

Effectiveness of Clinical COVID-19 Protocol In Modulating Oral *Selenomonas noxia*

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BACKGROUND

Due to the COVID-19 pandemic, dental offices have extended mouth washing protocols to 60 seconds for the purpose of reducing levels of oral SARS-CoV-2 and other oral microbes. In particular, chlorhexidine mouthwash has demonstrated a significant effect of reducing salivary SARS-CoV-2 load for at least 60 minutes [1]. However, the effects of mouthwash remain unknown on the newly identified periodontal pathogen, *Selenomonas noxia*. *S. noxia* is a gram-negative crescent shaped bacteria that is commonly found in saliva and gingival crevicular fluid [2]. It is also associated with obesity [2]. Although periodontal disease is uncommon among pediatric patients, the increasing rate of childhood obesity has made *S. noxia* an oral health concern for pediatric patients [3].

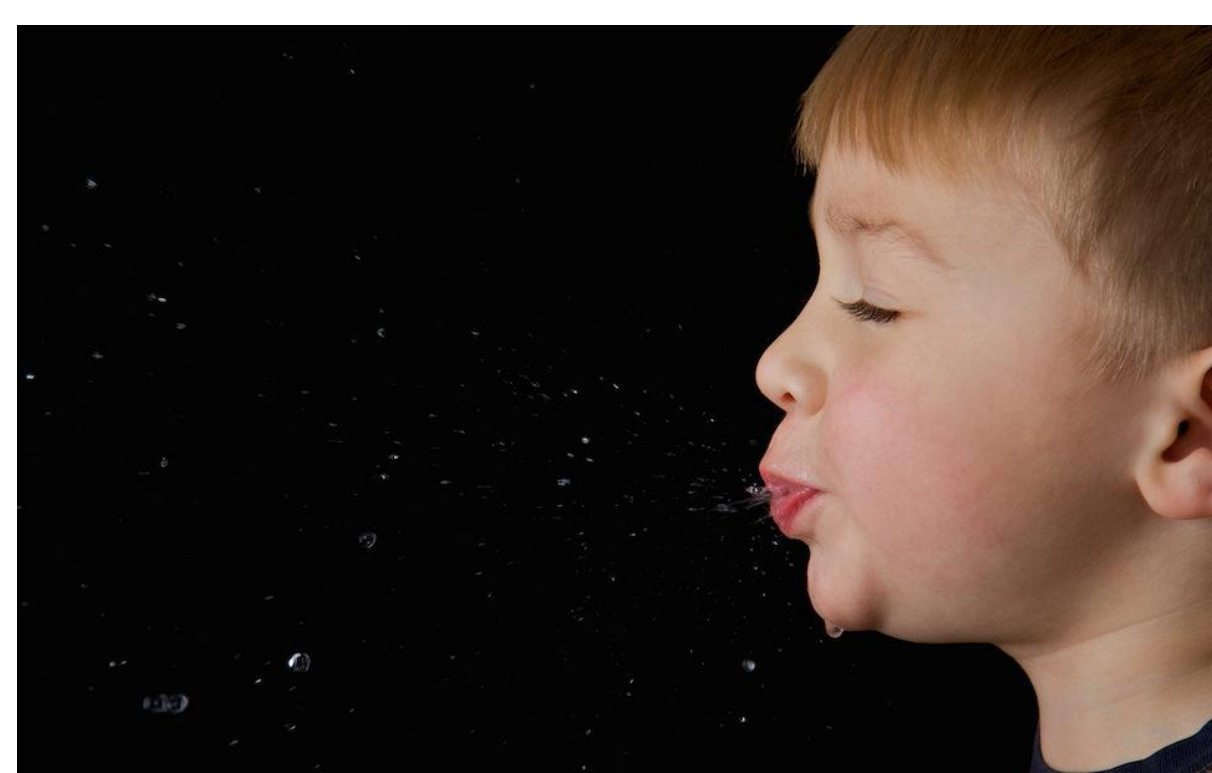


STUDY OBJECTIVE

To evaluate the prevalence of newly identified oral pathogen, *Selenomonas noxia*, before and after the use of chlorhexidine mouthwash in the undergraduate and graduate pediatric clinics.

RESEARCH QUESTION

- ❖ **Null hypothesis:** Chlorhexidine mouthwash has no effect on *S. noxia*.
- ❖ **Alternative hypothesis:** Chlorhexidine mouthwash has an effect on *S. noxia*.



METHODS

- ❖ Saliva samples were collected from the undergraduate and graduate pediatric clinics at UNLV SDM using Institutional Review Board (IRB) approved protocol, “The Prevalence of Oral Microbes in Saliva from UNLV School of Dental Medicine Pediatric and Adult Clinical Population”.
- ❖ Two saliva samples were collected on the same visit before and after chlorhexidine mouthwash (Sample A and Sample B), while the third sample (Sample C) was taken upon recall 2-8 weeks later.
- ❖ DNA isolation was performed using Trizol (phenol:chloroform). A260:A280 absorbance readings were obtained using a Nanodrop spectrophotometer and used to calculate DNA quality and quantity.
- ❖ Previously validated primers for 16S (positive control) and *S. noxia* were used and PowerTrack SYBR green assays were performed using the QuantStudio qPCR system.

RESULTS

DNA Isolation

Selenomonas noxia (SN) Screening

n=99 Samples A, B
n=48 Samples A, B, C

	Sample A (T1)	Sample B (T2)	Sample C (T3)	Sample A (T1) pre-MW	Sample B (T2) post-MW	Sample C (T3)
Average	1141.74 ng/uL	883.94 ng/uL	1350.85 ng/uL	n=4/36 (11.1%) SN	n=0/36 (0.0%)	n=5/36 (13.8%) (3/4 original + 2 new)
Range	629-1847 ng/uL	663-2110 ng/uL	737-2207 ng/uL		X2=12.360, d.f.=1, p=0.0004 (significant decrease)	X2=0.354, d.f.=1, p=0.552 (similar to pre-MW)
Two-tailed t-test		T1:T2, p=0.0042	T1:T3, p=0.0361			
A260:A280	1.61	1.65	1.66			
Range	1.45 - 1.84	1.42 - 1.89	1.51 - 1.85			

- ❖ Detectable numbers of *S. noxia* appear to be temporarily removed following chlorhexidine mouthwash (MW) protocol as shown in Figures 1, 2 and 3
- ❖ *S. noxia* appears to come back in patients previously *S. noxia* positive (n=3/4 that returned in Sample C)
- ❖ *S. noxia* appeared in two patients that were previously *S. noxia* negative for Sample A and Sample B (n=2)

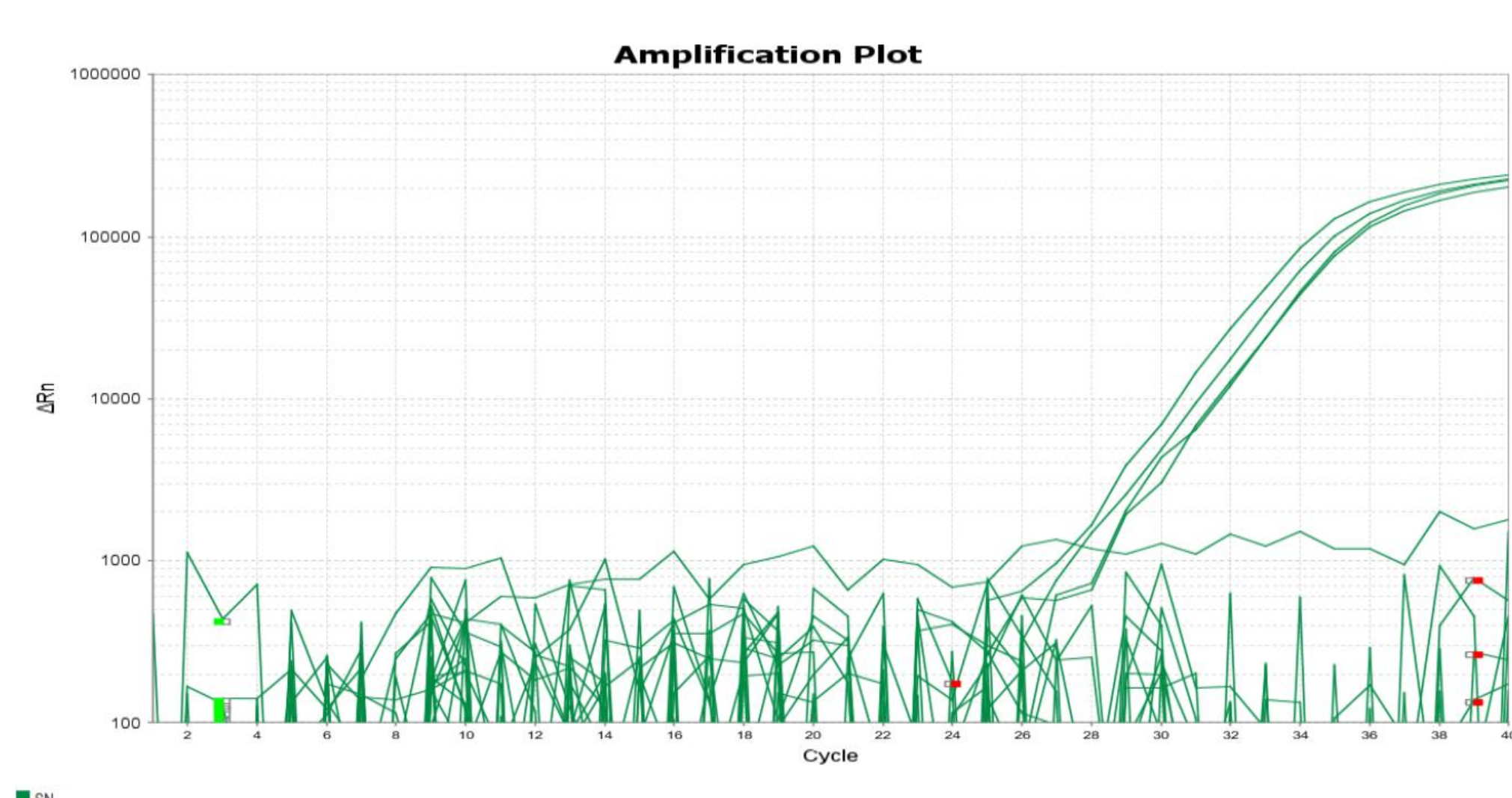


Figure 1. Set A of Sample A (12) analyzed in the qPCR graph. 2 out of 12 samples tested double positive for *S. noxia*.

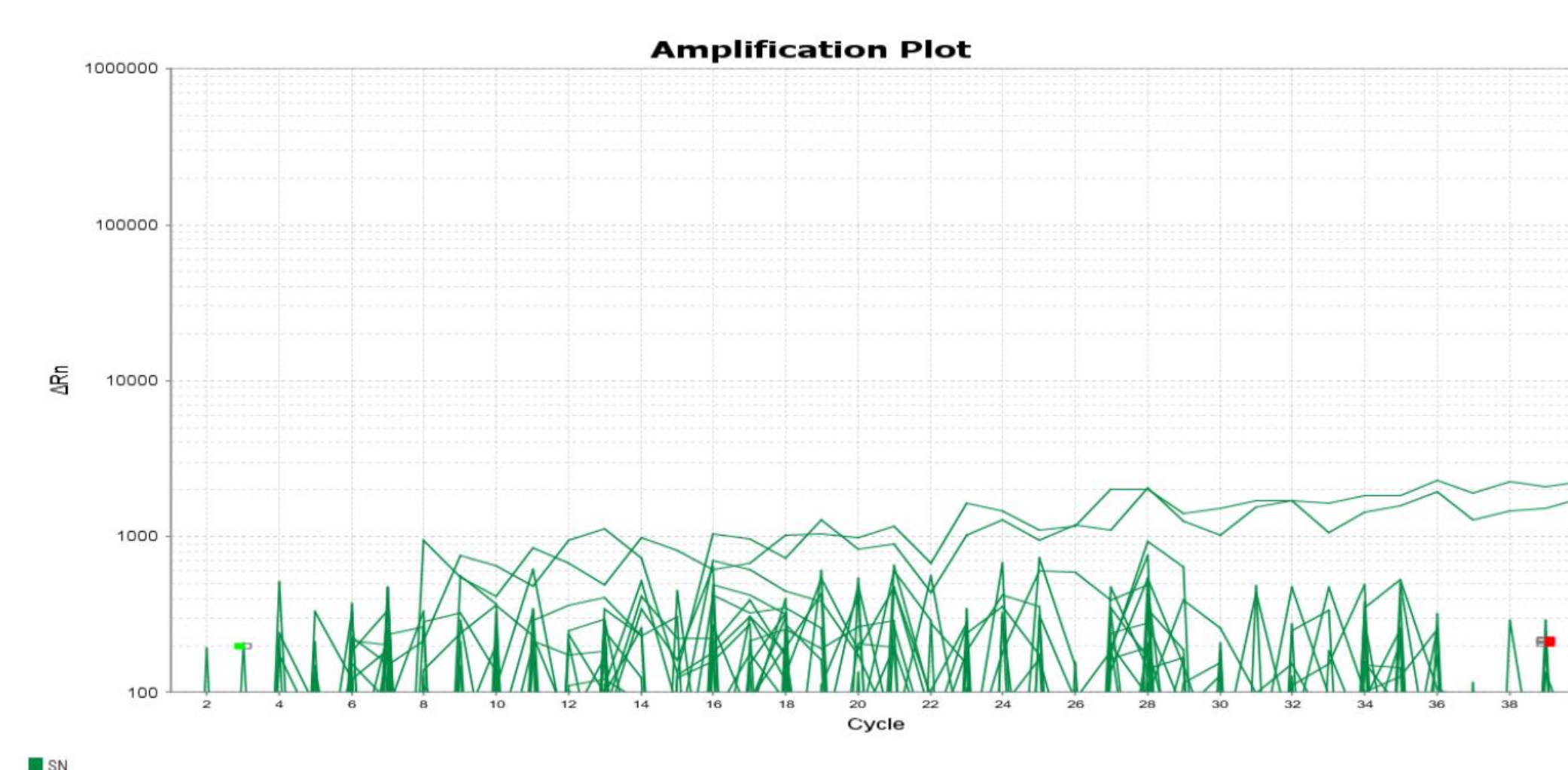


Figure 2. Set A of sample B (12) analyzed in the qPCR graph. No *S. noxia* was found in all 12 samples.

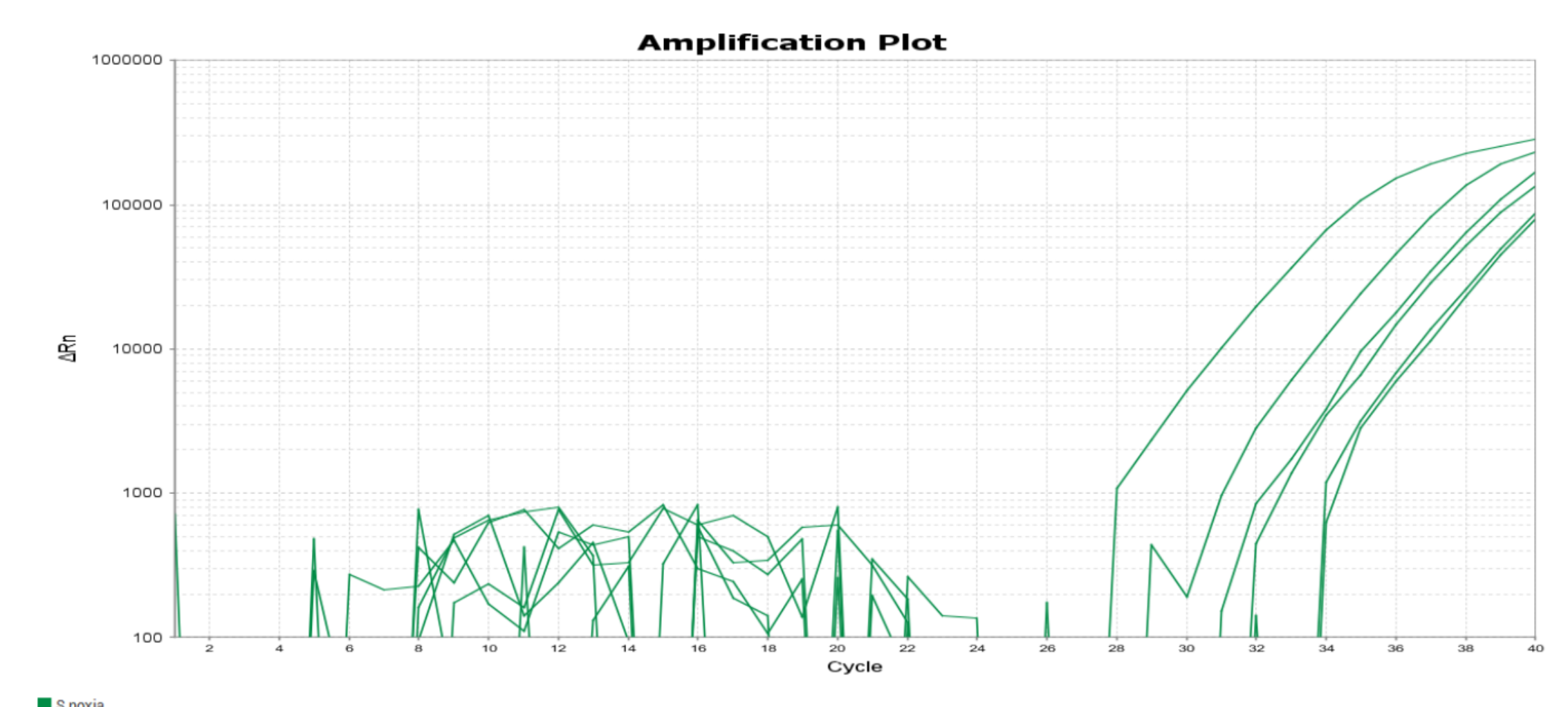


Figure 3. Sample C that tested *S. noxia* positive analyzed in the qPCR graph. All *S. noxia* came back in Sample C in set A.

CONCLUSIONS

- ❖ Chlorhexidine rinse has demonstrated two different effects on the presence of *Selenomonas noxia* in oral cavity. The results have shown that it can have temporary effects, in which *S. noxia* presents in both Sample A and Sample C. It can also have an opposite effect, in which it is shown to be negative in Sample A, but positive in Sample C (n=2).
- ❖ Limitations in this research includes inconsistent Sample C recall time, mouthwash administer time, mouthwash remnants, and pre- and post-operative collections.
- ❖ More research is needed to further determine the possible correlation between the effects of mouthwash protocol and prevalence of *S. noxia*.
- ❖ If future work were able to support the alternative hypothesis of this research, an implementation of mouthwash protocol in dental practice can be used to lower the prevalence of periodontal pathogen in pediatric patients.

ACKNOWLEDGEMENTS

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