

## Chemical, structural and mechanical characterization of 4 formulations of composite resin

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Objective: Characterization of chemical, structural and mechanical of 4 formulations of composite resin

**Method:** 48 cylinders of 38,465 mm<sup>3</sup> of composite resins were made with the incremental technique using a halogen lamp Astralis3(Ivoclar/Vivadent<sup>\*</sup>). Each specimen was made the test of resistance in compression using a Universal Shimadzu AGS-J test machine. These specimens were grouped as follows: G1:ROK posterior composite(SDI<sup>\*</sup>), G2:FiltekZ-250(3MESPE<sup>\*</sup>),G3:ICE universal composite(SDI<sup>\*</sup>), G4:TetricCeramHR(Ivoclar/Vivadent<sup>\*</sup>). Subsequently, 8 specimens were produced to be analyzed through a DiffractingXRays(XRD) and obtain its crystalline structure.Also,8 Specimens were made to obtain the chemical and morphological analysis through the scanning electronic microscope(2500HITACHI)

**Result:** Mean and standard deviation (SD±) expressed in MpaG1:77,2001(10,1522),G2:95,9617(15,8017),G3:82,1331 (8,71107),G4:71, 9225 (8,37925). The XRD patterns for G2 and G4 showed that they are highly crystalline. G1 and G3 are amorphous. G2 contain yttrium oxide and zirconia; XRD indicates that G4 contains ytterbium fluoride while SEM showed, additionally, crystals of barium aluminum fluorosilicate and quartz. The particle sizes from SEM were:G1:10-25 $\mu$ m,G2:0.01-3.5 $\mu$ m,G3:0.04-0.07 $\mu$ m and clusters <3-5 $\mu$ m,G4:0.04-3.0 $\mu$ m.

**Conclusion:** G1 resin has a low value to the traccional resistance, and has an amorphous structure; it means greater concentration of polymers. The G2 while it is the most rigid, this is because it has a crystalline structure that is why it doesn't stand high concentration of stress. The G3 and G4 have a similar value despite the fact that the G3 has an amorphous structure while theG4 is crystal clear, in fact the most crystal clear from all the groups studied. The properties of the composite resin will depend on the type of organic matrix, the integrity of the coupling silanico between the organic matrix and inorganic filler, of the type, the percentage of particles of filling and the size of these particles that can influence the resistance of composite resins.

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