NANOPARTICLE-LOADED HYDROGEL CONTACT LENS: A POTENTIAL OCULAR DRUG DELIVERY SYSTEM FOR A CONTROLLED RELEASE

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1. Introduction

Ocular drug delivery (ODD) represents a considerable challenge for drug delivery and formulation scientists. There are several routes for ODD [1] (Figure 1).

The development of novel nanoparticle (NP)-laden soft contact lenses (SCLs) is being investigated as a way to enhance controlled drug release and targeted delivery [2] (Figure 2).

Figure 1: Ocular drug delivery routes [3].

Figure 2: Ocular drug delivery through contact lens [4].

2. Key Aims

- To manufacture contact lenses that have comparable properties to commercial lens.
- To study polymerization kinetics and the effects of sterilization on lens properties.
- To formulate and optimize polymeric nanoparticles for drug encapsulation, followed by their incorporation into fabricated lenses.
- To formulate and optimize drug-loaded contact lenses.

3. Experimental Methodology

4. Results and Discussion

5. Key Findings

- Lenses were successfully manufactured on-site, which exhibited all the critical parameters when compared to the commercially prepared lens.
- HA-coated CS NPs were shown to enhance the stability of CS NPs at pH 6.8-7.4.
- A significant increase of 6480-fold in NAR aqueous solubility by forming a NAR:CD complex.

6. Future Work

- Drug release profiles of the developed drug-loaded NPs and NP-loaded lenses.
- Cell-based studies investigating drug-loaded NP: cytotoxicity, anti-inflammatory, anti-oxidant and mucoadhesion.

7. References


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