

Kinetic Study On The Release Of Clotrimazole – An Antifungal Agent In Polymers

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ABSTRACT

Denture related stomatitis is an inflammatory reaction of oral tissue that are in contact with denture. Various bacteria, fungi and other micro-organisms are responsible for this. Topical application of medicine in these cases are more effective than systemic intake.

In this study release of clotrimazole from different acrylic resin were studied in artificial saliva at 5.8 pH.

Experiment shows that clotrimazole release from different materials was found to be maximum on 8th day and uniformly decrease after that.

Release of clotrimazole with time obeys first order kinetics upto 56 days. The K-value was found to be 0.02 day⁻¹ and t^{1/2} 33 days.

INTRODUCTION

Denture related stomatitis is an inflammatory reaction of the oral tissue that are in contact with denture^{2,17}. The tissue surface of the denture serves as a reservoir for the bacteria, fungi and other micro-organisms, of which candida albicans is the most prevalent^{2,4}. Topical release of antifungal agents is more effective than systemic intake, which has adverse effect like renal toxicity and CNS toxicity.

In this study Clotrimazole, an effective antifungal agent is incorporated into acrylic denture base resins as dental patches with enhancers to improve the release and the kinetics of the release was studied.

EXPERIMENT

The release of clotrimazole out of polymer matrix was studied at various pH. It was found to be maximum at the pH of 2.5. since the pH of the saliva is near neutral and also due to the fact that candida albicans grows in acidic pH (5.8) for the diabetic and immune compromised patients^{1,11,24,25}. The release was studied at a pH of 5.8 using artificial saliva. There was no release of clotrimazole at this pH which necessitated the use of an enhancer.

The antifungal agent clotrimazole was mixed with autopolymerising clear acrylic resin, heat cure acrylic resin, autopolymerising reliner and autopolymerising tissue conditioner in the concentration of 2%, 5%, and 10% by weight along with 1% sodium lauryl sulphate, the

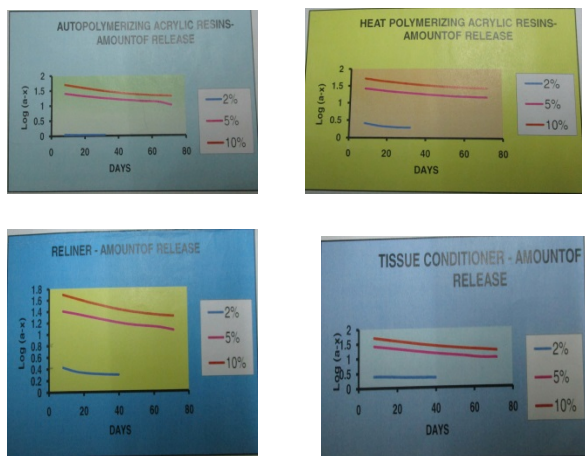
enhancer, and made into square specimens of 15mm x 15mm x 2mm. they were cure by the standard procedures recommended for various types of resins.

The specimens were kept in separate beakers immersed in 10 ml of artificial saliva at pH 5.8, the optimum pH for the maximum drug release. 1 ml aliquot of solutions were removed with pippete at an interval of 8 days upto 72 days and tested for cortimazole concentration by extraction with chloroform and absorpion at 268 nm as the hydrochloride^{10,13,19}.

RESULTS AND DISCUSSION

The following observations were made regarding the amount of release of clotrimazole with the different materials used. In all cases thr concentration was maximum on the 8th day and than uniformly decreased thereafter. Where 2% clotrimazole was incorporated the specimen shows no significant release after 32 days^{7,10,14,15,22,23}. The maximum amount of release upto 8th day was 2.5 mg , 4.23 mg and 9.84 mg for 2% , 5% , and 10% materials^{2,18}. In the 5% category for the heat cure acrylic resin specimen the release was practically stopped after 48 days and after 64 days for the autoploymerising acrylic resin reliner and tissue conditioner. For the 10% category, the release for all the four levelled off after 72 days.

The release of cotrimzole with time for the different types of acrylic resin against time (days) was plotted and was found to obey first order kinetics upto 56 days. The K-value was found to be 0.02 day-1 and the $t^{1/2}$ is 33 days.



CONCLUSION

On the basis this experiment it was concluded that release of clotrimazole at different concentration with enhancer , sodium lauryl sulphate, follows first order kinetics



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