

# **Boric Acid Added Composite Hydrogel Synthesis, Characterization and Investigation of Usage as Soft Contact Lens Material**

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Soft contact lenses are prostheses using by millions of people to correct of visual disorders, changing eye color, or in the treatment of corneal diseases. Poly (2-hydroxyethyl methacrylate) (PHEMA) is commonly used for soft contact lenses. However, PHEMA lenses are not entirely satisfactory due to their relatively low oxygen permeability, which can cause hypoxia in the cornea. Poly(vinyl alcohol) (PVA) can be used with these materials as it has higher breaking strength and oxygen permeability than commercially available soft contact lens materials. It is also known that the use of low amounts of boric acid (BA) together with PHEMA plays an important role in the water content and provides antibacterial properties. Therefore, in this study, it was aimed to examine the usability of the composite obtained by PHEMA, PVA, and BA synthesized by emulsion polymerization for improve the water retention and swelling properties and antibacterial activity, which are the desired properties for contact lenses. Prepared hydrogel discs were examined by FT-IR/ATR (Fourier Transform Infrared Spectroscopy) for structural characterization and SEM (Scanning Electron Microscopy) for surface porosity. Disc diffusion method was used to evaluate the antibacterial activities of the discs. In addition, the discs were also evaluated in terms of biodegradability, swelling ratio, hydrophilicity and light transmittance. FTIR results prove the presence of BA on the PHEMA-PVA/BA composite hydrogel. The obtained PHEMA-PVA/BA composite hydrogels show high light transmittance, swelling behavior and hydrophilic character. This material could potentially be used as a soft contact lens material in the future. Key Words: HEMA,PVA, Contact Lenses, Boric Acid