



CODEN [USA]: IAJ PBB

ISSN : 2349-7750

**INDO AMERICAN JOURNAL OF
PHARMACEUTICAL SCIENCES**

SJIF Impact Factor: 7.187

<https://doi.org/10.5281/zenodo.21245902>Available online at: <http://www.iajps.com>

Research Article

**DEVELOPMENT AND EVALUATION OF BIODEGRADABLE
FOOD PACKAGING USING NATURAL POLYMERS****R. Venkat Reddy*, J. Bhargav Teja, MD. Abduss Salam, Dr. P. Poli Reddy***

Department of Chemistry, Nalanda College of Pharmacy, Cherlapally, Nalgonda, Telangana-508001.

Abstract:

Increasing environmental concerns associated with synthetic plastic packaging have created a need for eco-friendly alternatives. The present study aimed to develop and evaluate biodegradable food packaging using natural polymers. Biodegradable films were prepared using potato starch as the primary natural polymer and glycerol as a plasticizer through the solvent casting method. The prepared films were evaluated for physicochemical properties such as thickness, transparency, flexibility, tensile strength, moisture absorption, water solubility, and biodegradability. The developed film showed good film-forming ability, acceptable mechanical strength, flexibility, and biodegradability under environmental conditions. The results suggest that biodegradable packaging films prepared from natural polymers can serve as sustainable alternatives to conventional plastic packaging. These materials reduce environmental pollution and provide promising applications in food preservation and shelf-life improvement. Further studies may be conducted to enhance barrier properties and large-scale commercial applicability.

Keywords: Biodegradable packaging, Natural polymers, Potato starch, Food packaging, Biopolymer film, Evaluation.

Corresponding author:

R. Venkat Reddy,
Department of Chemistry,
Nalanda College of Pharmacy,
Cherlapally, Nalgonda, Telangana-508001.



Please cite this article in press R. Venkat Reddy et al., **Development And Evaluation Of Biodegradable Food Packaging Using Natural Polymers**, Indo Am. J. P. Sci, 2026; 13(07).

INTRODUCTION:

Packaging plays an essential role in the protection, storage, transportation, and preservation of food products. Conventional plastic packaging materials such as polyethylene and polypropylene are widely used due to their durability and low cost. However, these synthetic plastics are non-biodegradable and cause severe environmental pollution due to their accumulation in landfills and water bodies.

Biodegradable polymers have emerged as eco-friendly alternatives to synthetic plastics. These polymers are derived from renewable resources such as starch, cellulose, chitosan, and gelatin. They undergo decomposition by microbial action into water, carbon dioxide, and biomass without producing harmful residues. Natural polymer-based packaging materials provide sustainability, reduced carbon footprint, and compatibility with food safety standards.

MATERIALS AND METHODS:

The materials used for the preparation of biodegradable food packaging film include potato starch, glycerol, distilled water, and citric acid. Laboratory apparatus such as beakers, measuring cylinders, glass rods, petri plates, hot plates, thermometers, and digital weighing balances were used during formulation. Preparation of

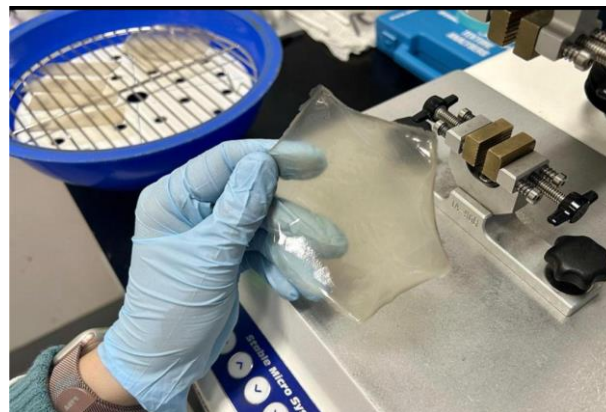
Biodegradable Film

1. Weigh 5 g of potato starch and add it to 100 mL distilled water.
2. Stir thoroughly to obtain a uniform suspension.
3. Add 2 mL glycerol as plasticizer and mix well.
4. Heat the mixture at 70–80°C with continuous stirring until gelatinization occurs.
5. Pour the hot solution onto petri plates to form a thin film.
6. Dry at 40–50°C for 24 hours.
7. Peel off the dried film and store for evaluation.

FORMULATION

Table 1: Formulation of Biodegradable Film

S.No	Ingredient	Quantity
1	Potato starch	5 g
2	Distilled water	100 mL
3	Glycerol	2 mL
4	Citric acid	Q.S.

**EVALUATION OF FILM**

The prepared biodegradable film was evaluated using the following parameters:

- * Appearance and transparency
- * Thickness
- * Tensile strength
- * Folding endurance
- * Moisture absorption
- * Water solubility
- * Biodegradability

Thickness

Film thickness was measured using a micrometer at different positions and average thickness was recorded.

Tensile Strength

Mechanical strength of the film was evaluated by applying force until breakage.

Moisture Absorption

Films were weighed before and after exposure to humidity to determine moisture uptake.

Biodegradability

Prepared films were buried in soil and observed periodically for degradation.

RESULTS AND DISCUSSION:

The prepared biodegradable packaging film showed uniform appearance, smooth texture, and good

transparency. The film exhibited satisfactory flexibility due to glycerol plasticization. Moisture absorption was moderate, indicating acceptable barrier properties. The biodegradability study showed gradual decomposition under soil conditions, confirming eco-friendly behavior.

The starch-based film demonstrated promising mechanical and physical properties suitable for food packaging applications. Compared with conventional plastic packaging, biodegradable films showed significant environmental advantages.

Table 2: Evaluation Results

Parameter	Observation
Appearance	Transparent
Thickness	Uniform
Flexibility	Good
Tensile Strength	Moderate
Moisture Absorption	Acceptable
Biodegradability	Good

CONCLUSION:

Biodegradable food packaging using natural polymers was successfully developed and evaluated. The prepared starch-based film demonstrated good mechanical strength, flexibility, transparency, and biodegradability. The developed material can serve as a promising sustainable alternative to conventional plastic packaging. Adoption of such biodegradable packaging can reduce plastic waste and contribute to environmental protection.

REFERENCES:

1. Surendren et al. Thermoplastic Starches and Blends, 2022.
2. Dirpan et al. Biopolymer Packaging Trends, 2023.
3. Venkatesan & Muniyan. Natural Preservatives and Edible Films, 2024.
4. Khalil et al. Classification of Biopolymers, 2018.
5. Mangaraj et al. Biodegradable Food Packaging Applications, 2019.