

BIODEGRADABLE FOOD PACKAGING

PRAJAKTA TANAJI GAWARI

PRN :-2016420496

PRODUCTION OF BIODEGRADABLE POLYLACTIC ACID (PLA) FILM

PLA is a biopolymer that is a biodegradable plastic that is made from a renewable resource (starch). It is formed through condensation polymerisation, (loss of a water molecule)

PLA is the most common bioplastic in use today. First, corn or other raw materials are fermented to produce lactic acid, which is then polymerized to make PLA.

PLA film can be laminated with paper tray and replace envelope window and other food packaging.

NEED OF PLA FILM

PLA is mainly used in the packaging industry for cups, bowls, bottles and straws. Other applications include disposable bags and trash liners as well as compostable agriculture films.

PLA is an excellent choice for biomedical and pharmaceutical applications such as drug delivery systems and sutures because PLA is biodegradable, hydrolysable and generally recognized as safe.

The huge benefit of PLA as a bioplastic is its versatility and the fact that it naturally degrades when exposed to the environment

RAW MATERIAL

Processing possibilities of typical commercial biodegradable polymers:-

- ▶ PHB = Poly(3-hydroxybutyrate); PHV = Poly(hydroxyl valerate); PBS = Poly(butylenes succinate); PCL = Poly(ϵ -caprolactone); PBST = Poly(butylene succinate terephthalate); PBAT = Poly(butylene adipate terephthalate);
- ▶ PTMAT = Poly(tetramethylene adipate terephthalate); PVA = Poly(vinyl alcohol).
- ▶ **Ingeo**
- ▶ 4032D film, higher heat resistant

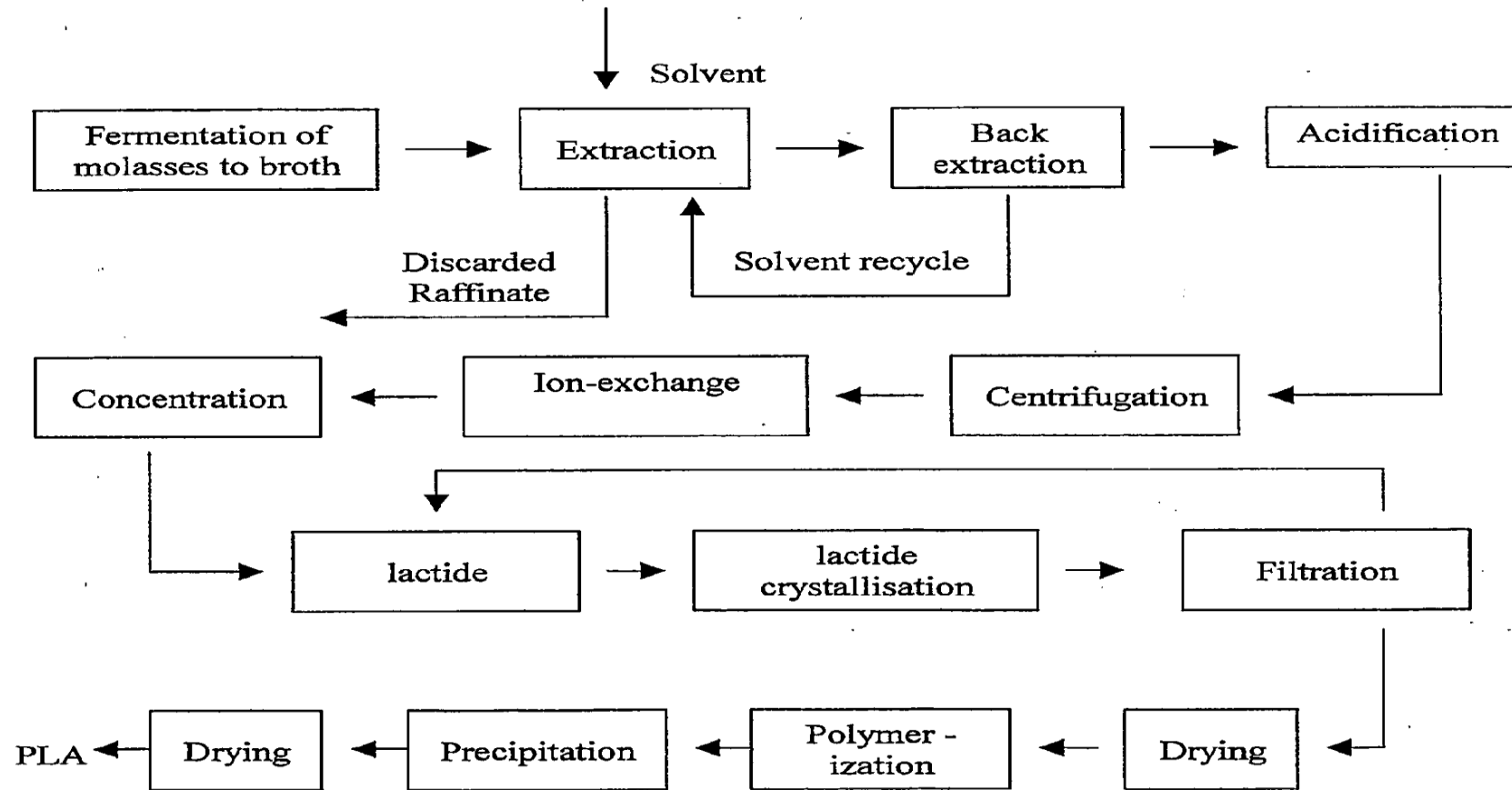
PLA PROCESS:-

- ▶ DRYING
- ▶ EXTRUSION
- ▶ INJECTION MOLDING
- ▶ BLOW MOLDING: EXTRUSION BLOW MOLDING
INJECTION BLOW MOLDING
INJECTION STRETCH BY BLOW MOLDING
- ▶ CAST FILM EXTRUSION
- ▶ THERMOFORMING

PLA PROCESS:-

Figure 1

Flow sheet for the production of PLA from fermentation of molasses



MARKETING PLAN:-

- ▶ Marketing strategy will include deciding the positioning strategy for product. Which as follows:
 - ❑ Identifying the competitors and determine their position.
 - ❑ Economic analysis which depends on market size and penetration probability.
 - ❑ Analysis of customer

Compititors:-

- ❑ **Bag Poly International**

95 Km Stone, Alipur Khalsa Road, Kohand, Haryana - 132114, India

- ❑ **Green Bioplast International**

B/604, Sargam,gaurav Galaxy Phase : 1 Nityanand Nagar, Miraroad (east),
Maharashtra- 400056, India

- ❑ **Pragati Corporation**

2159, Main Road, Rani Bagh, Opposite Railway Flats, Delhi - 110034, India

- ❑ **Bhag Polymers**

New Delhi, Delhi , India

- ❑ **Inspire Unlimited**

B-1199 G D Farm Mayur Vihar Phase-iii Delhi - 110096 India, Delhi , India

INSTITUTE OF GOVERNMENT PROVIDES FUNDS

- ▶ National Institute of Construction Management and Research, Mumbai.
- ▶ International Institute for Population Sciences, Mumbai.
- ▶ Film and Television Institute of India.

COST AND RETURN ANALYSIS

- Average setup cost (cost of all equipment, land etc.)= 7.5 lakh

SR.NO.	TYPE OF EXPENDITURE	RATE	COST (IN RUPEES)
1.	Thermoplastic cost	2500	20,000
2.	Labour cost	400 per person	4000 (Min10 labours required)
3.	Transportation + packaging cost	-	2000
TOTAL EXPENDITURE			RS. 26,000

- ▶ Average rate of PLA film in market = Rs.2900 Per Quintal (Per 100 Kg)

COST AND RETURN ANALYSIS

- ▶ Total Revenue= Rs.2,900* 1.2 Quintal= Rs 34,800
- Profit = Total Revenue - Total Expenditure
=Rs 34,800 - Rs 26000
= Rs 8,800 per day
- Monthly Income = Rs 2,20,000(25 working days)
- EFFICIENCY RATIO (ER)

$$\text{Efficiency ratio} = \frac{\text{TOTAL REVENUE}}{\text{TOTAL EXPENDITURE}}$$
$$= \frac{\text{Rs } 34,800}{\text{Rs } 26,000} = 1.33$$

As $ER > 1$, Unit is efficient

COST AND RETURN ANALYSIS

► PROFITABILITY RATIO (PR)

$$\begin{aligned}\text{Profitability ratio (PR)} &= \frac{\text{PROFIT}}{\text{TOTAL EXPENDITURE}} \\ &= \frac{\text{Rs } 8,800}{\text{Rs } 26,000} = \mathbf{0.338}\end{aligned}$$

As PR < 1, Unit is efficient

PARAMETERS	
TOTAL EXPENDITURE	Rs. 26,000
TOTAL COST	Rs. 34,000
PROFIT	Rs. 8,800
EFFICIENCY RATIO	1.33
PROFITABILITY RATIO	0.338

ADVANTAGES:

- ✓ PLA film is plant base material.
- ✓ A biodegradable polymer.
- ✓ It is made from lactic acid monomers.
- ✓ An alophtatic thermoplastic polymer.
- ✓ Less flexible.
- ✓ Lower melting point.

CONCLUSION:-

- ▶ PLA film has a largest potential market because is a compostable and biodegradable thermoplastic.
- ▶ Study on PLA's properties are necessary to be fully adapted in packaging applications.

*Thank
you*

