VORICONAZOLE-CYCLODEXTRIN COMPLEX LOADED OCULAR FILMS FOR FUNGAL KERATITIS

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VORICONAZOLE (VRC)

MW: 349.31 g/mol
Log P: 1.64
Sol: ~0.7mg/mL

- Second-generation triazole antifungal drug
- Prevention of fungal cell wall (ergosterol) synthesis
- Poor solubility and stability

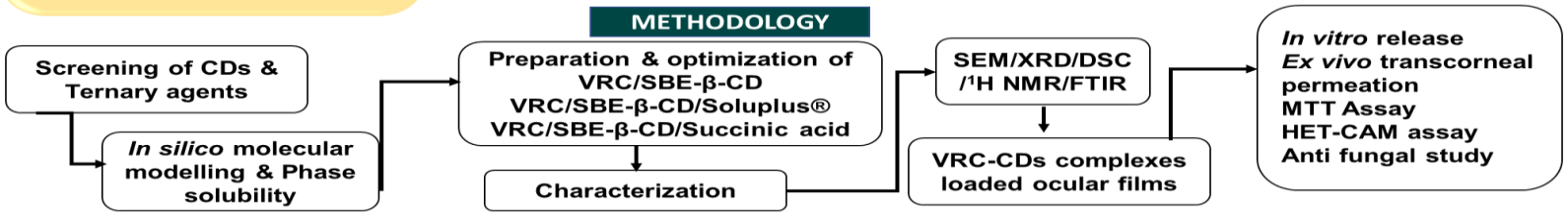
BACKGROUND

- Ocular drug delivery is challenging attributed to poor precorneal retention, permeation and frequent administration (non-patient compliance)
- The aim of the study was to improve solubility, stability, transcorneal permeation, and efficacy of voriconazole

OBJECTIVES

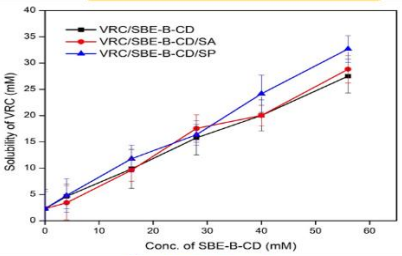
- *In silico* molecular modelling and optimization of binary and ternary complexes
- Formulation of binary/ternary complexes loaded ocular films
- *In vitro* and *Ex vivo* evaluation of optimized films

METHODOLOGY

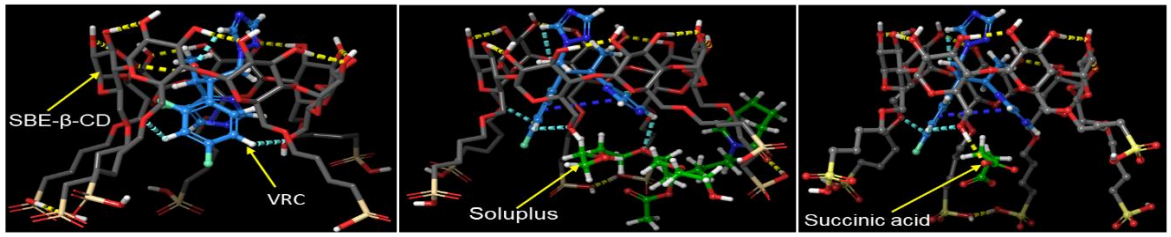


RESULTS AND DISCUSSION

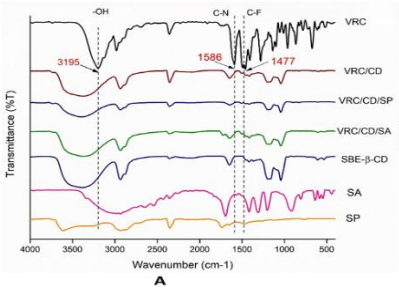
Phase solubility



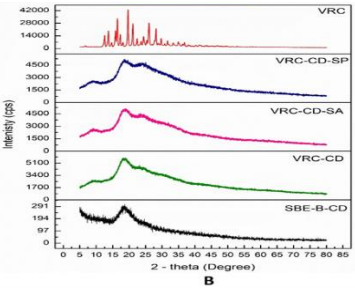
VRC/SBE-β-CD | VRC/SBE-β-CD/Soluplus® | VRC/SBE-β-CD/Succinic acid



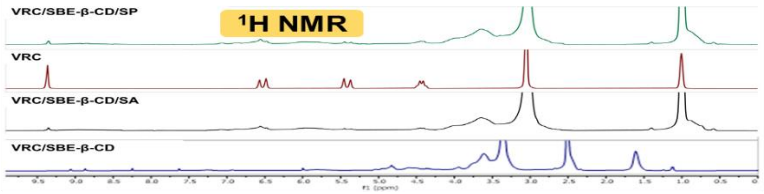
FTIR



PXRD

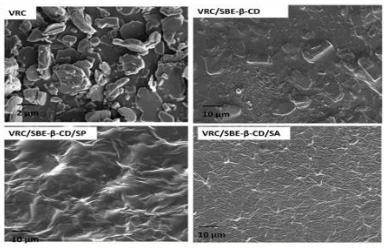


¹H NMR

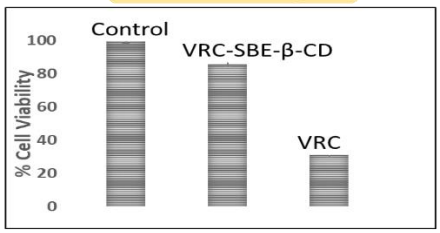


Phase solubility study suggested ~14-fold improvement in VRC solubility, whereas physicochemical characterization confirmed the inclusion of VRC in the cyclodextrin inner cavity. *In silico* docking studies suggested formation of stable of the inclusion complex.

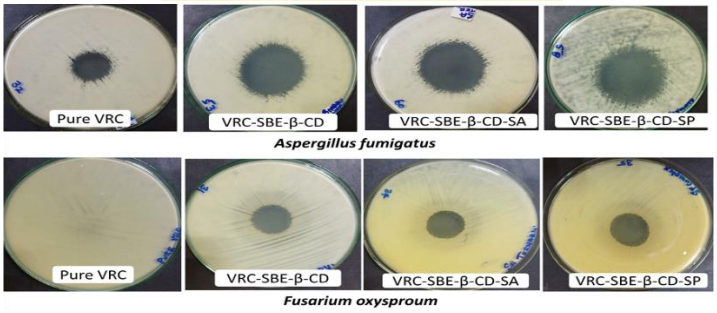
FESEM



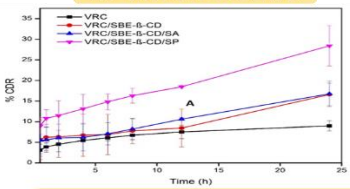
MTT Assay



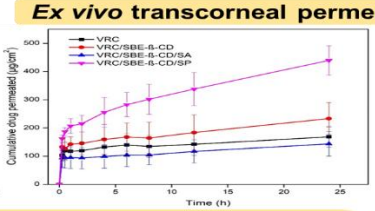
In vitro antifungal study



In vitro release



Ex vivo transcorneal permeation



CONCLUSION

- The optimized complexes loaded films were nontoxic and non-irritant confirmed by MTT and HET-CAM assay, respectively.
- Enhanced steady-state flux and corneal permeation were obtained for films containing VRC/ SBE-β-CD /SP complex
- Our study showed that the VRC, complexed with SBE-β-CD increased the antifungal potency of VRC against *A.fumigatus and F. oxysporum* compared to the uncomplexed drug.

References:

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Acknowledgement

The authors are thankful to the Central Instrumentation facility (CIF, Manipal) for providing characterization facility. The authors would also like to acknowledge Manipal - Schrödinger Centre for Molecular Simulations, MCOPS, Manipal for providing facilities to conduct the *in silico* studies.