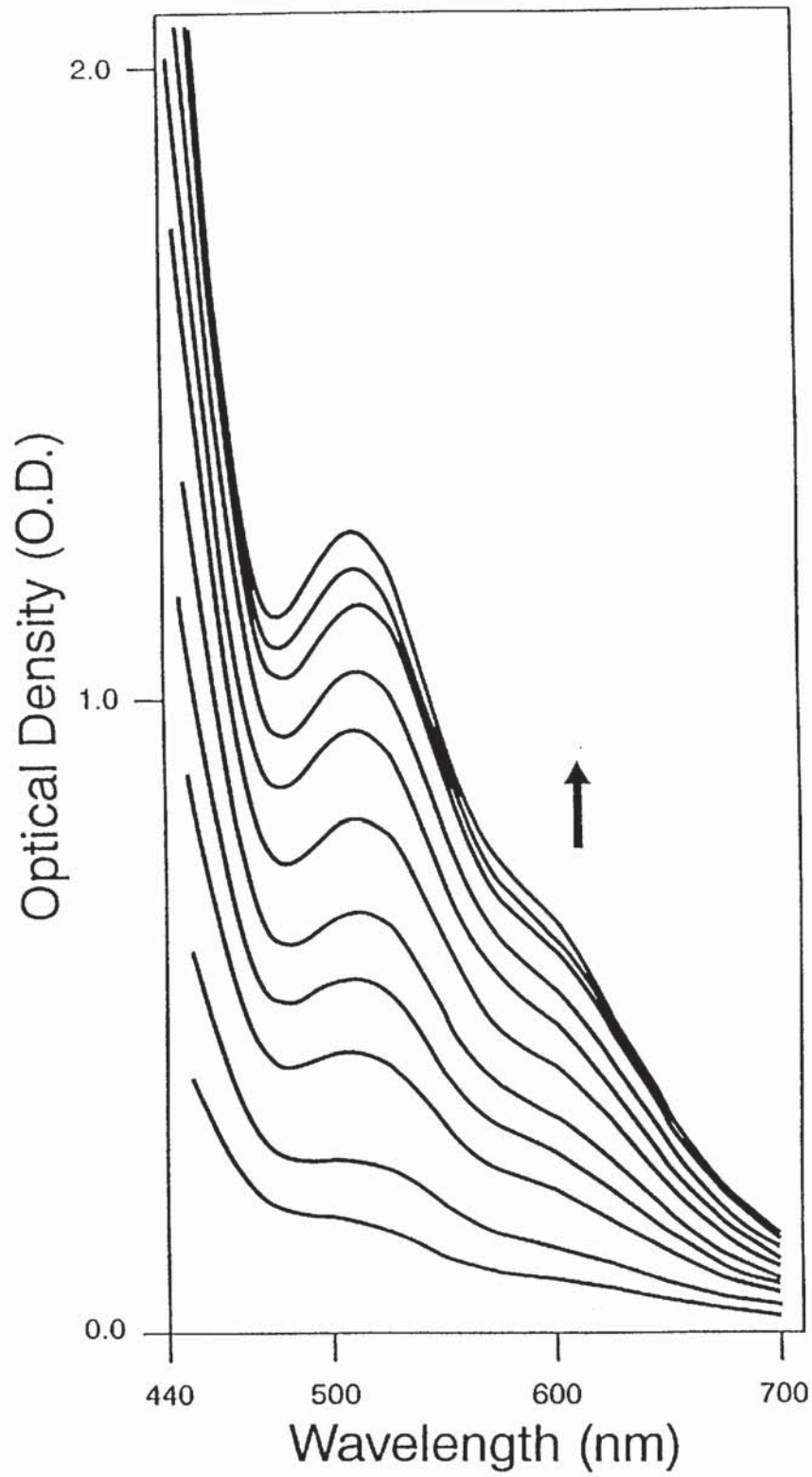


FIG. 2

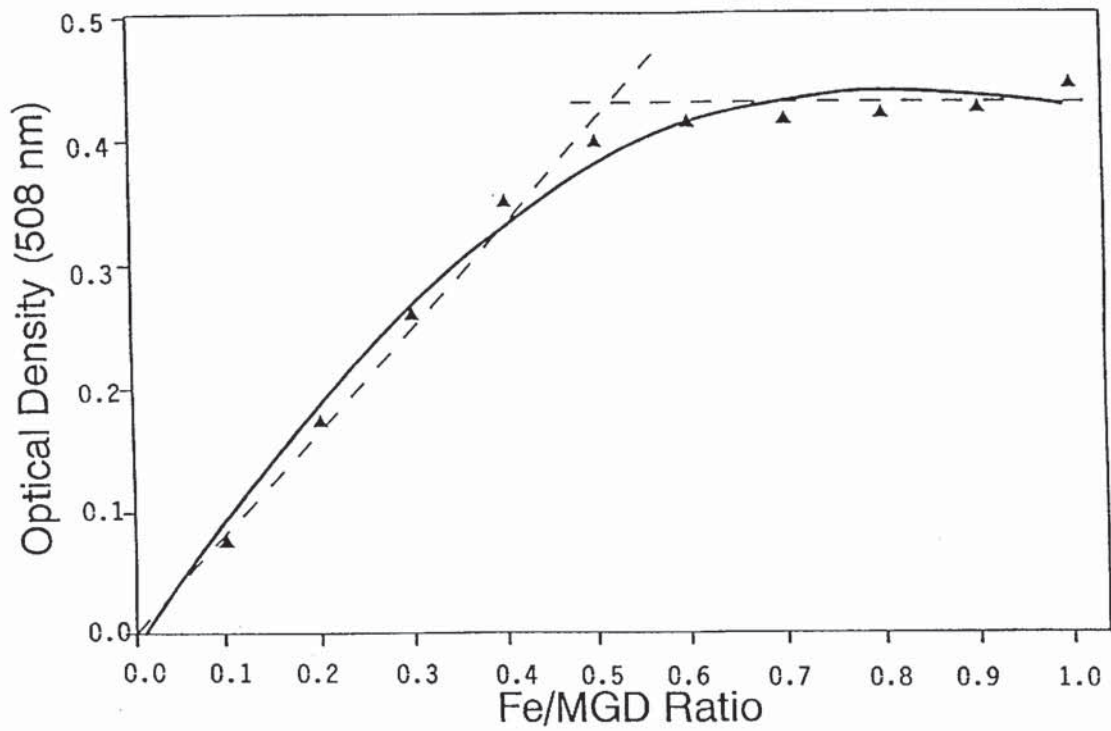


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