Chlorhexidine-Delivery-System based on Acrylic Resins - Microbiological and Biocompatibility Studies -

0518

CED-IADR/NOF
Oral Health Research Congress

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INTRODUCTION

Adhesion and biofilm formation of *Candida albicans* in acrylic resins have been considered as essential local factor for the development of denture stomatitis.[1,2] As a treatment option, incorporation of chlorhexidine (CHX) into acrylic resins is reported in the literature.[3-6] Studies have not yet been demonstrated the effect of antibiofilm of this drug delivery system. It has also been reported that CHX may cause cytotoxic effects on oral cells and tissues[7-9], however no studies have yet been performed to assess cytotoxicity upon incorporation into these biomaterials.

OBJECTIVES

To evaluate the antimicrobial activity against *Candida albicans* and *Streptococcus oralis* and to assess the cytotoxic potential, using cultures of fibroblasts, of acrylic reline resins loaded with chlorhexidine.

MATERIALS AND METHODS

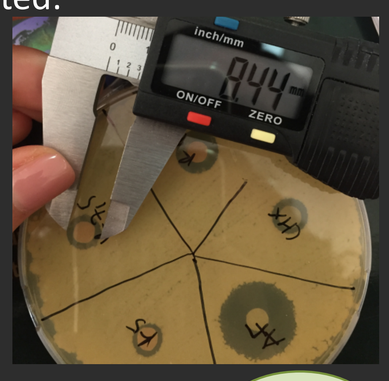
Distinct CHX diacetate monohydrate (Panreac Applichem, Darmstadt, Germany) concentrations were selected for inclusion in the composition of three acrylic reline resins. Kooliner (K) was incorporated with 2.5% (w/w) while Ufi Gel Hard (U) and Probase Cold (P) with 5% (w/w). All materials also included a control group (0% CHX).

1. Agar diffusion assay

n=3

1. Resin disks were placed on agar plates and inoculated:
   Candida albicans (ATCC® 10231TM)
   Streptococcus oralis (ATCC® 3507)

48h 37 ° C



2. Diameters of inhibition zones were measured

2. Antibiofilm assay

n=1

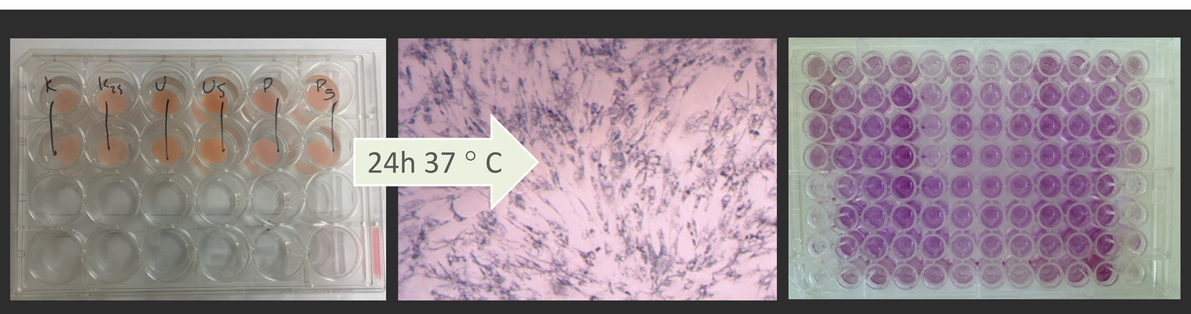
48h 37 ° C

Candida albicans (ATCC® 10231TM)

1. Fixed with different ethanol solutions: 75, 90 and 100% (V/V) 40 min
2. Analyzed and photographed using a scanning electron microscope (SEM JSM7001F JEOL)

3. Cytotoxic potential

n=2



24h 37 ° C

1. Extracts were obtained by incubating the specimens in 1 mL of distilled water
2. Cultures of **L929 fibroblasts** (ATCC®1 CCL-1TM) were exposed to the extracts
3. **Cell viability** was determined by the spectrophotometric tetrazolium bromide reduction assay (**MTT**)

Data were analyzed using parametric *t*-test (p=0.05)

RESULTS

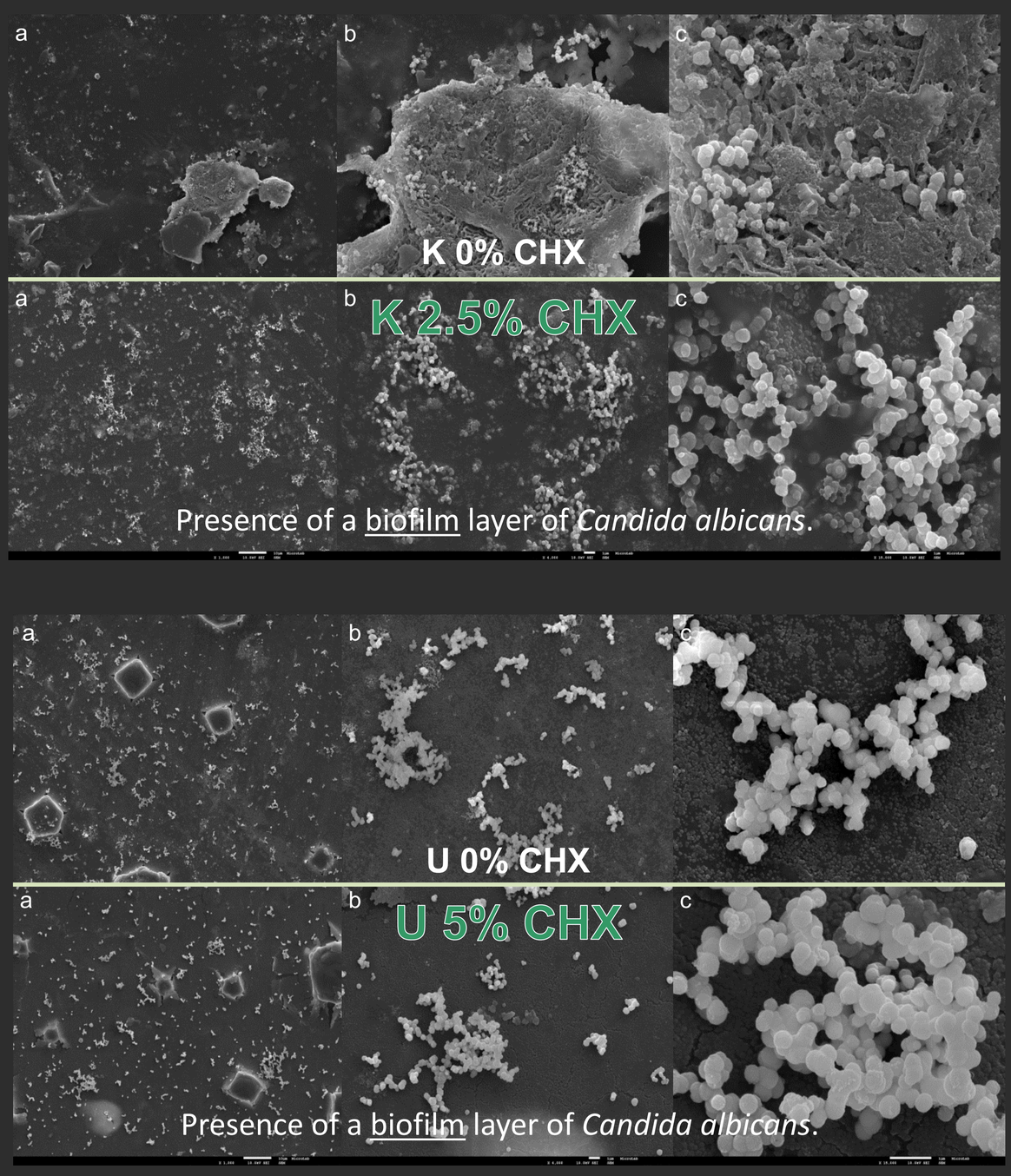
1. Agar diffusion assay

All resins loaded with CHX showed an inhibition halo for both strains.

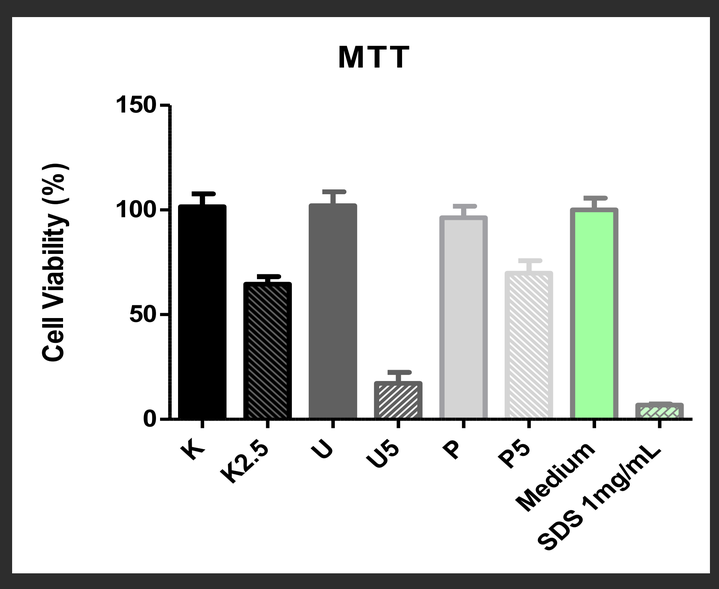
Diameters of inhibition zones (mm)
Mean±SD

	K		U		P	
CHX (%)	**0**	**2.5**	**0**	**5**	**0**	**5**
C. albicans	--	8.6±0.97	--	10.0±3.29	--	7.3±1.18
S. oralis	--	17.4±0.69	--	16.6±1.26	--	10.3±0.67

2. Antibiofilm assay



3. Cytotoxic potential



The incorporation of the drug **decreased cell viability** in the three tested resins (p<0.001).

When compared to each other, Probase Cold was the less cytotoxic resin (70.6±6.17%) and Ufi Gel Hard the most cytotoxic (16.6±5.24%).

CONCLUSIONS

The best option of a chlorhexidine-delivery-system is **Probase Cold containing 5% of the drug.** This system presented antimicrobial activity against *Candida albicans* and *Streptococcus oralis*, including high antibiofilm effect against the fungal, being, at the same time, the less cytotoxic resin under evaluation.

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ACKNOWLEDGEMENTS

Portuguese government, *Fundação para a Ciência e Tecnologia* (FCT), iMed.ULisboa, for financial support, Pest-UID/DTP/04138/2019.

The presentation is based upon work from COST TD1305 (Improved Protection of Medical Devices against infection).
VOCO GmbH for the donation of the UGH material.