CHITOSAN-COATED PLGA NANOPARTICLES OF TRIAMCINOLONE ACETONIDE: FORMULATION OPTIMIZATION FOR OCULAR DRUG DELIVERY

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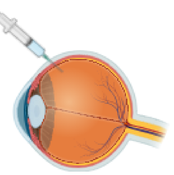
Introduction

- Age-related Macular Degeneration (AMD) is a back of the eye disease – a common cause of vision loss in elderly people.

Intravitreal injection

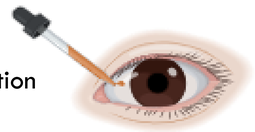


- AMD treatment - regular intravitreal injections associated with serious side effects, such as retinal detachment, an increase in intraocular pressure, etc[1].
- There is an unmet need for the development of a non-invasive treatment option for AMD.

Aims & Objectives

- To develop a topically applied nanoparticulate system exhibiting extended drug release for the treatment of AMD.

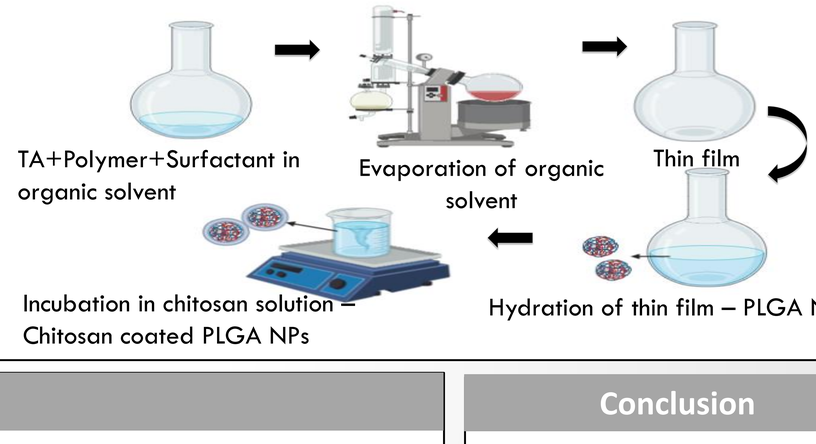
Representation of topical formulation



- Development, characterization and analysing the drug release profile of surface modified PLGA nanoparticles.
- To assess the tolerance of optimized particles on ocular cell lines.

Methods

Preparation of Triamcinolone acetonide (TA) loaded nanoparticles (NPs)



Investigation of the Nanoparticulate System – Key Results

- The nanoparticles were optimized using factorial Placket Burman DOE

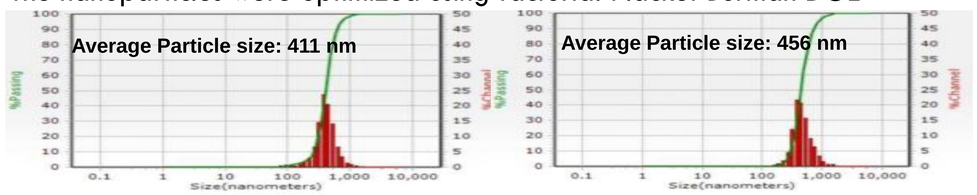


Fig 1: Particle size distribution of PLGA and chitosan coated PLGA NPs

- The zeta potential & % Encapsulation efficiency of PLGA & coated NPs was - 4.1 ± 1.4 mV & +44.1 ± 5.0 mV: 63.1% ± 6.4% & 34.4% ± 7.9%

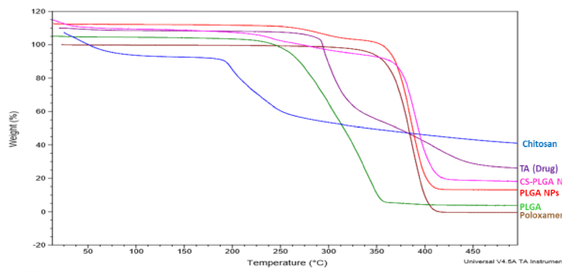


Fig 2: Thermogravimetric analysis

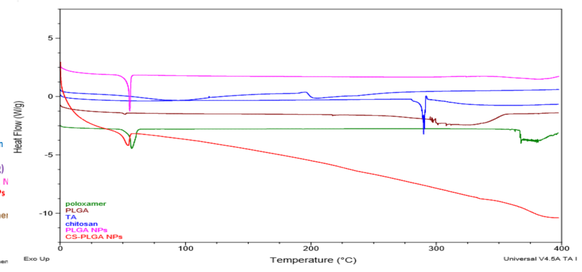


Fig 3: Differential scanning calorimetry analysis

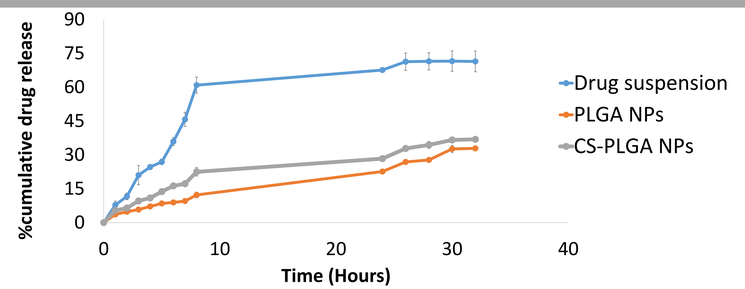


Fig 4: *In-vitro* drug release in PBS with 1% tween80

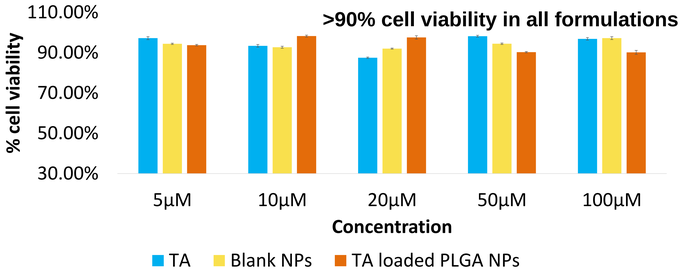


Fig 5: % cell viability of drug, blank and drug loaded NPs

Conclusion

- Successful optimization of surface modified PLGA NPs with 28% drug release in 32 hours, reaching a plateau suggesting the controlled release of the drug.
- Stable monodispersed NPs proved non-toxic on primary human corneal epithelial cell lines.

A. Sternfeld, R. Ehrlich, D. Weinberger, and A. Dotan, "Effect of different lens status on intraocular pressure elevation in patients treated with anti-vascular endothelial growth factor injections," *Int. J. Ophthalmol.*, vol. 13, no. 1, pp. 79–84, 2020.

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