

INSIGHTS ON CHLORHEXIDINE LOADED ACRYLIC RESINS AFTER AGEING



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ADR GENERAL SESSION

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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 *C. albicans* considered the main etiologic factor¹⁻³. 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}. Previous studies of loading CHX into acrylic reline resins^{6,7} were promising because established concentrations of CHX that had antifungal activity with no influence on the properties of the resins. However, these studies point to a short period after polymerization occurred. Oral biomaterials in function are submitted to biodegradation processes that can change their physical and biomechanical properties which lead to the importance of mimic the conditions of the oral cavity through ageing processes⁸.

OBJECTIVES

Evaluate the effect of **chlorhexidine loading** on microhardness and flexural strength of **acrylic reline resins** after a thermal ageing process.

MATERIALS AND METHODS

ACRYLIC RESINS

Kooliner (K)



Ufi Gel Hard (U)



Probase Cold (PC)



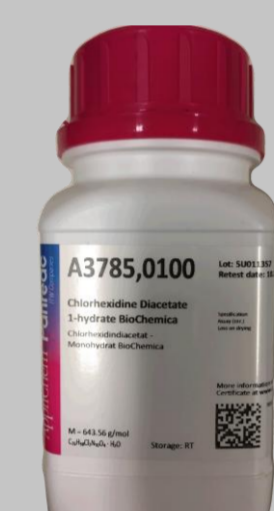
EXPERIMENTAL GROUPS

n=8

0%
1%
2.5%
5%
7.5%
(w/w)

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

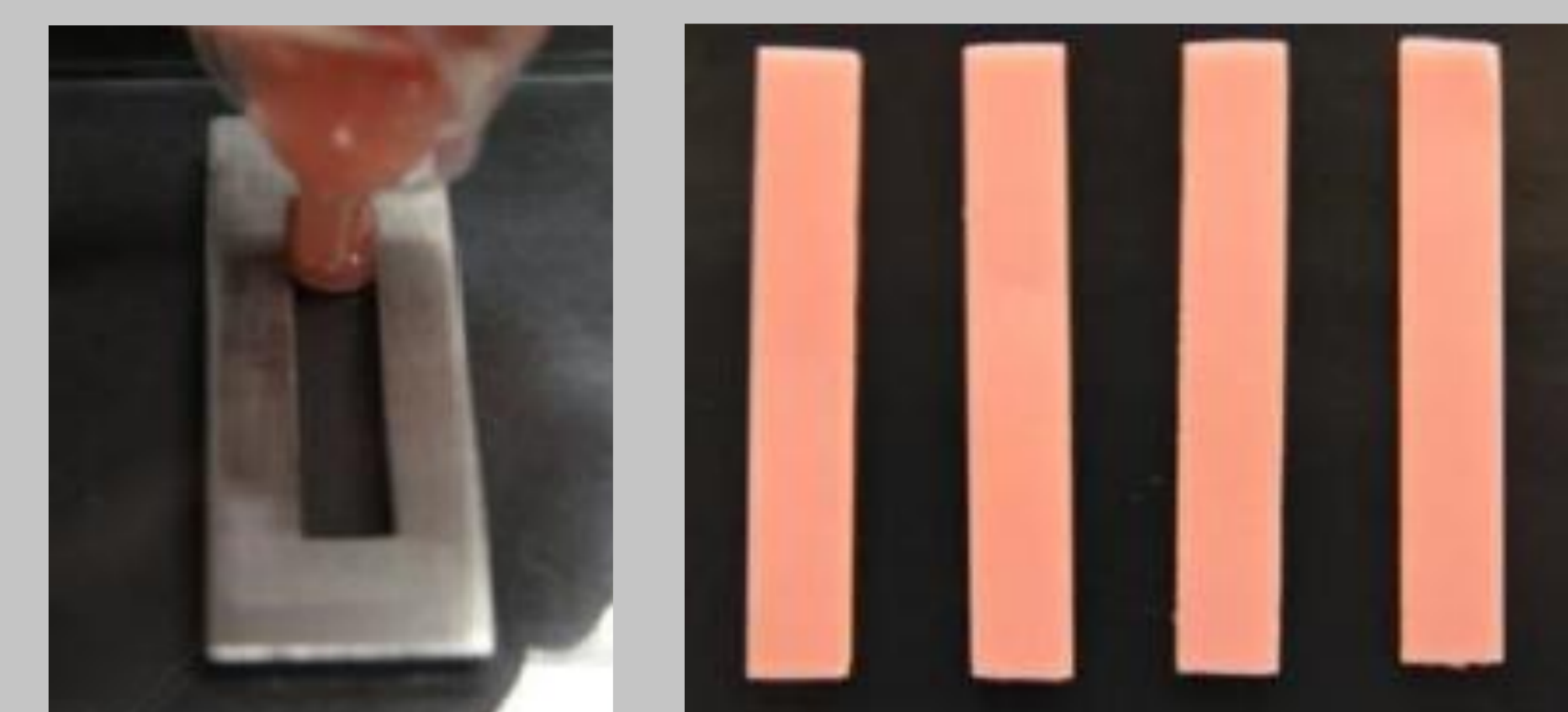
0%
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(w/w)



CHX Diacetate Monohydrate

PREPARATION OF SPECIMENS

64 x 10 x 3.3 mm
ISO 20795-1:2013

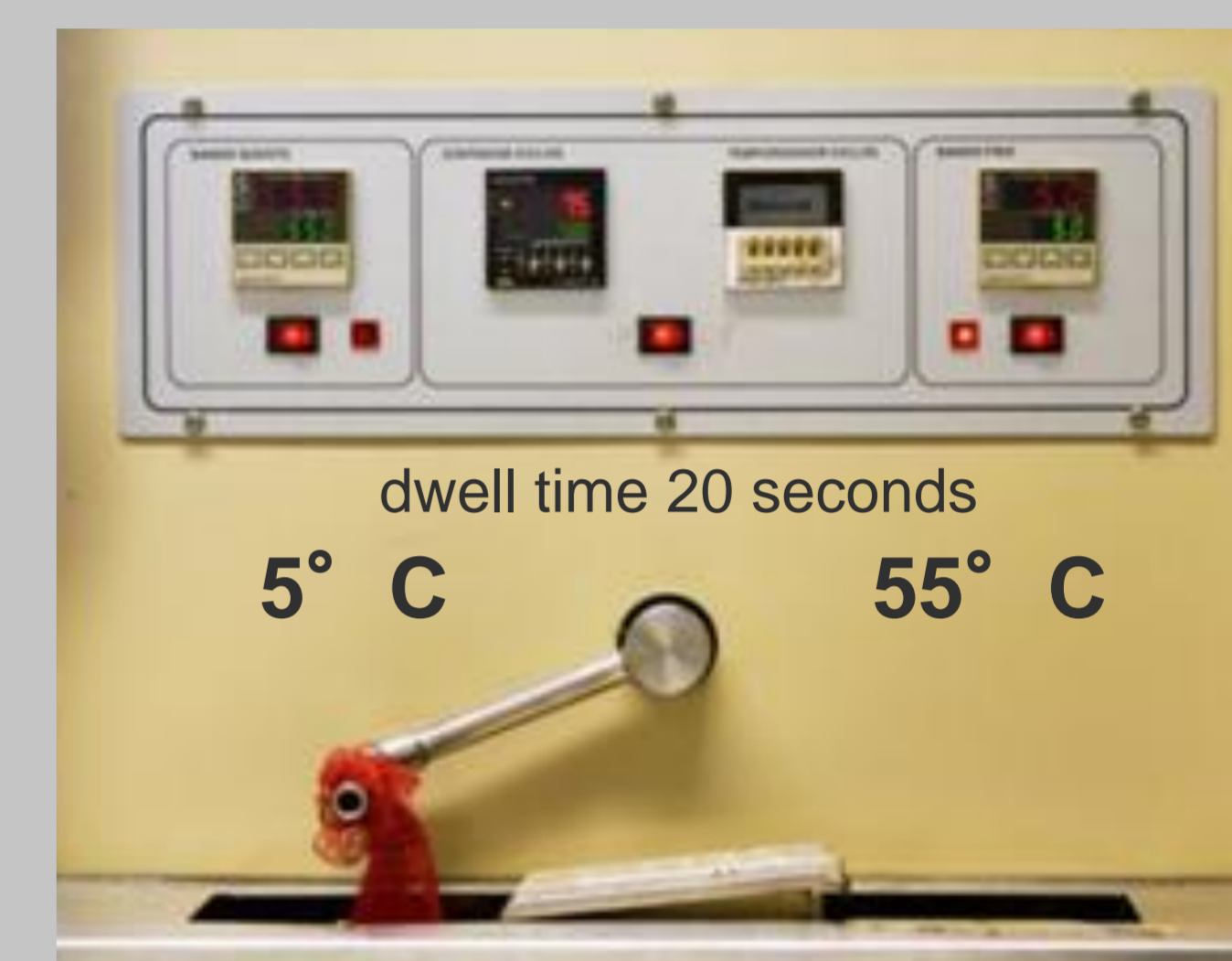


THERMAL AGEING

Thermocycling machine
1000 cycles of thermal fluctuations



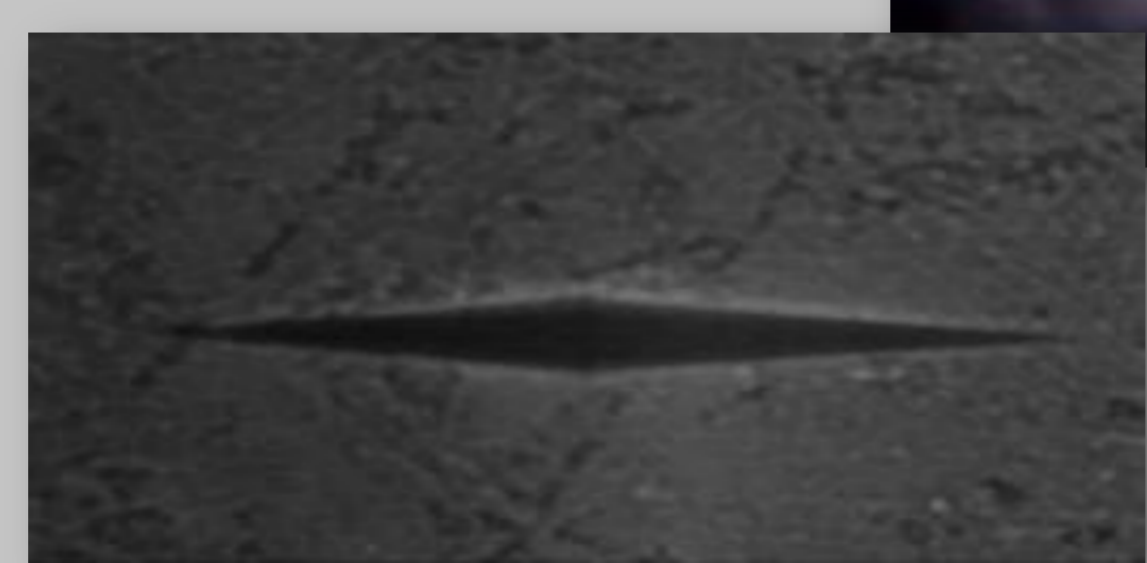
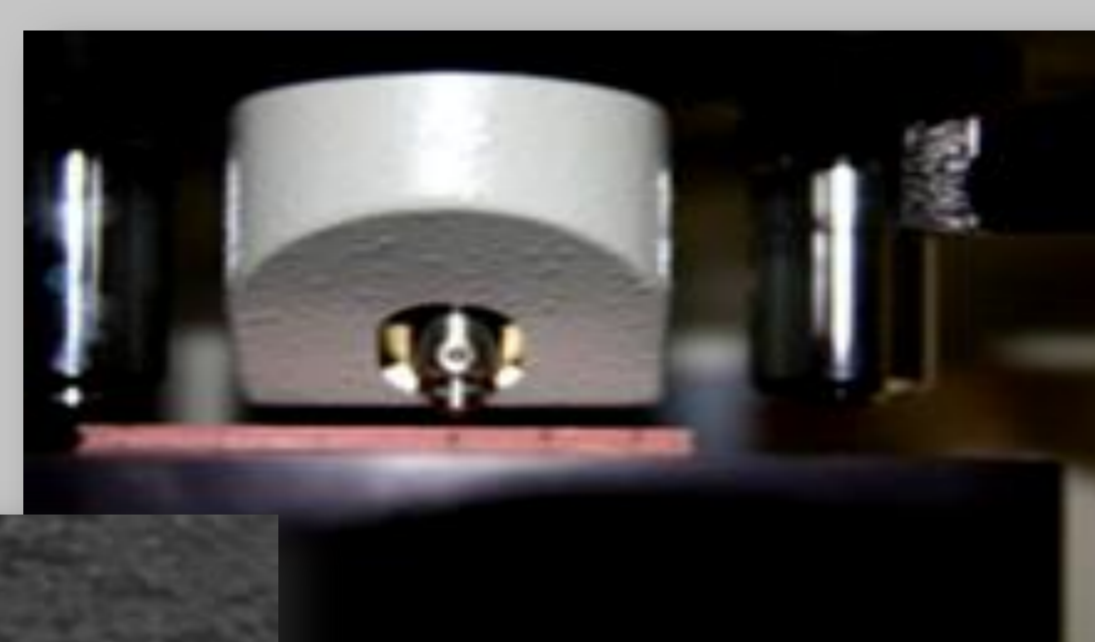
1 month of oral environment



MICROHARDNESS

Microhardness Indentation Machine *Duramin*

- Knoop diamond indenter
- 98.12 mN load 30 seconds
- 12 measurements in each specimen

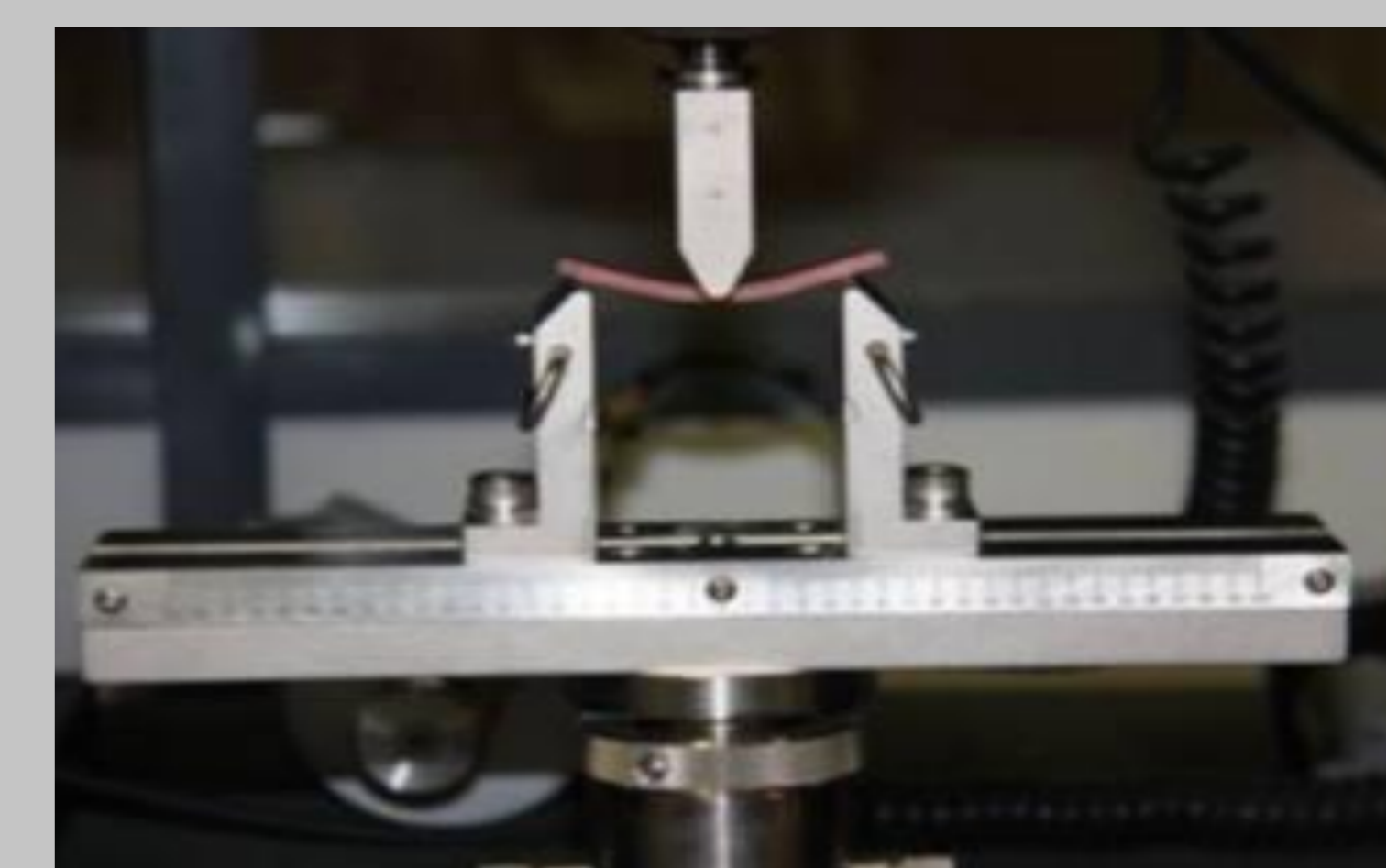


Kruskal-Wallis and Mann-Whitney tests with Bonferroni corrections
($\alpha=0.05$)

FLEXURAL STRENGTH

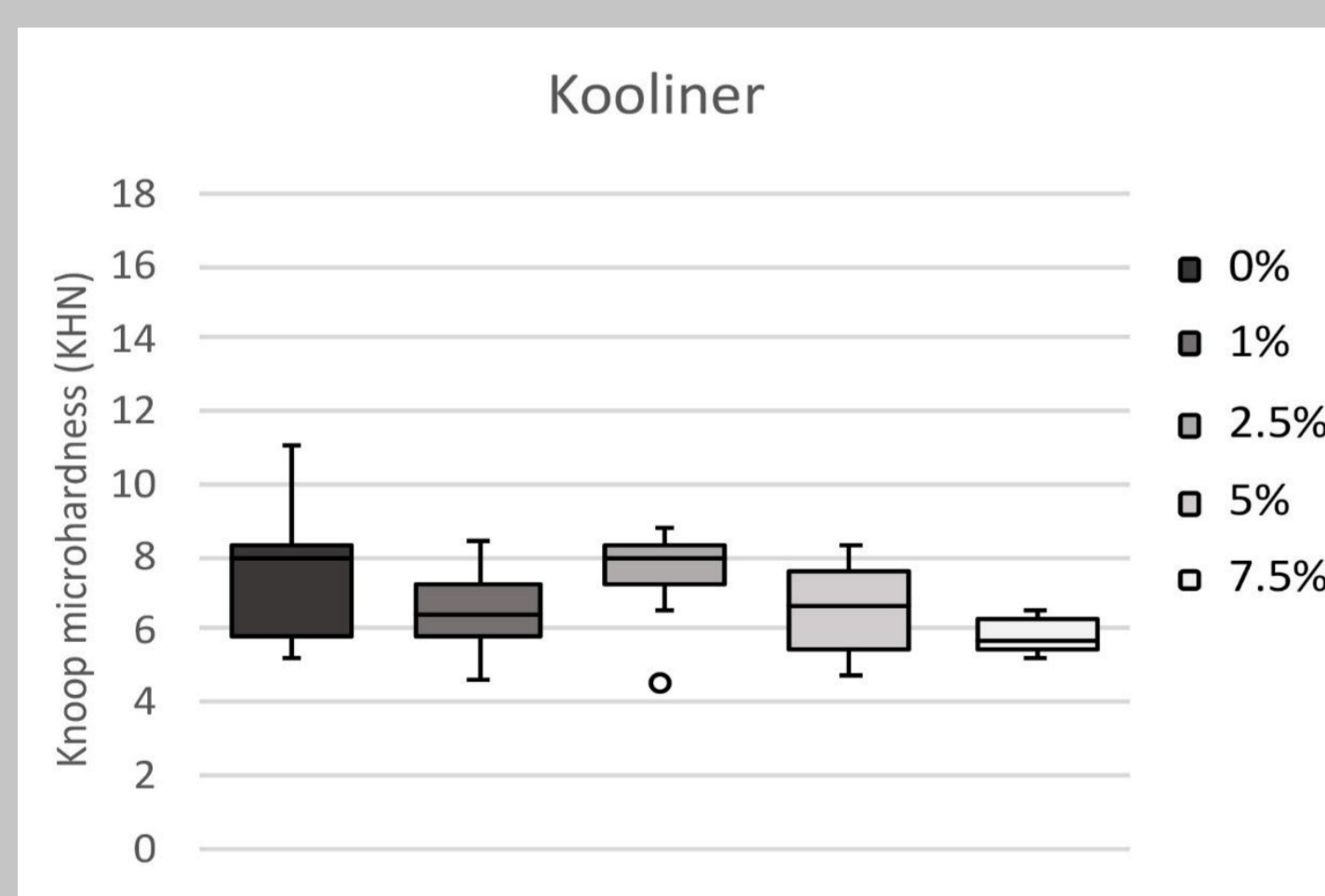
Universal Testing Machine *Instron*

- 3-point device
- 5 mm/min crosshead speed
- 50 mm distance between supports

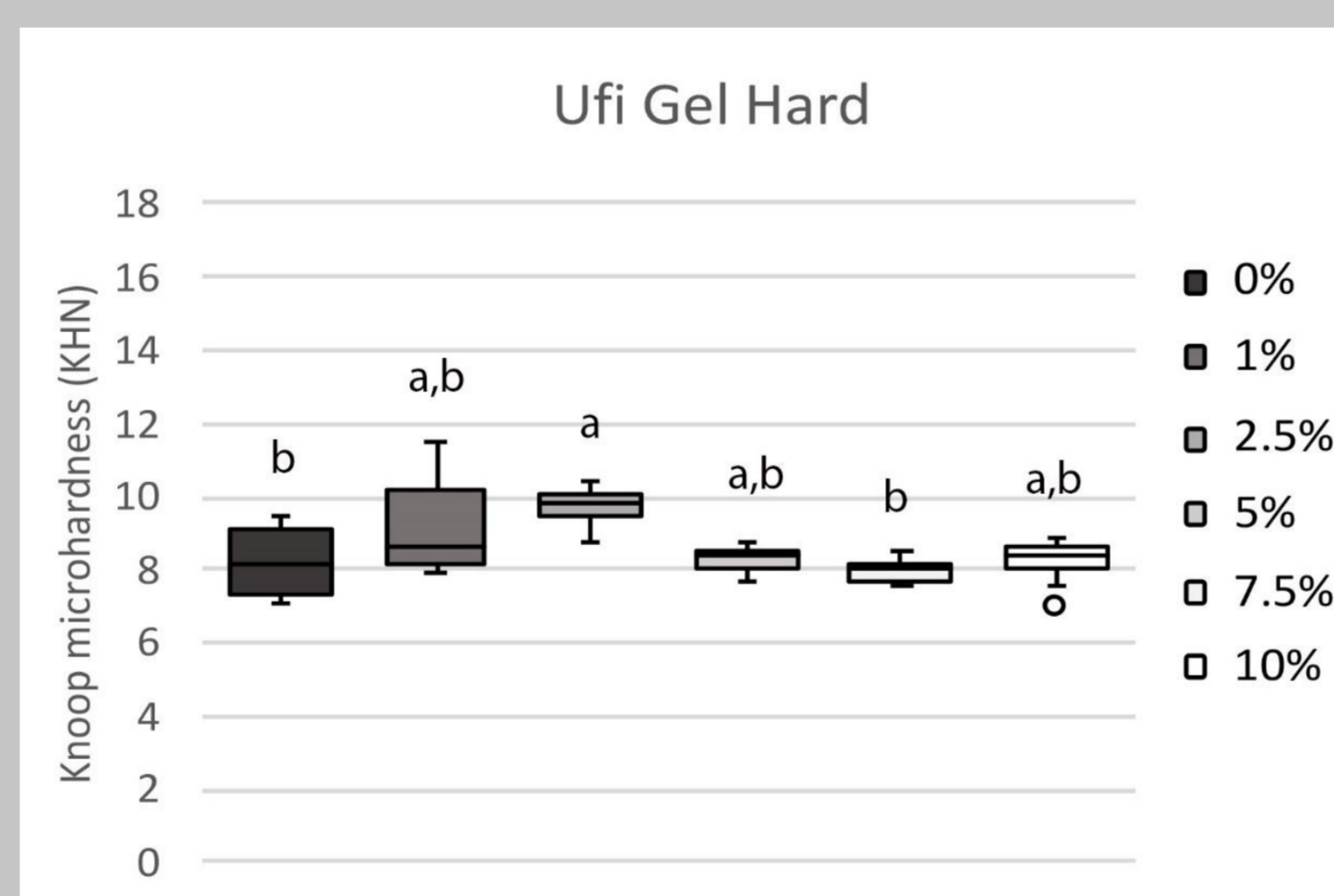


RESULTS

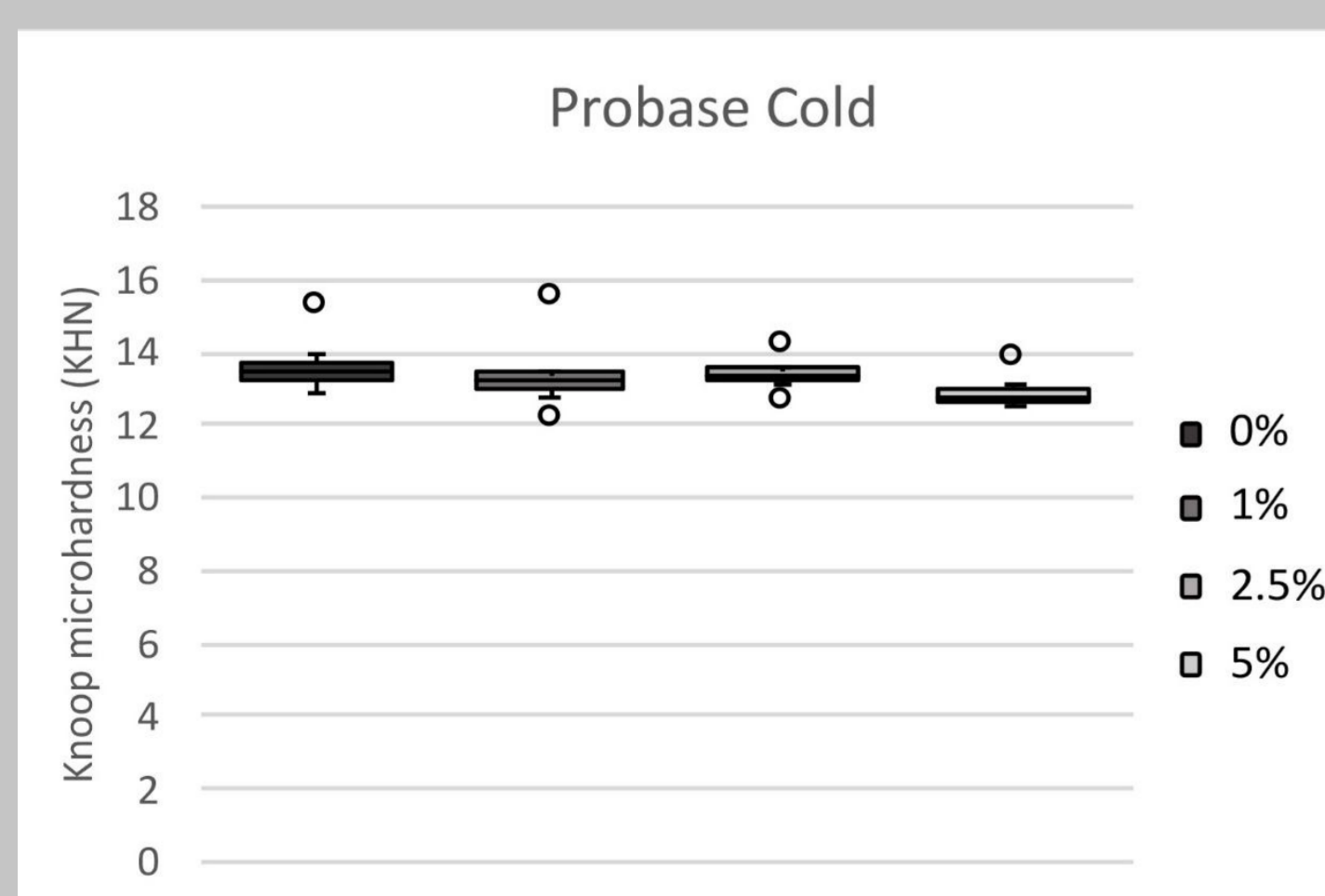
MICROHARDNESS



K: Loading with CHX concentrations did not showed differences on values ($p=0.114$).

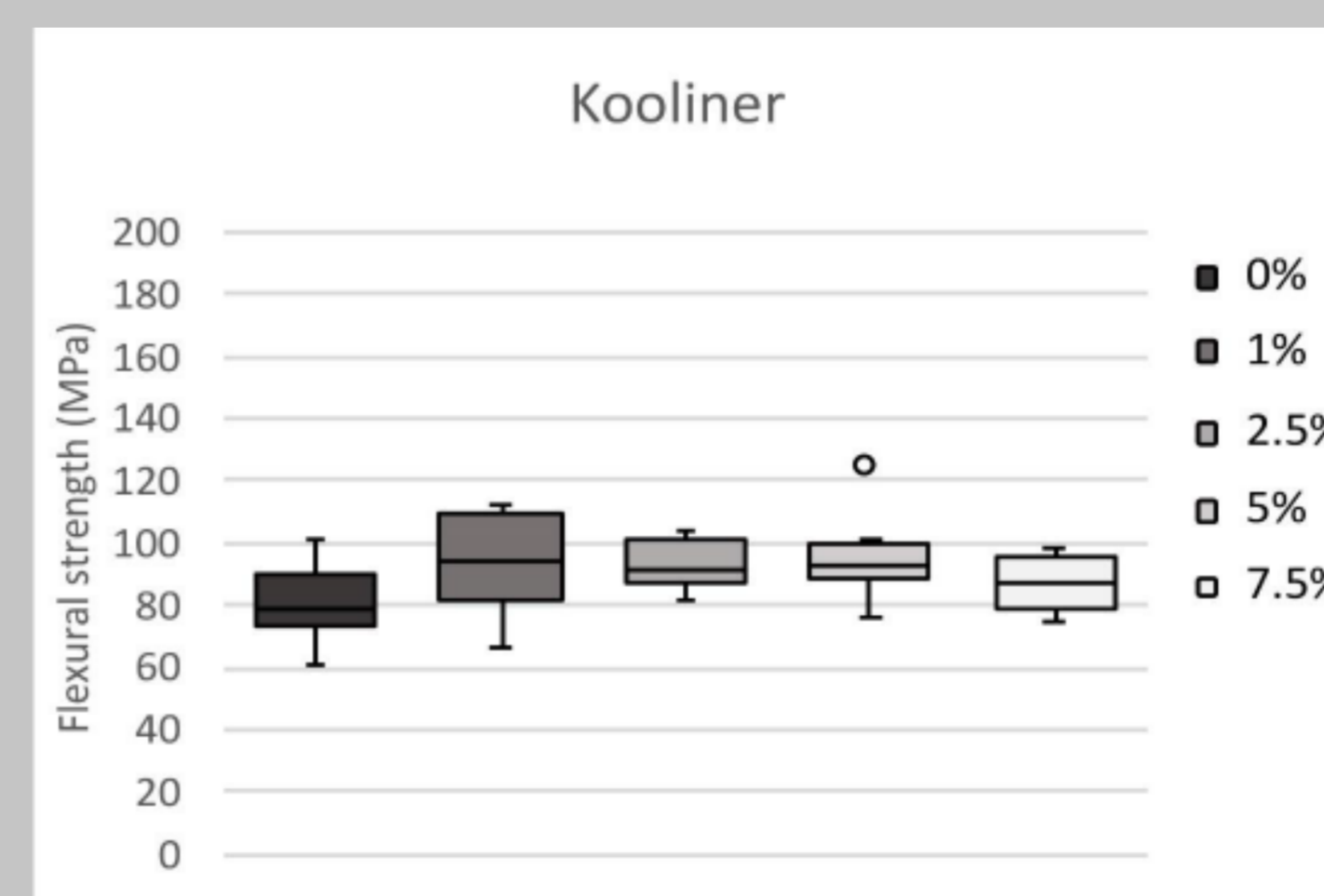


U: 2.5% CHX group showed higher values than the control ($p=0.042$) and 7.5% CHX group ($p=0.002$).

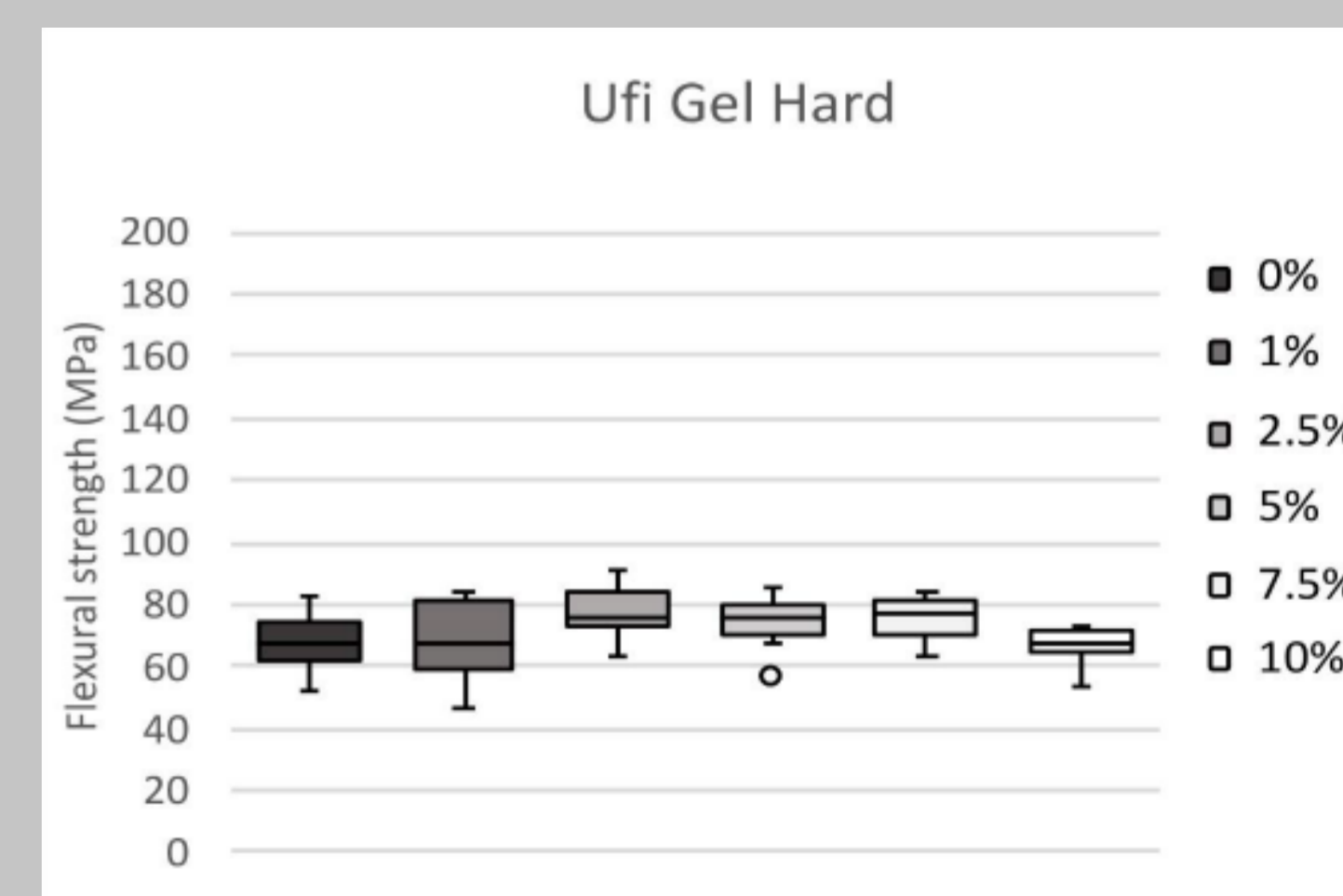


PC: No statistical differences between the CHX concentrations groups ($p=0.051$).

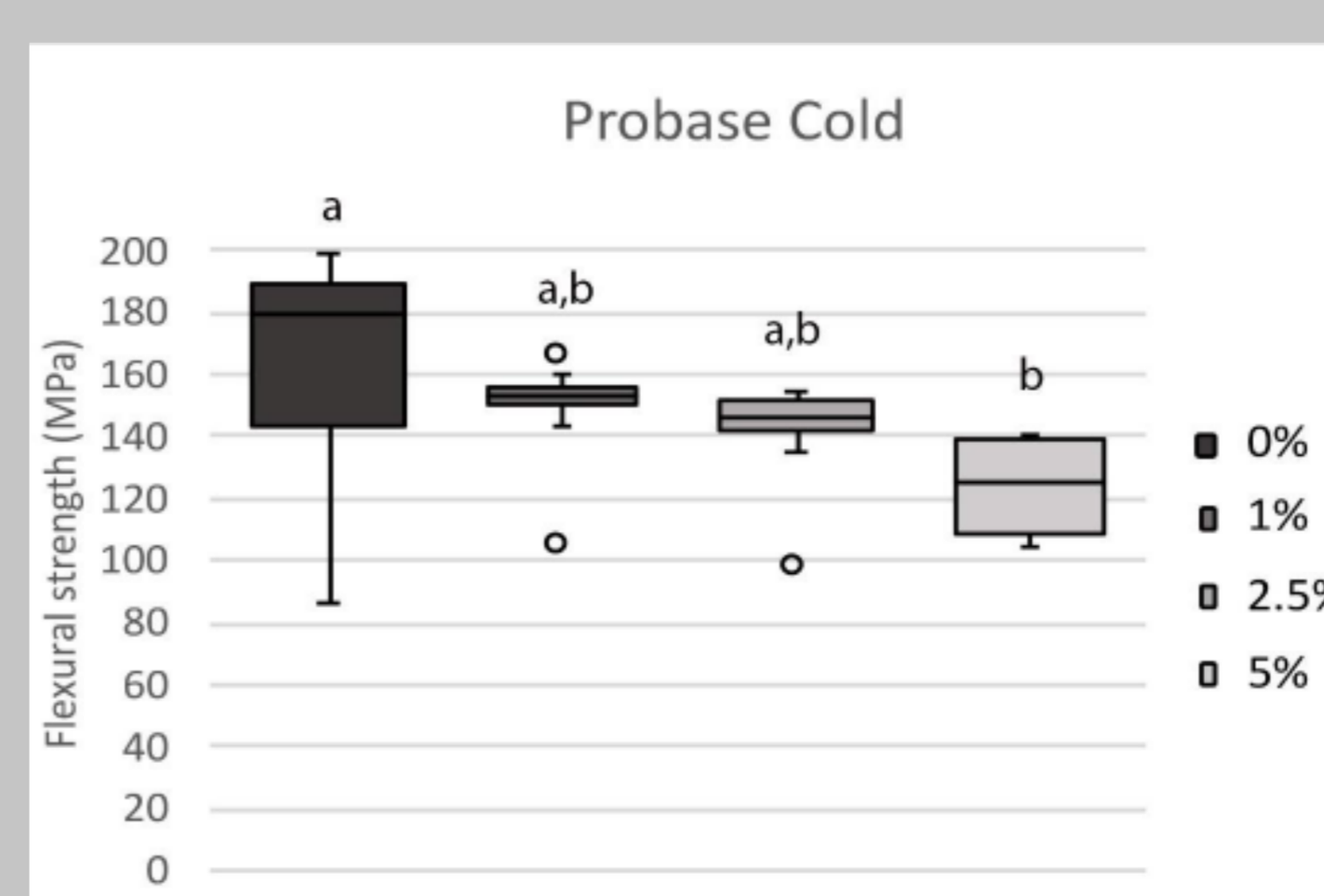
FLEXURAL STRENGTH



K: No differences among groups of different CHX concentrations loaded in the resin ($p>0.05$).



U: No statistical significant differences on values ($p>0.05$).



PC: 5% CHX group had lower flexural strength values compared to control group ($p=0.033$).

CONCLUSION

After a thermal ageing equivalent to one month of oral environment,

- Loading with any concentration of CHX **does not negatively affects the microhardness values** of the three acrylic reline resins.
- In Kooliner and Ufi Gel Hard, the chlorhexidine loading didn't evidence a negative impact on their flexural strength.
- However, a concentration of **5% CHX** in Probase Cold **diminished flexural strength**.

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ACKNOWLEDGEMENTS

Portuguese government, Fundação para a Ciência e Tecnologia (FCT), iMed.Ulisboa, for financial support, Pest-UID/TPD/04138/2014. 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.

