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Bahal et al.

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[54] **STABILIZED NALOXONE FORMULATIONS**
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Related U.S. Application Data

[63] Continuation of Ser. No. 319,920, Oct. 7, 1994, abandoned.
[51] **Int. Cl.⁶** **A61F 2/02; A61K 31/70**
[52] **U.S. Cl.** **424/423; 514/23**
[58] **Field of Search** **514/23; 424/423**

[56] **References Cited**
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Attorney, Agent, or Firm—Karen H. Kondrad

[57] **ABSTRACT**
Physically and chemically stable pharmaceutical compositions useful for administering naloxone by injection are described. These compositions are essentially aqueous solutions having a pH between 3.0–3.5, and containing naloxone, an acidic or buffer component, a tonicity-adjusting agent, and a stabilizing agent, said composition being optionally sterilized by autoclaving.

9 Claims, 8 Drawing Sheets

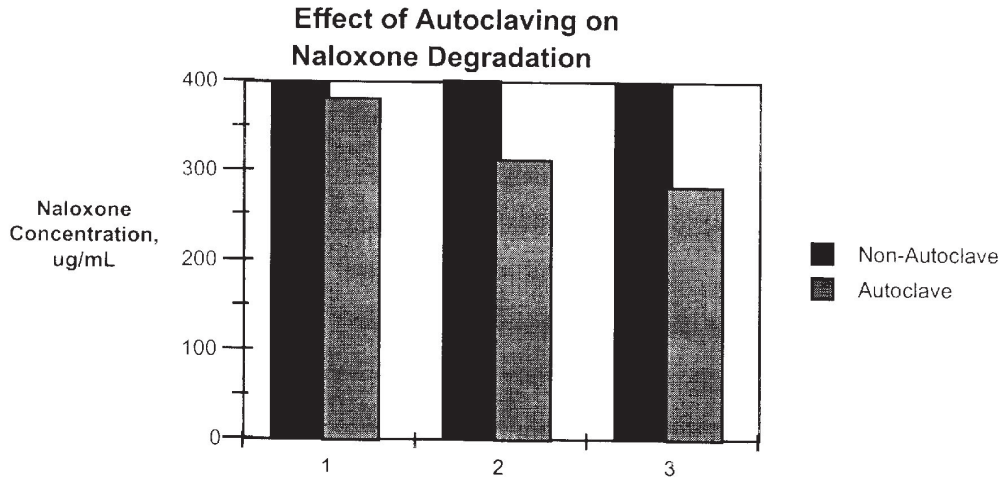
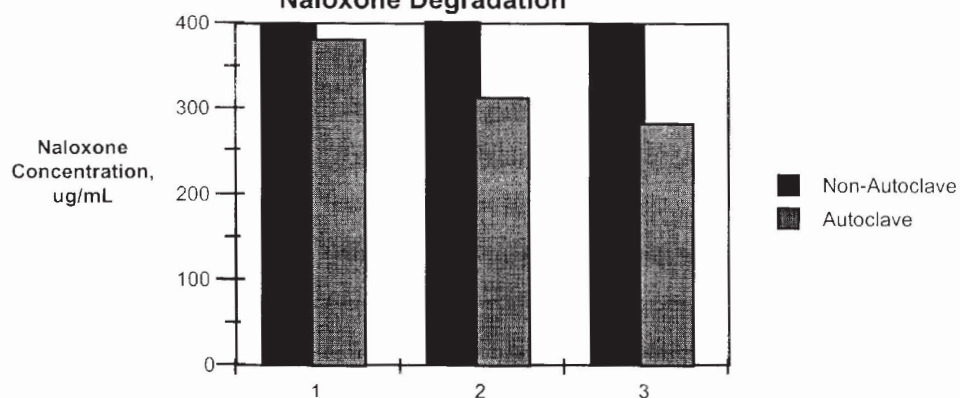
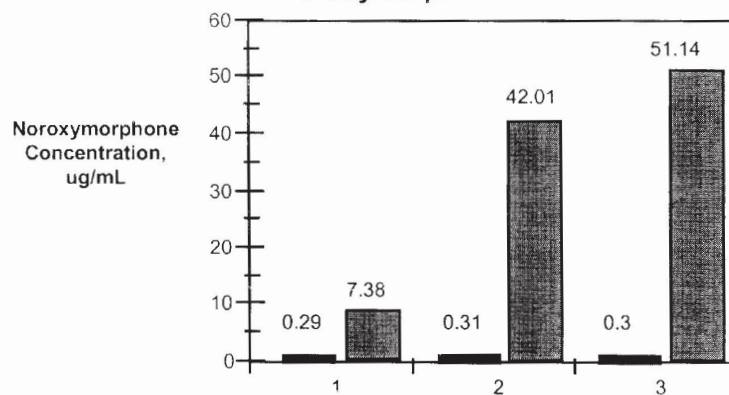


Figure 1a**Effect of Autoclaving on
Naloxone Degradation****Figure 1b****Effect of Autoclaving on
Noroxymorphone Formation**

The degradation of naloxone (Figure 1a) and formation of noroxymorphone (Figure 1b) for nitrogen sparged (1), non-sparged (2), and oxygen sparged (3) samples under autoclaving and non-autoclaving conditions.

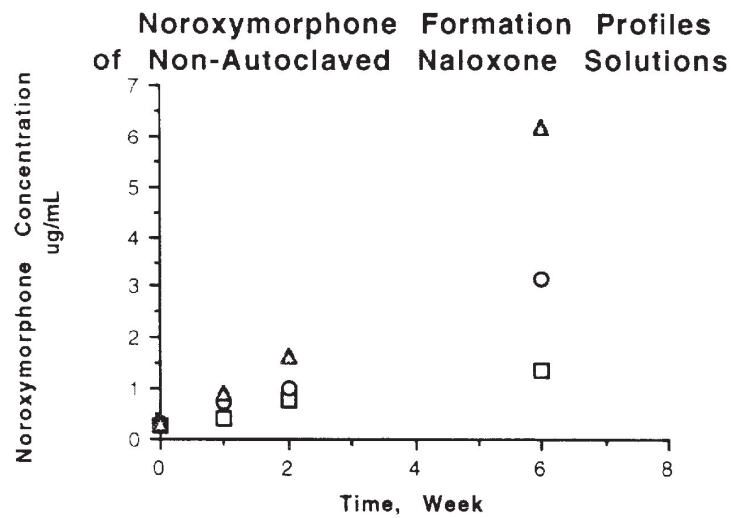


Figure 2 Noroxymorphone formation profiles of non-autoclaved naloxone solutions stored at 60°C.

- Δ Oxygen sparged sample (~100% oxygen in headspace)
- Non-sparged sample (18% oxygen in headspace)
- Nitrogen sparged sample (3-5% oxygen in headspace)

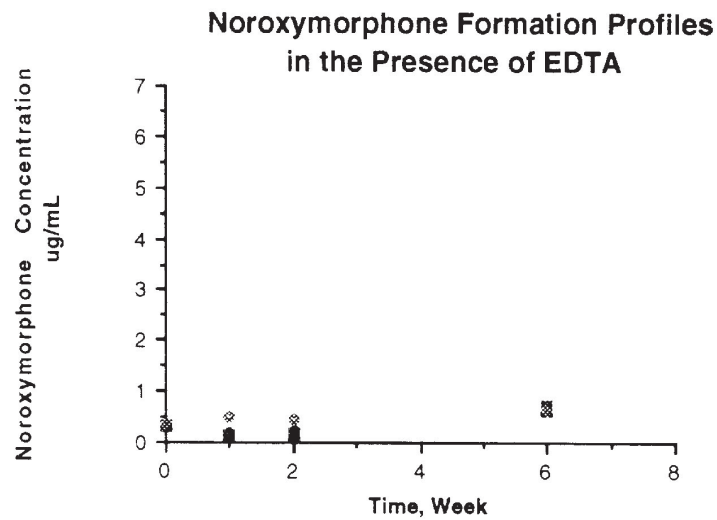


Figure 3 Noroxymorphone formation profiles of solutions with EDTA added and stored at 60°C.

- θ Nitrogen sparged, non-autoclaved sample
- F Nitrogen sparged, autoclaved sample
- n Non-sparged, non-autoclaved sample
- v Non-sparged, autoclaved sample

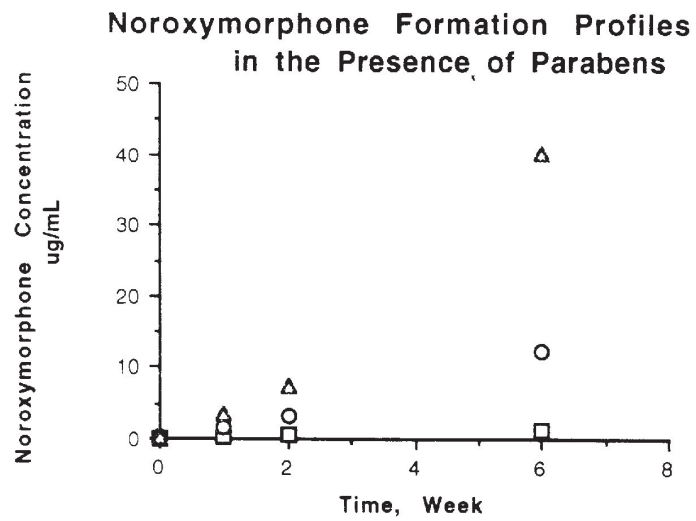


Figure 4 Noroxymorphone formation profiles of samples with parabens added and stored at 60°C.
Δ Oxygen sparged sample;
O Non-sparged sample;
□ Nitrogen sparged sample.

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