

## **Extrusion of gelatin-based composite films: effects of processing temperature and pH of film forming solution on mechanical and barrier properties of manufactured films**

### **ABSTRACT**

The composite films, gelatin incorporated with corn oil were manufactured using a twin-screw co-rotating extruder. The effect of extrusion temperature (90, 105, 120 and 130°C) and film forming pH values (5.7-8.7) on the mechanical and barrier properties of gelatin-based composite films were investigated. Increasing the temperature from 90 to 130°C improved ( $P < 0.05$ ) the tensile strength (TS) of films. Increasing temperature to 120°C improved ( $P < 0.05$ ) water vapour permeability (WVP) values of gelatin-based composite films; however, this was accompanied by a decrease ( $P < 0.05$ ) in gas barrier properties. Additionally the use of film forming solutions possessing high pH values improved the mechanical properties of films and caused a decrease ( $P < 0.05$ ) in oxygen permeability. Neither temperature nor pH had any significant effect on the seal strength for any of the gelatin-based composite films manufactured. Confocal laser scanning microscopy (CLSM) results showed a corresponding increase in the number of oil droplets when processing temperature increased.

**Keyword:** Gelatin films; Extrusion; Mechanical properties; Barrier