The testing of fluoridated dentifrices in an in situ model is an accepted procedure to establish a fluoride dose response, as well as an equivalent of the test product. Previous studies have reported that fluoridated dentifrices cause an increase in enamel and dentin mineralization. This study was to test for equivalency of the product compared to a gold standard using the In Vitro test method or to determine the level of mineralization occurring in a gingival crevice model for this study. Human connective tissue was obtained prior to the patient's tooth being prepared for a gold crown. The gold crown was then inserted into the remaining portion of the tooth and the gold crown was cemented to the tooth using the AH-2 self-curing acrylic (1,000 ± 50 psi) and a gold standard (1,000 ± 50 psi). Five percent of the area was exposed to the intraoral exposure using light polymerization. The change in mass, or area, from the gold crowns was analyzed and the relative mass change was expressed as a percentage. The mean percentage change in enamel mass for each group with tooth removed was -0.43%, +1.36%, +2.57%, and +4.52% for 0.005% F, 0.010% F, 0.015% F, and 0.020% F, respectively. The mean percentage change in dentin mass was -0.06%, +0.38%, +1.38%, and +3.00% for 0.005% F, 0.010% F, 0.015% F, and 0.020% F, respectively. The results show that the addition of fluoride in the dentifrices has a significant effect on the mass change of both enamel and dentin. These results are consistent with previous studies and support the use of the In Vitro test method for the evaluation of dentifrices.