

The effect of Hydrogen Peroxide on the whitening of teeth stained with two different household products

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Introduction

Tooth whitening is a frequent aesthetic dental procedure, involving a bleaching agent that aims to oxidize chromophores within the tooth structure thus making it whiter.

Tooth staining can be intrinsic staining affected by genetics, age, developmental disorders, and high levels of fluoride or extrinsic caused by environmental factors, namely; pigments in food and beverages, smoking, and metals like iron or copper.

Objective

This study's objective is to evaluate the whitening ability of H₂O₂ after exposure to extrinsic staining

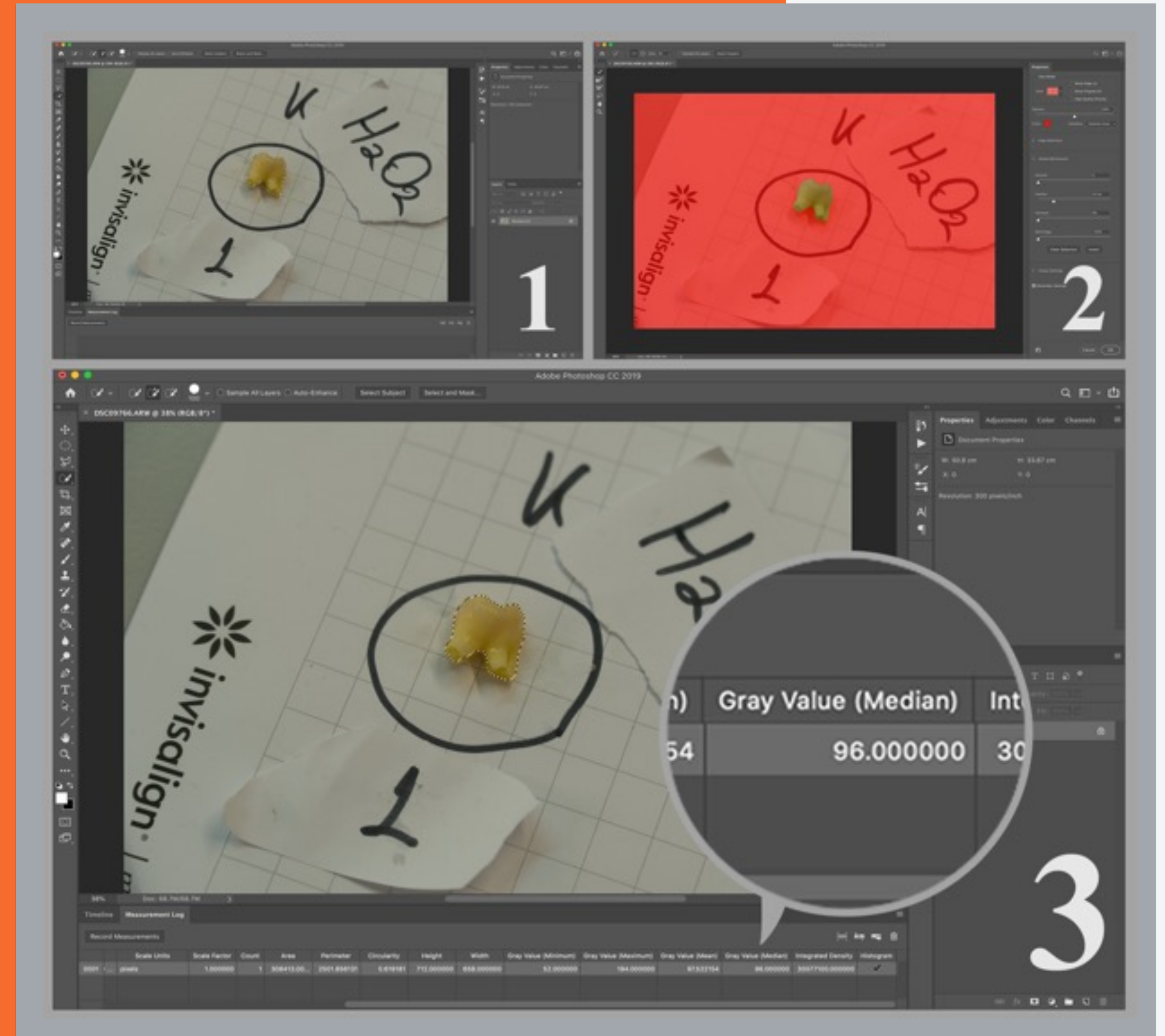
We intend to provide literature for a case-specific, history-driven whitening protocol, in which clinicians obtain more information about the environmental factors associated with the extrinsic discoloration of a case-by-case basis to provide aided estimations for the predicted outcome and number of appointments needed to achieve whitening saturation.

Materials & Methods

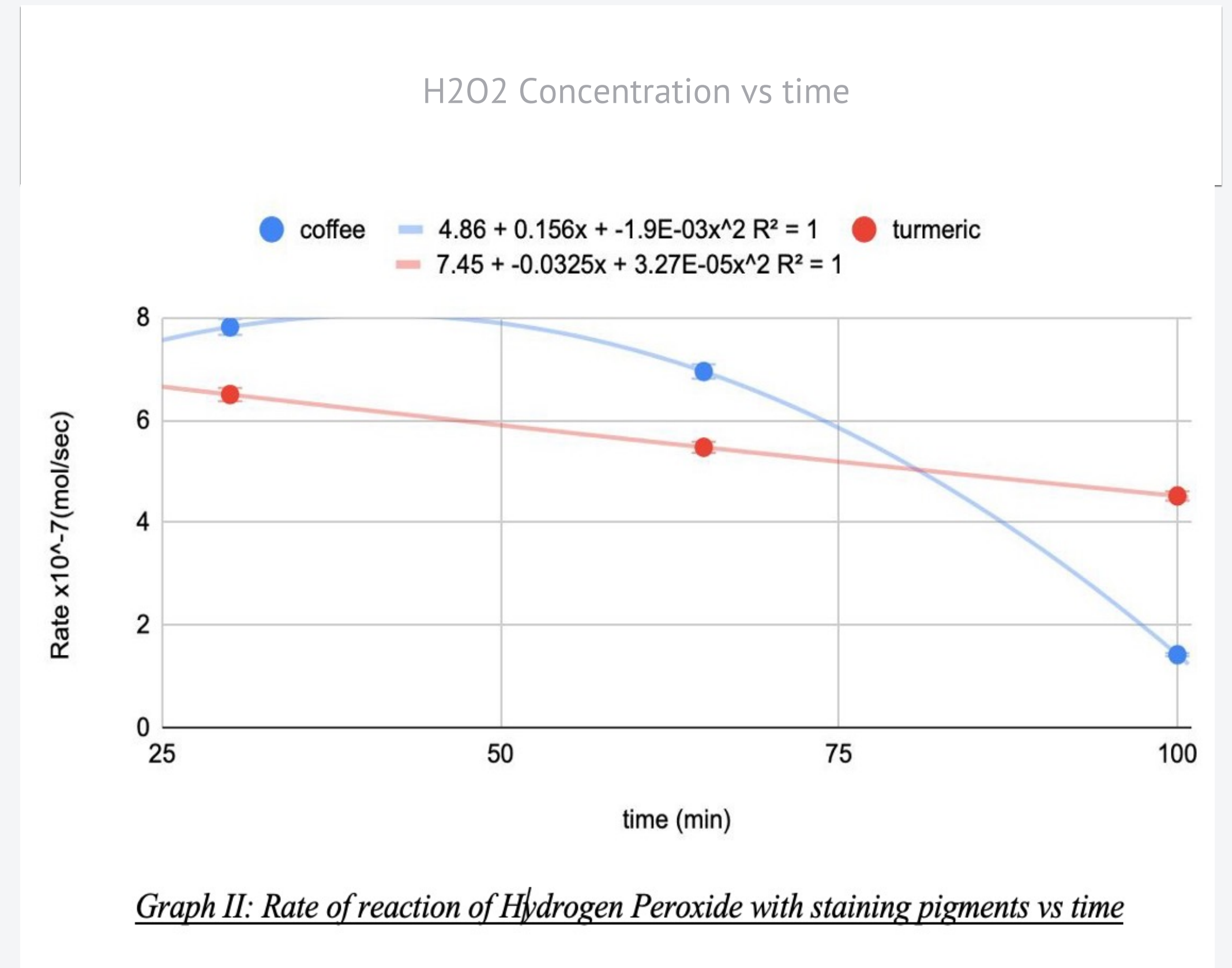
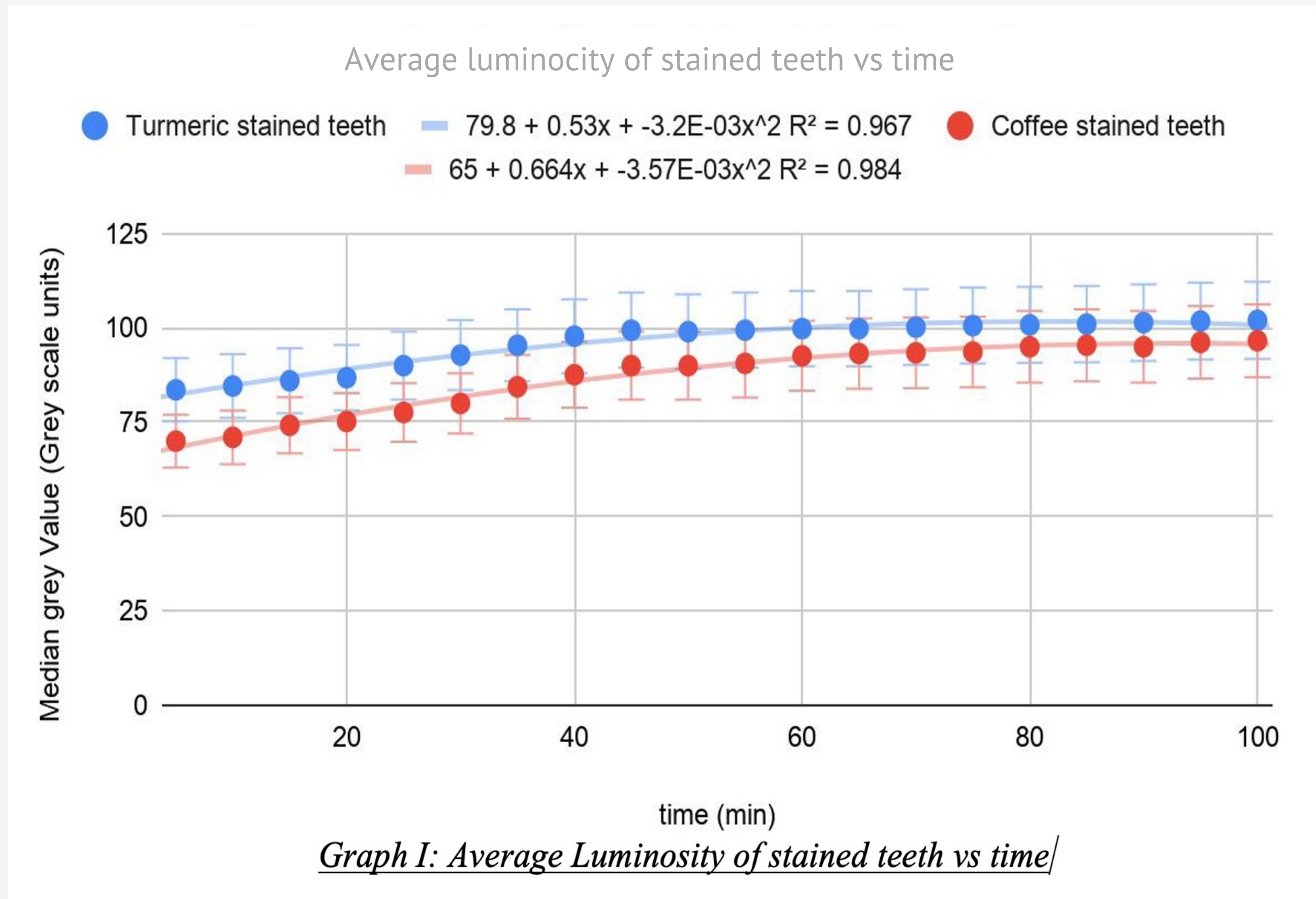
This study investigated how common household products such as coffee and turmeric cause extrinsic tooth staining, and the different effect Hydrogen peroxide can have on their whitening.

The sample size consisted of ten teeth and their whiteness was quantified via analysis of median gray values of controlled photographs.

Additionally, how the concentration of Hydrogen Peroxide changes during tooth whitening has been explored and monitored using a permanganometric titration of the hydrogen peroxide used.



Results:



Conclusion:

The results regarding pigmentation showed that coffee produced darker staining (mGV= 70) of less value when compared to turmeric (mGV= 83.6). Moreover, turmeric-stained teeth were shown to achieve a better whitening saturation (final mGV = 102) in comparison to coffee-stained teeth (final mGV = 97.4).

Finally, we concluded that Hydrogen peroxide reacted faster with coffee-stained teeth due to the nature of the chromophores present in coffee. This can be explained by the fact that the major chromophore in coffee is chlorophyll which although it can be oxidized by peroxide, it needs some enzymes present, which are not part of the in-office bleaching formulation.

These results are interesting for clinicians to be able to estimate the whitening potential of a stained tooth in relation to the type of staining present as well as to approximate the number of appointments needed to reach the desired outcome. Furthermore, this study provides more insight into the rate of the bleaching reactions included in tooth whitening.