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## Effect of different plasticizers on physical and chemical properties of bioplastic produced from vegetable starch

Sidra Sikandar, Dr. Samina Yasmin and Abdul Rehman  
Habib University, Pakistan

With the rise in environmental problems associated with plastic waste because of having long life properties, there has been a considerable interest in producing environmental friendly bioplastics. This study demonstrates the production of bioplastic from vegetable starch without any blend of other polymers and to analyze the role of different plasticizers on their properties. Four bioplastic films were produced from potato starch, one without plasticizer while the rest were blended with 2% of glycerin, ethylene glycol, and sucrose as a plasticizer respectively. Physical properties of bioplastic were tested through water-uptake, tensile-strength, elongation, haze, transmittance, and opacity. Chemical properties of the samples were also determined by testing their printing properties. The results obtained in the study demonstrated that plastic films produced with the addition of plasticizer significantly improved the film properties, whereas without plasticizer the film was found brittle and showed poor physical properties. Among the three plasticizers used; plastic with Sucrose was smooth and flexible and found to have highest tensile strength (403 kgf/mm<sup>2</sup>); Ethylene-glycol has the highest transmittance (85.2 Transmittance-Unit); Glycerin has highest opacity (44.7%), haze (89 Haze-Unit), water-uptake (90.2%) and elongation (19.2%). Moreover, elongation of ethylene-glycol and sucrose was found close to the glycerin (17.2%) and among the plasticizers, printability of sucrose was found highest (41 dynes/cm). Overall, addition of plasticizers showed enhanced flexibility and workability of biopolymers and among them, sucrose was relatively strongest, smooth and flexible as compared to others.

sidra.sikandar@sse.habib.edu.pk