

# Effect of ultrasonic activation on the physicochemical properties and chemical composition of calcium silicate sealers

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May 12, 2023

## Abstract

**Introduction:** This study evaluated the physicochemical properties of four calcium silicate sealers after ultrasonic activation (UA), using an epoxy resin sealer as a control material. **Methods:** Ten groups were created: SP without UA in the control group and UA Sealer Plus (SP/UA); Sealer Plus BC (SPBC); SPBC/UA; Bio C Sealer (BCS); BCS/UA; EndoSequence BC Sealer (EBC); EBC/UA; BioRoot RCS (BR); BR/UA;. Sealer properties were evaluated using a pH meter and a colorimetric spectrophotometer for the measurement of pH and calcium release at 1, 24, 72 and 168 hours. Solubility and setting times were also evaluated, and Raman spectroscopy was used to evaluate structural changes. Data were analyzed statistically, and the level of significance was set at 5%. **Results:** All bioceramic sealers had higher pH values than SP and SP/AU ( $P < .05$ ) from 24 hours onwards. BR and BR/AU had the highest pH at all time points. Intragroup analyses revealed that pH was stable in SP and SP/AU at all time points. UA sealers had higher pH values than sealers not activated, but there were no significant differences between them. SP and SP/UA had the lowest calcium release values at all time points ( $P < .05$ ). Significant differences were found between UA and no activation only for the EBC group at 24 and 72 hours ( $P < .05$ ). Setting times and solubility of all sealers were not affected by UA ( $P < .05$ ), but the highest solubility values were found for BCS and BR ( $P < .05$ ). Raman spectroscopy detected the peaks of UA and not activated sealer samples. **Conclusion:** UA did not affect the pH of all sealers tested, did not affect calcium release from SP, SPBC and BCS, did not affect setting time and did not change the chemical structure of the sealers tested.

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