Effect of Phytic Acid on the Efficacy of Bioactive Desensitizers

Sindagi Swabhaanu Manoj [a*], Raj Kruthi Bipin [a], Paramashivaiah Ashwini [a], Mehta Deepak [b]

[a*]Vokkaligara Sangha Dental College and Hospital,Bangalore,India (swabhaanu.sindagi@gmail.com)

[a]Vokkaligara Sangha Dental College and Hospital, Bangalore, India

[b]Tohoku University, Sendai, Japan

5th Biennial Meeting International Academy of Adhesive Dentistry (IAAD)
Zurich, Switzerland

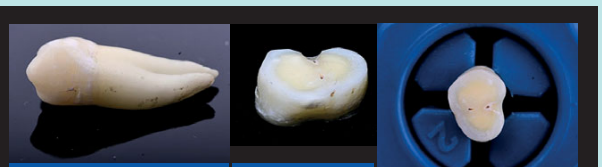
Introduction

Several clinic-based and home-based treatment dentine desensitizing agents are currently available. However, no single agent is a "gold- standard". Bioactive desensitizers are a promising addition to the current armamentarium.

Objectives

To evaluate dentine tubule occlusion efficacy of Predicta Bioactive Desensitizer, a methacrylate-free, nanohydroxyapatite-based desensitizer, and the effects of phytic acid pretreatment.

Materials and Methods



55 Caries free premolars stored in 0.5% thymol at 4°C

Prepared and polished dentin disc

Mounted dentin disc

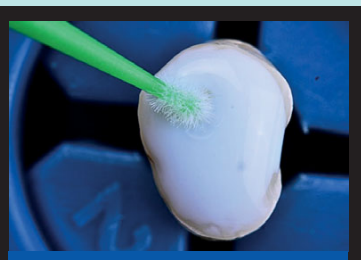
Experimental setup used to hold dentin disc

1% Phytic Acid (diluted)

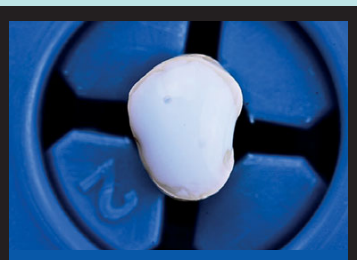
Predicta Bioactive Desensitizer – Gel; Parkell, USA

- **A** n=10 — 30 seconds application without dwelling time
- **B** n=10 — 30 seconds application with 15 seconds dwelling time
- **C** n=10 — 1 minute application with 15 seconds dwelling time
- **D** n=10 — 1% phytic acid with rinse
- **E** n=10 — 1% phytic acid without rinse
- **F** n=5 — Control (artificial saliva)

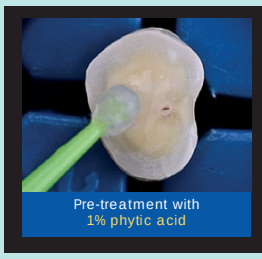
Predicta Bioactive Desensitizer
Gel dispensed onto dentin disc



Gentle agitation of gel

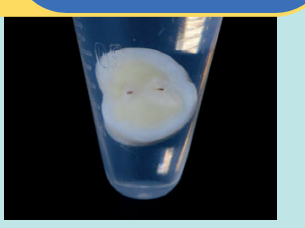


Gel allowed to dwell on surface of dentin disc

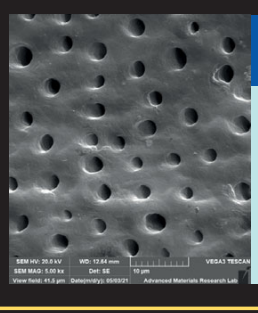


Pre-treatment with 1% phytic acid

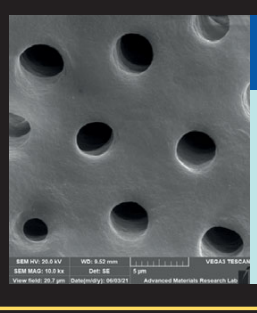
Predicta Desensitizer applied



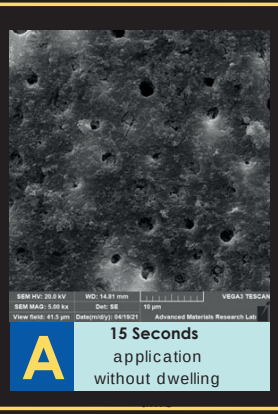
Results



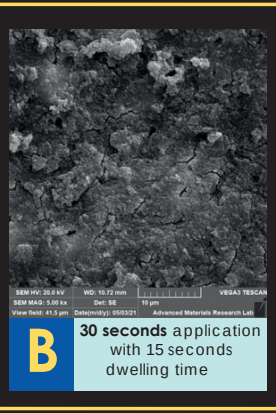
F — **Control** Immersed in artificial saliva



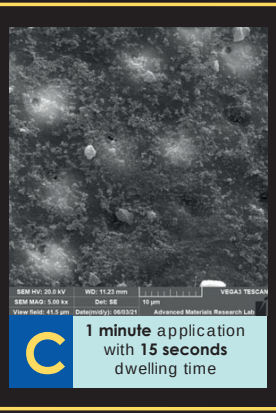
F — **Control** Immersed in artificial saliva **at 5µm**



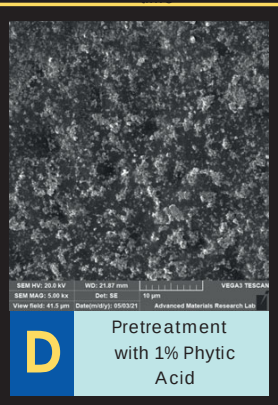
A — **15 Seconds** application without dwelling



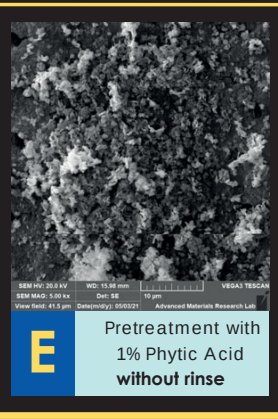
B — **30 seconds** application with 15 seconds dwelling time



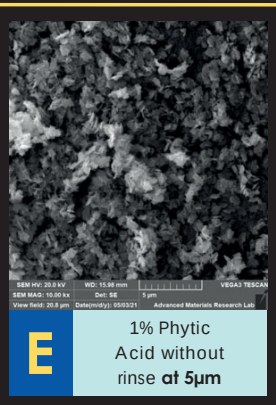
C — **1 minute** application with **15 seconds** dwelling time



D — Pretreatment with 1% Phytic Acid



E — Pretreatment with 1% Phytic Acid **without rinse**



E — 1% Phytic Acid without rinse **at 5µm**

Table 1: Mean difference of post treatment tubule occlusion score between groups

Group	Mean Difference	p-value*
Group A	1.8	<0.001
Group B	2.1	<0.001
Group C	2.6	<0.001
Group D	3.2	<0.001
Group E	3.6	<0.001
Group F	0.7	<0.001

*Computed using ANOVA and TUKEY adjustment

Scoring Criteria
Dentin Tubule Occlusion

Type	Amount of Occlusion	Score
Type 0	**No Occlusion**	**0**
Type 1	**Partial Occlusion; ≤25%**	**1**
Type 2	**Partial occlusion; 25-75%**	**2**
Type 3	**Complete occlusion; >75%**	**3**

Neha M, Vandana LK. Effects of citric Acid and desensitizing agent application on nonfluorosed and fluorosed dentin: an in vitro sem study. **Open Dent J. 2015 Mar 31;9:98-102**.

Tubule Occlusion

Group E > Group D > Group C = Group B > Group A > Group F

Discussion and Conclusions

The tubule occlusion efficacy of Predicta Bioactive Desensitizer seems to be more effective with:

- **Increased dwelling time** on the exposed dentinal surface;
- **1% phytic acid pretreatment without rinse**.

Bibliography

1) Nassar,M., Islam, M.S., A C., S.A., El-Damanhoury, H.M.; Sauro, S.; Hiraishi, N. Resin-Based Cement Applied to Enamel and Dentin Pre-Treated with Phytic Acid: An In Vitro Study. **Appl. Sci. 2021, 11, 11976.**

2) Luong MN., Huang L., Chan DCN., Sadr A. In Vitro Study on the Effect of a New Bioactive Desensitizer on Dentin Tubule Sealing and Bonding. **J Funct Biomater. 2020 Jun 2;11(2):38.**

3) Mehta D., Gowda V., Santosh A., Finger W.J., Sasaki K., Randomized controlled clinical trial on the efficacy of dentin desensitizing agents. **Acta Odontologica Scandinavica (2014), 72:8, 936-94.**