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ABSTRACT

The demand for improved safety through different delivery systems has led to a growing interest in plant-based adjuvants which include polysaccharides. The medical industry shows rising interest in natural polysaccharides since they provide enhanced vaccine performance while minimizing side effects that chemical adjuvants commonly produce. Crude water-soluble polysaccharide (BSP) was extracted from dried *Boswellia serrata* gum through a procedure combining hot water extraction and ethanol precipitation and then analyzed its structure using Fourier-transform infrared spectroscopy. The typical polysaccharide structural properties were proven through FTIR band analysis by detecting 868 cm^{-1} and 826 cm^{-1} bands in all bands which represented polysaccharides. *In vitro* disintegration studies on prepared tablets using the natural polysaccharide showed significant superdisintegrant properties as compared to sodium starch glycolate and croscopovidone. As a result, formulations with rapid release might be developed with this novel polysaccharide from *Boswellia serrata*. Also, this study investigated and evaluated its potential protective effects, particularly in extending antioxidant activities of kalmegh. *In vitro* antioxidant studies on prepared polymeric beads using polysaccharide showed more extension of antioxidant activity than usual. Research revealed that the polysaccharide (BSP) demonstrates strong protective abilities so it serves as a promising bioactive ingredient for developing safer plant-based pharmaceutical products. The results demonstrate the compound's essential value for pharmaceutical and nutraceutical applications.

Keywords: *Boswellia serrata*, FTIR, superdisintegrant, rapid release, antioxidant, pharmaceutical and nutraceutical applications