

Potential Erosive Assessment of Dry Mouth Lozenges and Tablets on Dentin



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Objective

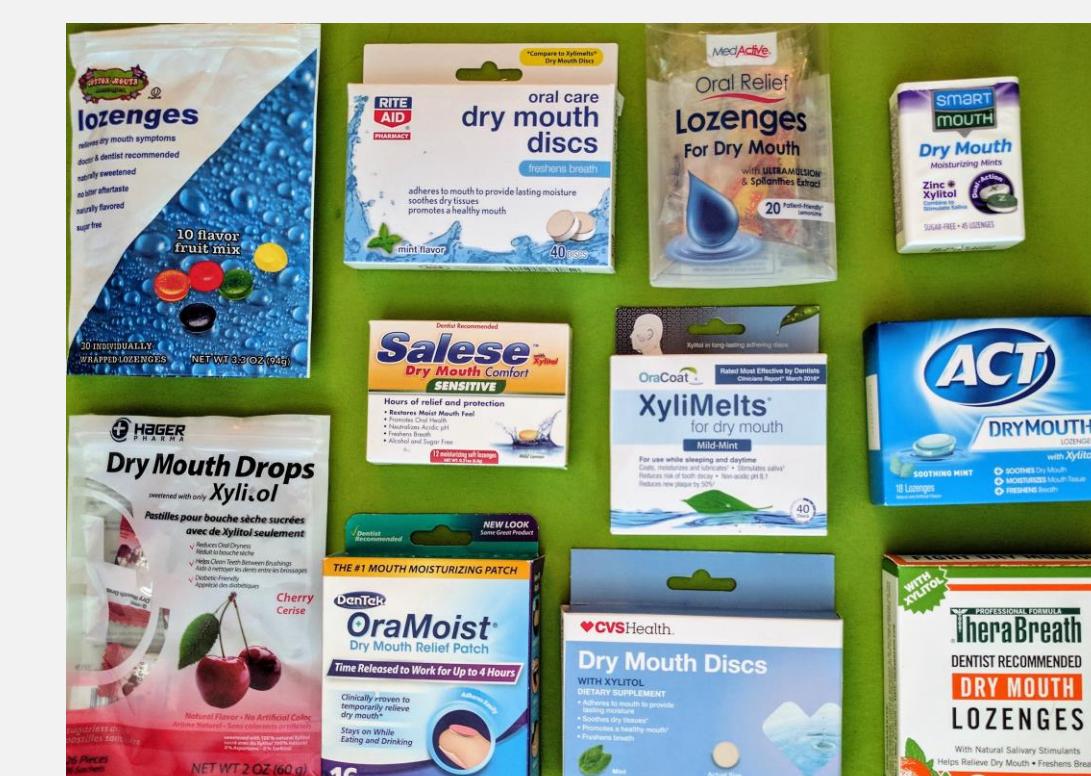
To measure the pH values, titratable acidity, and potential erosive effect of commercially available dry mouth lozenges/tablets and their effect on dentin.

Null Hypothesis

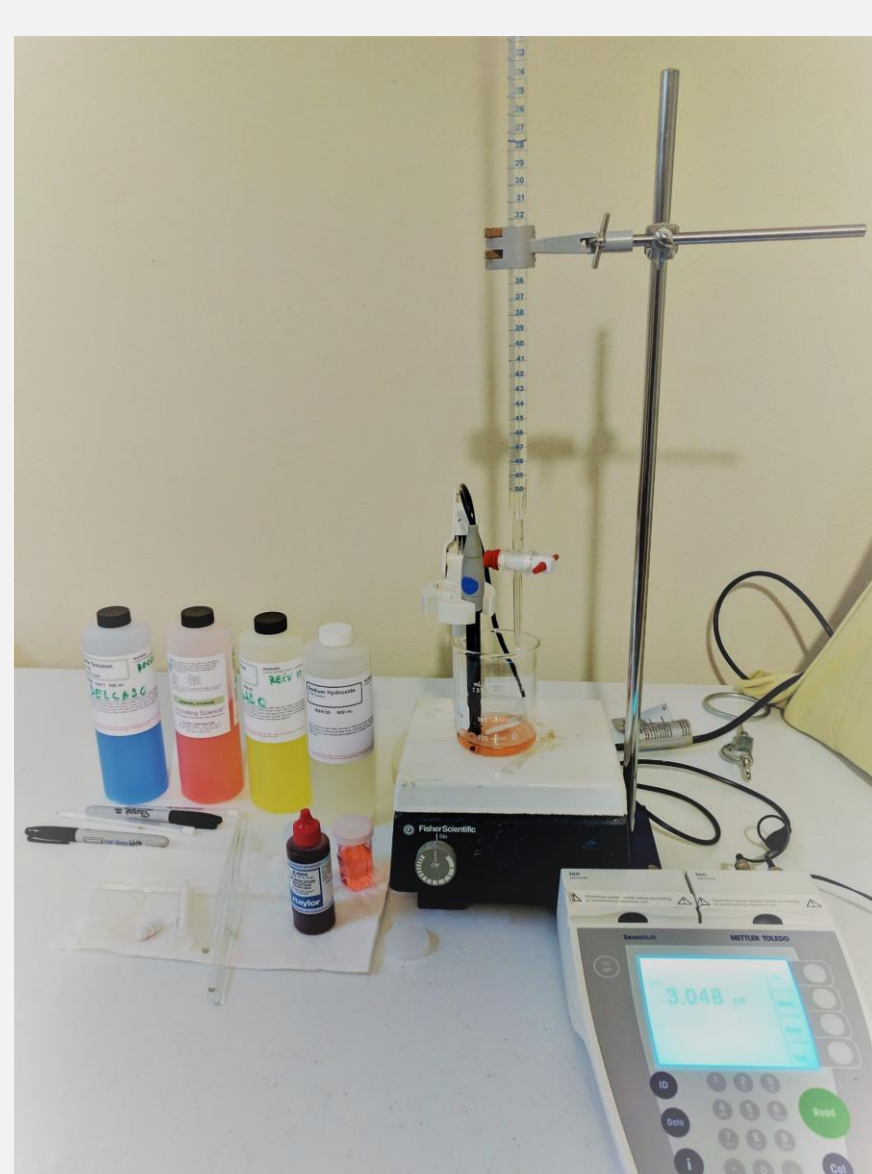
1. None of the lozenges, tablets, patches tested would have a pH below that the critical pH of dentin
2. None of these samples tested would demonstrate an erosive potential after measured with gravimetric analysis.

Materials and Methods

Lozenges and tablets: Salese™, Oracoat Xylimelts®, Cotton Mouth®, TheraBreath®, DenTek® OraMoist®, SmartMouth, ACT®, CVS Health™, Rite Aid®, Med Active®, and Hager Pharma



pH Analysis: Each lozenge or tablet was crushed with a pestle and mortar and 5 grams of the resultant powder was dissolved in 10 ml of distilled water (PH 7.02) The pH of each lozenge solution was assessed by using a calibrated pH meter.



Titrateable Acidity using pH meter and pH indicator (phenol red): Titratable acidity was measured by adding 0.1 M of NaOH to each homogenous tablet solution until the pH reached 7.0. The amount of base (m/mol) required to reach a neutral pH was recorded and then calculated. If there was a solution that presented a pH value of ≥ 7 this part of the experiment was omitted.

Gravimetric Analysis: Freshly extracted molars crown/roots were sectioned at the CEJ. The coronal and apical portions of the specimens were sealed with a self-etching dentin bonding agent to avoid influx of the solution into the pulp chamber. The specimens were then dried with air water syringe and weighed on a calibrated analytical balance to obtain a baseline recording.



The specimens were then submerged in 5 ml of solution containing 2.5 gm of crushed tablets for 24 hours, 48 hours, 96 hours and 1 week with measurements performed at each interval after drying the specimens as previously described. The solutions were renewed at each interval.

Results

In order to verify the data distribution, the Shapiro Wilk test was performed as well as a histogram analysis. All data (pH, TA and dentin loss) presented non-normal distribution and therefore non-parametric test was used (Spearman correlation).

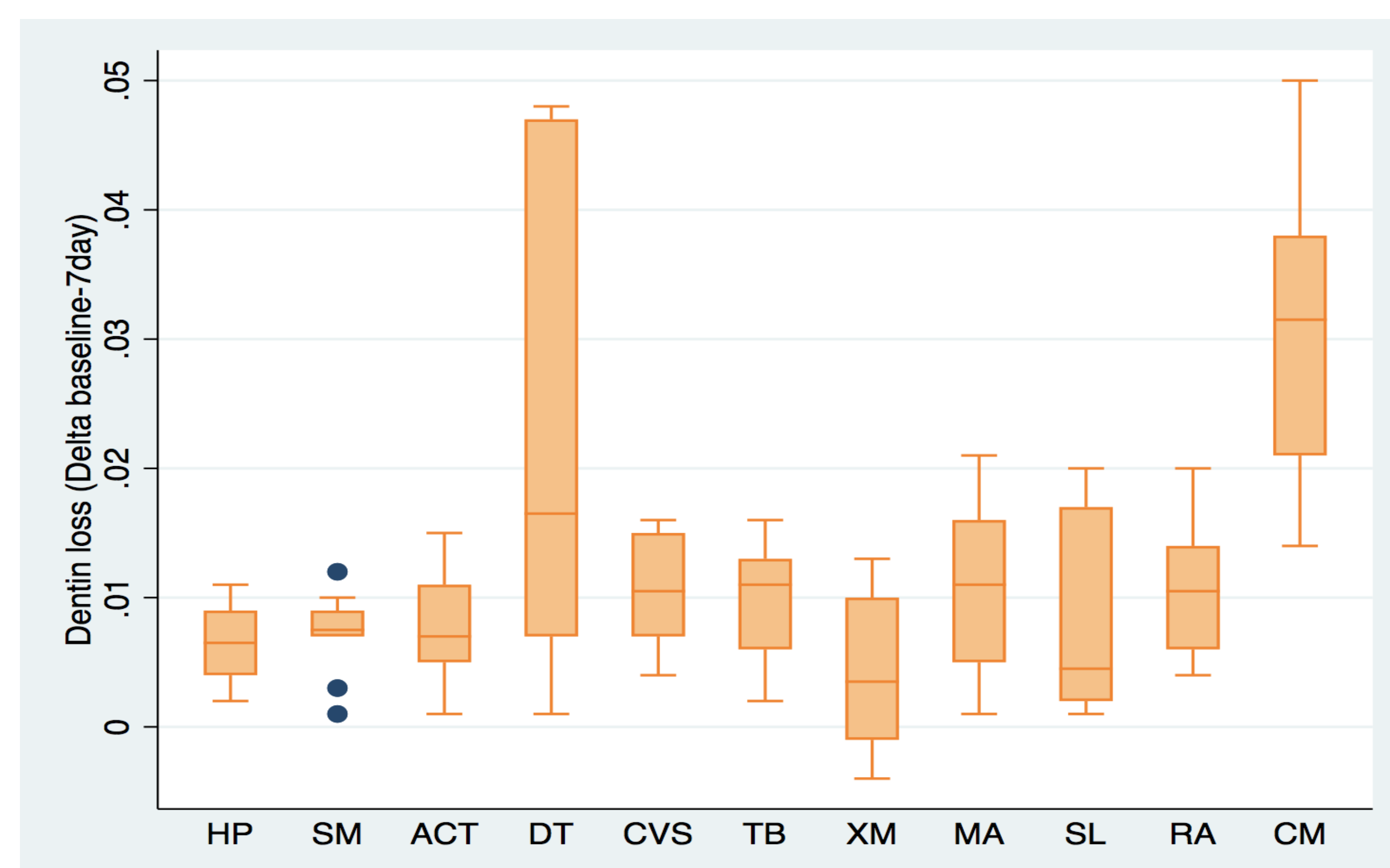
Product	pH mean (SD)	TA mean (SD)
Hager Pharma (HP)	4.44 (0.11)	0.98 (0.03)
Smart Mouth (SM)	6.02 (0.26)	0.17 (0.06)
ACT	5.72 (0.26)	0.25 (0.03)
DenTek (DT)	2.9 (0.22)	8.8 (0.3)
CVS	5.28 (0.15)	2.17 (0.21)
TheraBreadth (TB)	5.82 (0.47)	0.4 (0.1)
Xylimelts (XM)	8.04 (0.09)	-
Med Active (MA)	3.16 (0.15)	5.35 (0.15)
Salese (SL)	8.04 (0.22)	-
Rite Aid (RA)	5.1 (0.07)	2.03 (0.06)
Cotton Mouth (CM)	3.1 (0.07)	2.77 (0.25)

Table 1: Ph and TA means and standard deviations all samples

Product	Dentin mean (SD)
Hager Pharma (HP)	0.0066 (.0028) ^a
Smart Mouth (SM)	-0.0072 (.003) ^a
ACT	-0.0075 (.004) ^a
DenTek (DT)	-0.0227 (.019) ^a
CVS	-0.0102 (.004) ^a
TheraBreadth (TB)	-0.0097 (.005) ^a
Xylimelts (XM)	-0.0042 (.006) ^a
Med Active (MA)	-0.0109 (.006) ^a
Salese (SL)	-0.0083 (.007) ^a
Rite Aid (RA)	-0.0107 (.005) ^a
Cotton Mouth (CM)	-0.0306 (.012) ^b

Table 2: Dentin loss delta means and standard deviations for all samples

Initially, statistical analysis was performed to verify the correlation between pH and TA with the dentin loss. Both variables were not correlated with dentin loss ($p > 0.05$, Spearman correlation). In order to verify the difference between the 11 tablets, non-parametric tests were performed. A significant difference was observed between the 11 tablets regarding dentin loss ($p = 0.0002$, Kruskal-Wallis). The groups were compared using Mann-Whitney and the statistical analysis is presented in Table 2. It could be observed that the submersion in Cotton Mouth resulted in the higher dentin loss, which was different from all the other mouth tablets ($p < 0.05$).



Conclusion

1. Most of the tablets and lozenges tested reported an acidic pH value except Xylimelts® and Salese™.
2. DenTek® OraMoist®, Cotton Mouth®, and MedActive® lozenges reported the highest titratable acidity.
3. Dentin tooth loss is associated with high titratable acidity and low pH.