

**Title** Study of mechanical, optic and barrier properties of chitosan/glycerol films crosslinked with polygodial

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**Citation** Abstracts, 14<sup>th</sup> World Congress of Food Science & Technology, October 19-23 2008, Shanghai, China. 721 pages.

**Keyword** packaging; chitosan; ploygodial

### **Abstract**

**Introduction:** To obtain edible-biodegradable packaging films, chitosan has been studied as a partial solution to the problem of accumulation of solid waste composed of synthetic inert polymers. Some studies have been focus their attention to carry out cross-linking experiments to modulate the mechanical properties of films with aldehydes such as formaldehyde, glutaraldehyde and glyoxal. Polygodial is a natural dialdehyde present in different natural sources. The main goal of this study was to evaluate its effect on mechanical, optical and barrier properties of chitosan/glycerol films. **Materials and Methods:** Chitosan solutions were prepared by dispersing chitosan in acetic polygodial was added to obtain different concentration level on the films (0, 2.7, 13.9 and 25.0 mg of polygodial per gram of chitosan). Film thickness was measured using a digital micrometer. Water vapor permeability was determined gravimetrically using a modified ASTM E 96-95 method. Tensile strength (TS) and elongation to break (E) of films were measured on a texture analyzer according to ASTM standard method D882-95. Film color was measured using a CR-300 Minolta Chroma Meter calibrated with a standard. FTIR spectra analysis was recorded on a Bruker Vector-22 FTIR Spectrometer. Statistical analysis of data was performed through an analysis of variance (ANOVA) using Statgraphics Plus 5.0 Software (Statgraphics 2000). **Results and Discussion:** The use of polygodial resulted in stronger films without losing their extensibility and with low water vapor permeability. Films became darker with yellow-green coloration by increasing polygodial concentration. Polygodial added to chitosan films did not have interaction with any amino groups of chitosan as measured by FTIR and it can effectively be applied to enhance some physical properties of edible films prepared with chitosan.