

Comparison between Qmix and EdgeMix when mixed with Sodium Hypochlorite

Objective: To quantitatively and qualitatively prove that Qmix forms a precipitate when mixed with sodium hypochlorite while EdgeMix does not form a precipitate when mixed with sodium hypochlorite.

Materials:

- ✓ Qmix 2 in 1 Solution (Lot #: 130128)
- ✓ EdgeMix 2 in 1 Solution (Lot#: 2014-1990)
- ✓ Sodium Hypochlorite Solution (3%) (Lot #: 2014-1717)
- ✓ Sodium Hypochlorite Solution (6%) (Lot #: 2014-1394)
- ✓ Vernier UV-VIS Spectrophotometer (Beaverton, Oregon)
- ✓ Logger Pro Software (Version 3.8.6.2)
- ✓ 15 mL centrifuge tubes
- ✓ Cetrifuge:
 - Champion F-33D Model
 - Manufacturer: Ample Scientific, Norcross, GA
- ✓ Cuvettes

Methods:

Quantitative Analysis using UV-VIS

1. Start UV-VIS and logger pro software.
2. Calibrate the UV-VIS by adding 3 mL of water in a cuvette and allow the software to calibrate.
3. Prepare standard solutions in cuvettes:
 - 3 mL – Qmix
 - 3 mL – EdgeMix
 - 3 mL – Sodium Hypochlorite (3%)
 - 3 mL – Sodium Hypochlorite (6%)
4. Obtain spectra using UV-VIS and logger pro software for all of these standard solutions.
5. Prepare mixed solutions in cuvettes:
 - 1.5 mL Qmix + 1.5 mL Sodium Hypochlorite (3%)
 - 1.5 mL Qmix + 1.5 mL Sodium Hypochlorite (6%)
 - 1.5 mL EdgeMix + 1.5 mL Sodium Hypochlorite (3%)
 - 1.5 mL EdgeMix + 1.5 mL Sodium Hypochlorite (6%)
6. Obtain spectra using UV-VIS and logger pro software for all of these mixed solutions.
7. Export all spectra to excel and compare them.

Qualitative Analysis

1. Prepare standard and mixed solutions in 15 mL centrifuge containers:
 - 15 mL of EdgeMix
 - 7.5 mL of EdgeMix mixed with 7.5 mL of Sodium Hypochlorite (6%)
 - 7.5 mL of Qmix mixed with 7.5 mL of Sodium Hypochlorite (6%)
 - 15 mL of Qmix
2. Spin down standard and mixed solutions using a centrifuge at a speed setting of 3300 rpm for a cycle time of 7 minutes.
3. Record observations and take a picture of all solutions.

Results:

The spectra shown in Figure 1 shows that sodium hypochlorite (blue line) has an absence of absorbance past 400 nm in wavelength. The same observation is made when EdgeMix was mixed with sodium hypochlorite (green line). Furthermore, since the absorbance spectra of EdgeMix mixed with sodium hypochlorite falls in-between the two individual spectra. This implies that no additional component species are created by their mixture. On the other hand, Qmix when mixed with sodium hypochlorite (black line) shows that it is still being absorbed even after 400 nm. This shows that a color change has been noticed because it does not follow the same trend as sodium hypochlorite and EdgeMix with sodium hypochlorite. This color change also identifies that a precipitate is being formed and this means that other undesirable products are being formed when the two are being mixed together ^[1]. In a past study this orange/brown precipitate was characterized to be para-chloroaniline (PCA) and this precipitate has been shown to be toxic ^[1]. Not only is this precipitate toxic, but it also can interfere with the sealing of a root filling ^[1]. EdgeMix was found to be compatible with sodium hypochlorite while Qmix was not compatible with sodium hypochlorite.

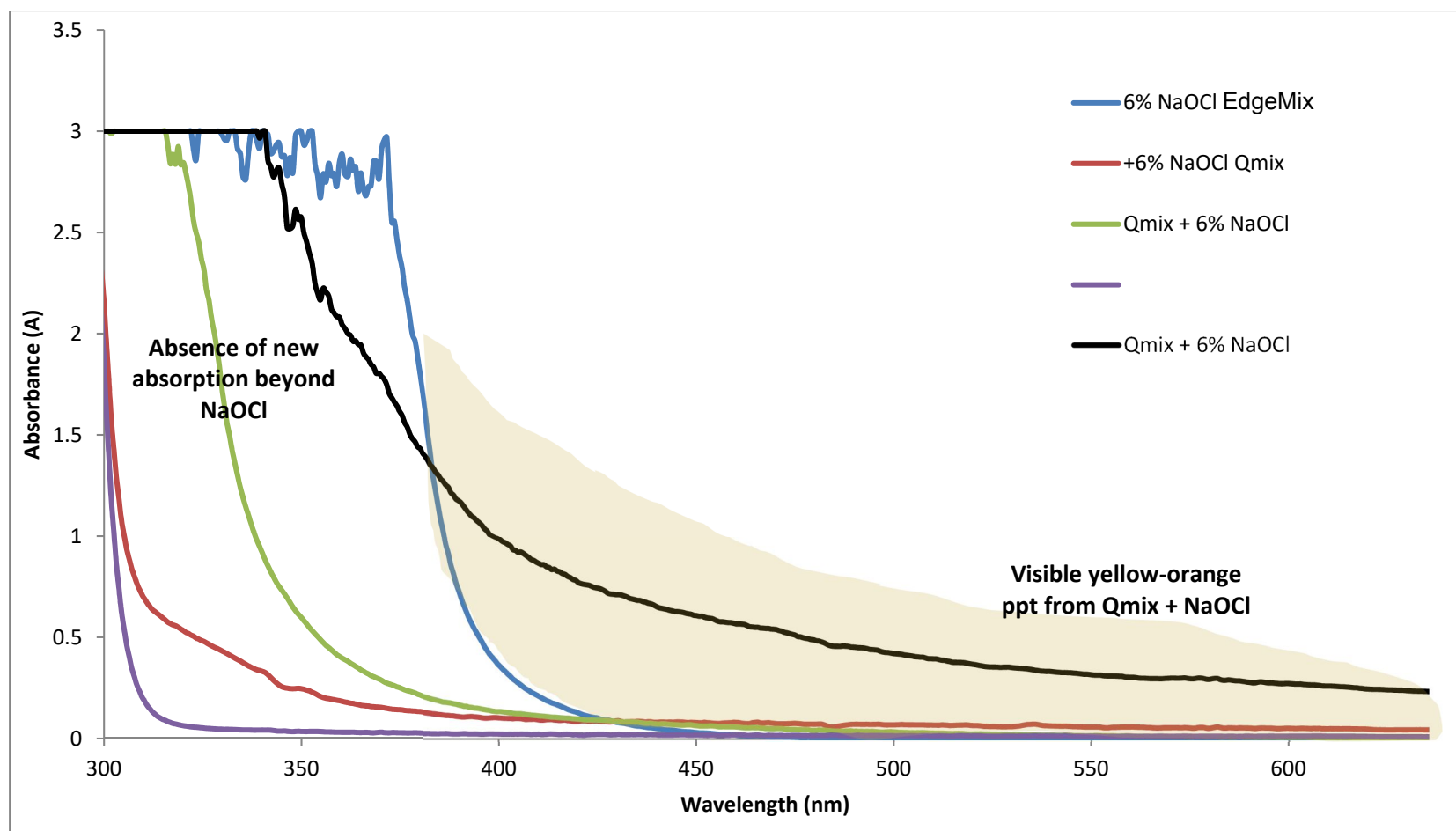


Figure 1: Absorbance vs. Wavelength.

The observations are shown in figure 2 and 3 as these pictures visually validate that Qmix is not compatible with sodium hypochlorite while EdgeMix is compatible with sodium hypochlorite.

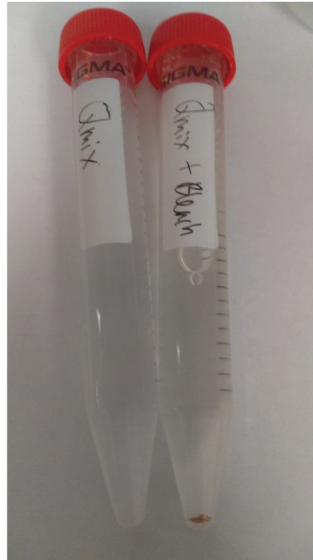


Figure 2: Photo showing Qmix 2in1 Irrigating Solution in 15 mL centrifuge tube (on the left) and Qmix 2in1 Irrigating Solution with Bleach (6% sodium hypochlorite) (1:1) in a 15 mL centrifuge tube (on the right). Brown precipitate was observed at the bottom of the centrifuge tube after centrifugation (on the right).

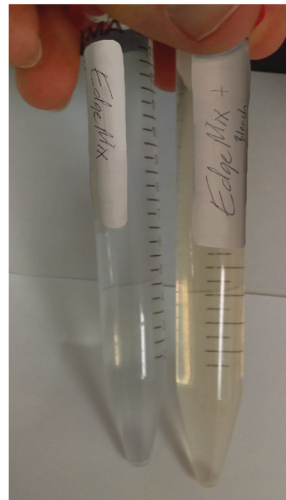


Figure 3: Photo showing EdgeMix 2in1 Solution in 15 mL centrifuge tube (on the left) and EdgeMix 2in1 Solution with Bleach (6% sodium hypochlorite) (1:1) in a 15 mL centrifuge tube (on the right). No precipitate was observed at the bottom of the centrifuge tube after centrifugation (on the right).

Conclusions:

We were able to prove that EdgeMix is compatible with sodium hypochlorite while Qmix is not compatible with sodium hypochlorite. Visually you can notice a precipitate forms when Qmix is mixed with sodium hypochlorite while EdgeMix does not produce a precipitate. When a precipitate (e.g. PCA) is formed during a root canal procedure, the toxic products could end up in the root canal or outside of the root canal. This is undesirable for the patient and also for the dental hygienist. EdgeMix is the preferred formula over Qmix because it is compatible to use with sodium hypochlorite. Vista-dental provides a balanced 2 in 1 formula that avoids any precipitation to form when mixed with sodium hypochlorite.

References:

1. Basrani, B., Manek, S., Sodhi, R., Fillery, E., & Manzur, A. Interaction between Sodium Hypochlorite and Chlorhexidine Gluconate. *Basic Research*, 33, 966-969. Retrieved August 1, 2014, from <http://endoexperience.com/documents/NaOClandCHX.pdf>.