

# Biological, mechanical and adhesive properties of universal adhesives containing zinc and copper nanoparticles

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**Objectives:** To evaluate the effect of addition of zinc oxide and copper nanoparticles (ZnO/CuNp) into universal adhesives, on antimicrobial activity (AMA), cytotoxicity (CTX), water sorption (WS) and solubility (SO), microhardness (MH) and in vitro degree of conversion (DC), as well as resin-dentin microtensile bond strength ( $\mu$ TBS), nanoleakage (NL) and in situ DC. **Methods:** ZnO/CuNp (0% [control]; 5/0.1 and 5/0.2 wt%) were added in Prime&Bond Active (PBA) and Ambar Universal (AMB). The AMA was evaluated against *Streptococcus mutans*. For CTX, Saos-2 cell-line was used. For WS and SO, specimens were tested for 28d. For MH, specimens were tested after 24 h and 28d and for in vitro DC, specimens were evaluated after 24 h. After, the adhesives were applied to flat dentine surfaces, composite resin build-ups, specimens were sectioned to obtain resin-dentine sticks. It was evaluated in  $\mu$ TBS, NL and in situ DC after 24 h of water storage. ANOVA and Tukey's test were applied