

## **ABSTRACT**

### **Evaluation of the physicochemical properties of two experimental calcium silicate-based endodontic sealers**

The study aimed to evaluate the physicochemical properties of two experimental tricalcium silicate-based sealers (CEO 1 e CEO 2) and compare them to Bio-C Sealer and AH Plus Bioceramic. For the evaluation of calcium ion release and pH, polyethylene tubes filled with the sealers were immersed in deionized water and measurements were taken after 3, 24, 72, and 168 hours. For radiopacity, sealers were x-rayed next to an aluminum penetrometer and the radiographic density was assessed in mmAl. For bond strength, bovine dentin discs were filled with sealers and push-out test was performed on the universal testing machine. For setting time, the sealers were poured into damp plaster rings and subjected to vertical pressure marking. Solubility and flow were evaluated according to ANSI/ADA specifications n°57. Kruskal-Wallis followed by Dunn test was used for non-parametric data, and ANOVA followed by Tukey test for parametric data ( $p > 0.05$ ). There was no significant difference between the sealers at all experimental times, except at 168h for CEO 1, which had a higher calcium ion release value than CEO 2. At 3h, Bio-C Sealer exhibited greater release compared to 24h and 168h. A decrease at 24h and an increase at 72h were recorded for Bio-C Sealer. Lower values for CEO 1 were found at 72h compared to 3h and 168h. Bio-C Sealer and CEO 2 were more alkaline at the beginning, while AH Plus Bioceramic at the end. CEO 1 was significantly more alkaline at 24h than at 3h and 168h. Bio-C Sealer was more alkaline than AH Plus Bioceramic at 3h and 72h and than CEO 1 at 3h, 72h and 168h. A lower pH value was detected for AH Plus Bioceramic compared to CEO 2, at 24h. Regarding radiopacity, all sealers presented values greater than 3 mmAl and no difference was observed between the experimental sealers. Bio-C Sealer and AH Plus Bioceramic showed higher push-out values compared to experimental sealers. Cohesive failures were predominant for all sealers evaluated. CEO 1 and CEO 2 had longer setting times. No difference was observed between the sealers concerning solubility and lower flow values were detected for CEO 1 and CEO 2 in relation to commercial sealers. It is concluded that CEO1 and CEO2 present similar physicochemical properties to sealers already available.

Keywords: physicochemical properties, tricalcium silicate, premixed sealer.