DRUG INCORPORATION OF ACRYLIC RESINS
MICROBIOLOGICAL AND RELEASE STUDIES

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PURPOSE

Denture stomatitis is a pathological condition of the denture bearing mucosa with multifactorial etiology, being the infection by *Candida* species especially *Candida albicans* considered the main etiologic factor[1-3]. Inhibition of the formation of *C. albicans* biofilms on prostheses may be very important in preventing the development of denture stomatitis; therefore, **chlorhexidine (CHX)** has been **incorporated in acrylic resins**[4,5]. Currently, only mechanical properties of acrylic reline resins incorporated with CHX were studied[2,6,7].

OBJECTIVES

Evaluate the drug release and antifungal activity against *Candida albicans* of **acrylic reline resins** loaded with **chlorhexidine**.

MATERIALS AND METHODS

ACRYLIC RESINS

Kooliner (K)

Ufi Gel Hard (U)

Probase Cold (PC)

PREPARATION OF SPECIMENS

CHX Diacetate

0%, 1%, 2.5%, 5%, 7.5% e 10% (w/w)

DRUG RELEASE

n=3

12 x 6 mm

▪ **Releasing solutions**
Artificial saliva
ph=7

Incubator at 37ºC
Constant gentle shaking
28 days

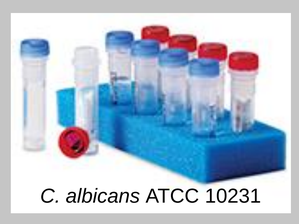
900 µL

1, 2, 4, 7, 24, 48, 72, 96, 168, 240, 360, 528, 672 hours

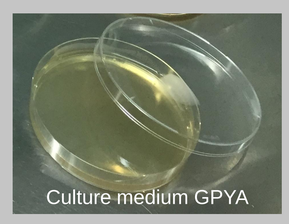
UV-spectroscopy (255nm)

ANTIFUNGAL ACTIVITY – *Kirby-Bauer test*

1) Inoculum Preparation: Direct Colony Suspension Method



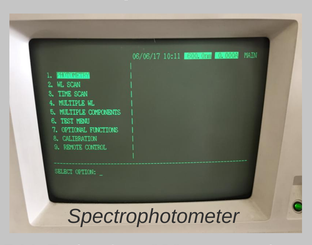
C. albicans ATCC 10231



Culture medium GPYA

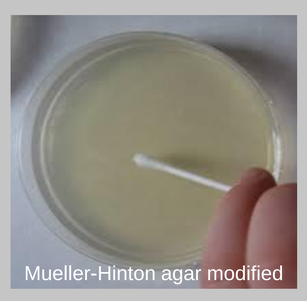
35±2°C
24h

2) Inoculation of Test Plates



Spectrophotometer

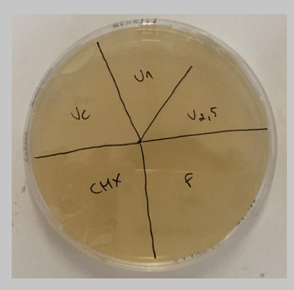
0.5 McFarland at 600 nm wavelength
1 x 10^6 to 5 x 10^6 cells per mL



Mueller-Hinton agar modified

n=3

3) Application of disks to inoculated agar plates

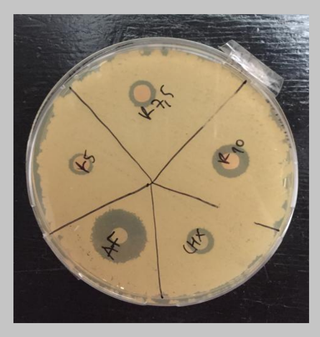


EXPERIMENTAL GROUPS
C – Resin with 0% CHX
1 – Resin with 1% CHX
2,5 – Resin with 2.5% CHX
5 – Resin with 5% CHX
7,5 – Resin with 7.5% CHX
10 – Resin with 10% CHX

POSITIVE CONTROLS
CHX – Paper disk with 10µg CHX
F – Paper disk with 20µg Amphotericin B

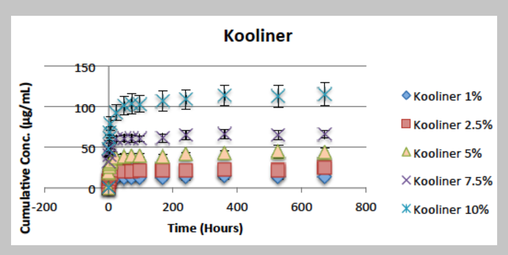
Incubation at 35 ±2 ºC for 48 hours

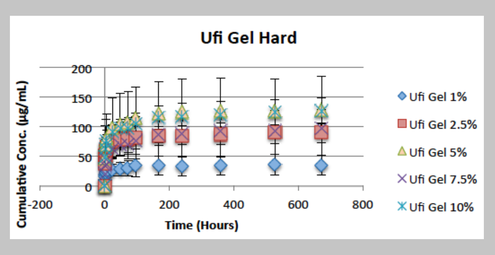
4) Reading plates
Measurement of the diameters of inhibition zones (mm)

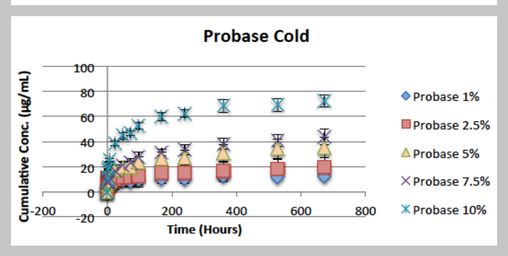


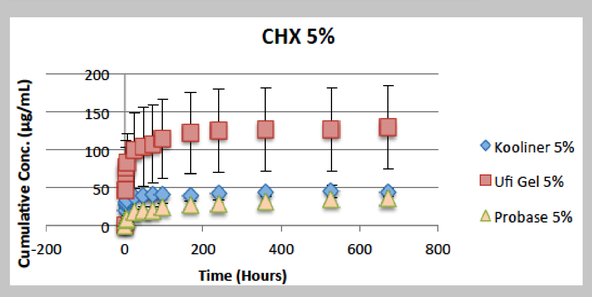
RESULTS

DRUG RELEASE





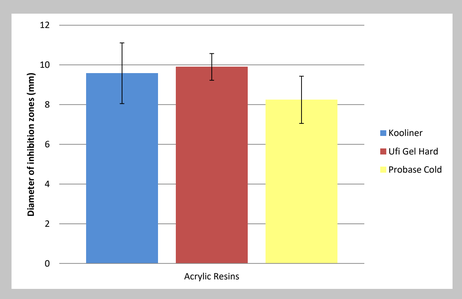




For all CHX % and for the majority of time intervals, **Ufi Gel Hard** released the highest amount of CHX, followed by **Kooliner and Probase Cold**.

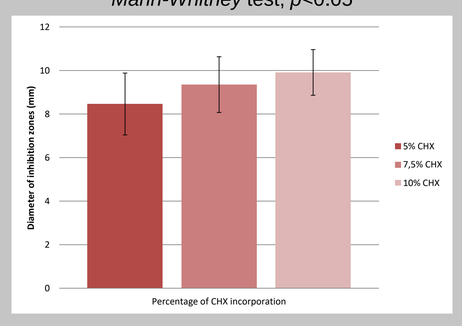
ANTIFUNGAL ACTIVITY

No group with 1% CHX presented inhibition zone, and only the **Kooliner** group presented inhibition zone in specimens with **2.5% CHX** (8.95±0.97 mm)**.**



Mann-Whitney test; $p<0.05$

Probase Cold presented lower values than **Ufi Gel Hard** ($p=0.017$).



There was a tendency to **increase the diameter of inhibition zone with the increase of the percentage of CHX incorporated** in the material ($p=0.198$).

CONCLUSION

- Different acrylic reline resins compositions and different CHX loading percentages affects the **drug release**.
- The incorporation of CHX into acrylic resins seems to have an influence on the **microbiological activity** against this strain of *C. albicans*.
- U appears to be the resin which releases more CHX and which, at 5% CHX concentration, already exhibits antifungal activity.
- CHX delivery systems based on acrylic reline resins are a potential approach in the treatment of denture stomatitis.

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