



## DETERMINING THE CAPABILITY OF USING FENUGREEK SEED GUM AS AN EDIBLE FILM-FORMING MATERIAL

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### Abstract

Recently, many researchers have focused on investigating novel biopolymer sources of biodegradable and edible films as a successful alternative for synthetic polymers that leads to environmental pollution. Galactomannan is identified as a potential source of film making material. Fenugreek seed gum (FSG) is a rich source of galactomannan, which can be utilized as a film-forming-agent. The main objective of this study is to identify the capability of FSG in formulating food packaging film along with its performance. In this study, FSG extracted from fenugreek seeds was dissolved in distilled water with previously determined contents of plasticizer, glycerol. The film preparation was carried out by casting the film-forming solutions followed by drying, and the physical and mechanical properties of developed films were measured. According to the findings, the film matrices were brittle and not strong, not cohesive. With the increase of glycerol content, the films become stickier. Further, the physical properties; moisture content, thickness, colour parameters ( $L^*$ ,  $a^*$ ,  $b^*$ ) of FSG based films were increased from  $0.062 \pm 0.001$  mm,  $54.27 \pm 0.06\%$ ,  $66.54 \pm 0.23$ ,  $6.95 \pm 0.03$ ,  $25.20 \pm 0.03$  to  $0.094 \pm 0.002$  mm,  $60.30 \pm 0.06\%$ ,  $73.23 \pm 0.06$ ,  $8.93 \pm 0.02$ ,  $26.37 \pm 0.01$  with the increase of glycerol concentration from 0.0 to 1.5%, respectively. Regarding the mechanical properties, the tensile strength and Young's module were decreased from  $35.61 \pm 0.21$ ,  $41.68 \pm 0.23$  to  $28.37 \pm 0.11$ ,  $29.65 \pm 0.10$  and the elongation at break was increased from  $85.45 \pm 0.03$  to  $95.67 \pm 0.08$  with the increase of glycerol content from 0.0 to 1.5% respectively. The analysis of physical and mechanical properties reveals that FSG is an applicable source in making edible film for food packaging and further studies are needed to analyse its biochemical properties.

**Keywords:** *Food packaging, edible films, biodegradability, galactomannan, fenugreek seed gum*