PROJECT REPORT

OF

BIODEGRADABLE PLASTIC BAGS MANUFACTURING UNIT

PURPOSE OF THE DOCUMENT

This particular pre-feasibility is regarding Biodegradable Plastic Bags manufacturing Unit.

The objective of the pre-feasibility report is primarily to facilitate potential entrepreneurs in project identification for investment and in order to serve his objective; the document covers various aspects of the project concept development, start-up, marketing, finance and management.

[We can modify the project capacity and project cost as per your requirement. We can also prepare project report on any subject as per your requirement.]

SAMADHAN

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PROJECT AT GLANCE

1	**Name of Proprietor/Director**	XXXXXXXX
2	**Firm Name**	XXXXXXXX
3	**Registered Address**	XXXXXXXX
4	**Nature of Activity**	XXXXXXXX
5	**Category of Applicant**	XXXXXXXX
6	**Location of Unit**	XXXXXXXX
7	**Cost of Project**	22.89 Rs. In Lakhs
8	**Means of Finance**	
i)	**Own Contribution**	2.29 Rs. In Lakhs
ii)	**Term Loan**	12.60 Rs. In Lakhs
iii)	**Working Capital**	8.00 Rs. In Lakhs
9	**Debt Service Coverage Ratio**	3.44
10	**Break Even Point**	0.35
11	**Power Requiremnet**	20 KW
12	**Employment**	6 Persons
13	**Major Raw Materials**	Polylactic Acids or Polylactic Acids Blends

14 Details of Cost of Project & Means of Finance

Cost of Project

Particulars	Amount in Lacs
Land	Owned/Leased
Building & Civil Work	Owned/Leased
Plant & Machinery	12.50
Furniture & Fixture	0.50
Other Misc Assets	1.00
Working Capital Requirement	8.89
Total	**22.89**

Means of Finance

Particulars	Amount in Lacs
Own Contribution	2.29
Term Loan	12.60
Working capital Loan	8.00
Total	**22.89**

1. INTRODUCTION

The term “Biodegradable” refers to anything or substances that can be degraded by the natural forces and micro-organisms and Bio-degradable plastics refer to those plastics that can be decomposed by the micro-organisms and also natural factors such as rain, sunlight, etc. Hence these bags will not pose to be a threat to the environment. Plastic bags can be made “Oxo-biodegradable” by manufacturing theme from the normal polyethylene or the polypropylene and then incorporating an additive that can cause them to degrade and then biodegradation of the polymer by oxidation.

Fig.: Biodegradable Plastic Bags and PLA pellets

The global production capacity of the biodegradable plastic bags reached around 1.17 million tons in 2019. Polylactic Acid (PLA) based is probably the most well-known biodegradable plastic but besides that there are about 20 groups of biodegradable plastic polymers. Of these 20 known biodegradable plastic groups, only 3 types are produced commercially and those include (i) Starch blends (ii) PLA; and (iii) Polybutylene based polymers which includes Polybutyl Succinate (PBS) and Polybutylene Adipate Terephthalate (PBAT) which are both fossil fuel based.

PLA (Polylactic Acid) is a potential and popular polymer material. It is also called “Polylactide” and can be produced by the fermentation of renewable sources such as Corn,

Cassava, Potato, and Sugarcane. Other feedstock that have been researched and explored include Cellulosic Materials, Agricultural Byproducts, and even greenhouse gases such as Carbon dioxide and Methane. But that technology is still under development and agricultural by-products set to remain as the main feedstock for starch blends and PLA in the near future.

PLA has excellent properties as compared to aliphatic polyesters such as high mechanical strength, high modulus, biodegradability, biocompatibility, bioabsorbability, transparency, and low toxicity. Because of its excellent properties, PLA has shown potential applications in different sectors such as agricultural films, biomedical devices, packaging, and automotive industries. Although PLA is a bio-degradable polymer, but its complete degradation may take several years. As of 2019, production capacity of PLA was approximately 290 thousand tons.

The initial production of the biodegradable polymers started in the Europe, the US, and Japan but the production was soon shifted to different parts of Asia due to the low cost of the raw materials and the convenience of feedstock acquisition. Many companies have emerged in China, India, and Thailand that are financed by the local investors and also companies from the global north.

2. PRODUCT DESCRIPTION

2.1 PRODUCT USES

The uses of the biodegradable plastics can be listed as follows:

1. The manufacturing of the compostable bags is the primary sector of application of the Biodegradable plastics. These bags can be used as grocery carrying, Food Storage, Garbage bags,
2. Packaging is another important sector of application of the biodegradable plastics and accounted for 59 % of the biodegradable plastics made in 2019. Flexible packaging requires almost 500, 000 tons of biodegradable plastics.
3. The second area is the agricultural and the horticultural sector that used 14 % of the biodegradable plastics manufactured in 2019. Agricultural mulching film is used to improve crop yield in many countries.
4. They are also used as consumer goods in different areas.

2.2 RAW MATERIAL REQUIREMENT

The raw materials required for the production of PLA plastics are "Polylactic Acid or Polylactic Acid Blends". These are available in the form of granules, in various grades, for the use by the plastic convertors.

PLA is a polymer of Lactic Acid, which is a natural acid produced by the fermentation of sugars or starch with the help of micro-organisms. The PLA formed from the starch or the sugar is incapable of being used as plastics and hence the raw PLA is compounded by mixing it with other substances or by co-polymerization or it is blended with other plastics to enhance its properties.

Besides this, certain additives are also added to the PLA blends that include UV stabilizers, impact resistance modifiers, plasticizers, color pigments.

2.3 MANUFACTURING PROCESS

The production process for PLA Plastic Blends can be written as follows:

1. A "polymer" becomes plastic only when they are correctly adapted to the specific application by compounding. Compounding means preparing for use, and describes the enhancing process that raw plastics go through, being blended with certain additives (e. g. fillers or other additives) to optimize their properties for the planned application. Such aids can be processing aids, UV stabilizers, impact resistance modifiers, plasticizers, color pigments, and many other things.

   Compounding can be done in a mixing vessel. Here the components that are added to the PLA blends are mixed together and homogenized.
2. The PLA blends are loaded into the hopper of a Plastic extrusion machine and it conveyed to the rotating screw of the machine.

   In the extruder, the PLA blends are heated to a particular temperature and then diversified. When the plastic within container is heated it becomes a melt, it can be extruded and then blown up with the help of circular die to give an inflated plastic sheet.

3. The inflated sheet of plastic is blown up vertically to a high level that further allows the material, a proper distribution and provides the required cooling time before the plastic film is flattened.
4. The ending step in the manufacturing process is to send the inflated sheet through a section of nip rollers to make the film flat and later roll the film into large cores. By altering the speed of the nip rolls, the bubble like formation can change its measurement and thickness of the film.
5. Following the extrusion process, the large coil of plastic films enters the converting department where the film roll is fed into an unwinder, where it's subsequently converted to the plastic bags. The plastic roll is treated with an electrostatic wave of current where it starts to unwind. This is an "Optional" step and is carried out to appropriately prepare the film for the printing process, where the plastic bags are printed with logos and messages.
6. Either after the printing process or after the extrusion process, depending on weather any printing is done, the film is cut into the correct dimensions with hot knives that seal the ends of the bags together at the same time.
7. After the cutting and the sealing process, any material that is "Scrap" is reused again in the manufacturing process in order to minimize any waste material.
8. After this process, the plastic bags are packed in large bundles and then stored for dispatch.

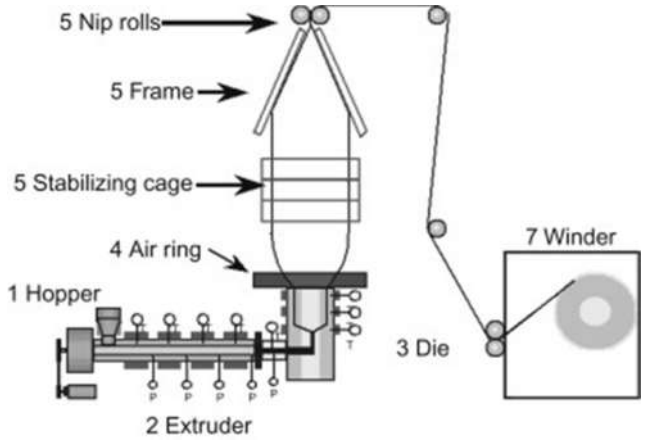

Fig.: Schematic diagram of the extrusion and blow up process.

3. PROJECT COMPONENTS

3.1 Land /Civil Work

An area of almost 2,000–3,000 square feet would be required to set up Biodegradable Plastic Bags Manufacturing plant. This space would be required for raw materials storage mainly, production, packaging, storage of finished goods, and administrative work.

We have not considered the cost of Land purchase & Building Civil work in the project. It is assumed that land & building will be on rent & approx. rental of the same will be Rs. 40,000 to 60,000 per month.

3.2 Plant & Machinery

The following machineries would be required for the manufacture of the Biodegradable Plastic Bag manufacturing plant:

1. A vertical mixing equipment for the mixing of the PLA with the other additives. The raw material is loaded through the hopper and thereby it is sucked up into the mixer. The outlet is connected to the extruding machine. This is generally made from mild steel and the power consumption is somewhere between 8 – 14 HP for the mixing 100 – 500 Kg PLA granules.

Fig.: Vertical blending machine

2. Plastic Extruder & Blow Film Machine. The mixed PLA blend is melted and shaped into the plastic bags in the extrusion machine, converting the solid plastic pellets into a uniform polymer melt. The power consumption can be anywhere between 30 - 50 kW depending upon the quantity of the input.

Fig.: Plastic bag extrusion with blown film.

3. After the plastic pellets are converted into the plastic rolls in the extrusion machine, they are printed in the Plastic bag printing machine.

Fig.: Plastic bags printing machine

4. After the bags have been printed, they are cut and their ends are sealed with a Plastic Cutting and Sealing machine. This machine may come along with a conveyor belt as well.

Fig.: Polythene bag cutting and sealing machine

4. LICENSE & APPROVALS

To start the biodegradable plastic bag manufacturing process the different licenses and registrations from the different authorities regarding the area and machineries must be obtained initially. These laws vary from one state to the other. Besides them, the other certificates that must be obtained are:

1. A trade license from the local Municipal Body authority.
2. MSME Udyam Online registration
3. The GST (Goods and Service Tax) certification.
4. A “No-objection Certificate” from the Pollution Control Board.
5. A “No-objection Certificate” from the Fire Board.

PROJECTED BALANCE SHEET **(in Lacs)**

PARTICULARS	1st year	2nd year	3rd year	4th year	5th year
Liabilities					
Capital					
Opening Balance		4.53	7.67	11.10	14.72
Add:- Own Capital	2.29				
Add:- Retained Profit	4.74	6.65	8.93	11.12	13.31
Less:- Drawings	2.50	3.50	5.50	7.50	10.00
Closing Balance	4.53	7.67	11.10	14.72	18.03
Term Loan	11.20	8.40	5.60	2.80	-
Working Capital Limit	8.00	8.00	8.00	8.00	8.00
Sundry Creditors	3.54	4.02	4.52	5.04	5.58
Provisions & Other Liabilities	1.00	0.50	0.60	0.72	0.86
TOTAL :	**28.27**	**28.59**	**29.82**	**31.28**	**32.48**
Assets					
Fixed Assets (Gross)	14.00	14.00	14.00	14.00	14.00
Gross Depriciation	2.08	3.84	5.34	6.62	7.71
Net Fixed Assets	**11.93**	**10.16**	**8.66**	**7.38**	**6.29**
Current Assets					
Sundry Debtors	4.79	5.69	6.40	7.14	7.93
Stock in Hand	8.33	9.71	10.92	12.18	13.51
Cash and Bank	1.48	1.03	1.35	2.49	1.75
Loans and advances	1.75	2.00	2.50	2.10	3.00
TOTAL :	**28.27**	**28.59**	**29.82**	**31.28**	**32.48**

PROJECTED PROFITABILITY STATEMENT					**(in Lacs)**
PARTICULARS	**1st year**	**2nd year**	**3rd year**	**4th year**	**5th year**
Capacity Utilisation %	**50%**	**55%**	**60%**	**65%**	**70%**
SALES					
BIODEGRADABLE PLASTIC BAGS	95.76	113.83	127.98	142.77	158.63
Total	**95.76**	**113.83**	**127.98**	**142.77**	**158.63**
COST OF SALES					
Raw material cost	70.88	80.39	90.34	100.74	111.57
Electricity Expenses	1.92	2.53	2.76	3.00	3.23
Depreciation	2.08	1.77	1.50	1.28	1.09
Wages & labour	4.08	4.49	4.94	5.43	5.97
Repair & maintenance	0.96	0.57	0.64	0.71	0.79
Consumables	1.92	2.28	2.56	2.86	3.17
Packaging cost	2.39	2.28	2.24	2.50	2.78
Cost of Production	84.22	94.30	104.99	116.51	128.60
Add: Opening Stock	-	4.79	5.69	6.40	7.14
Less: Closing Stock	4.79	5.69	6.40	7.14	7.93
Cost of Sales	79.43	93.40	104.28	115.77	127.81
GROSS PROFIT	**16.33**	**20.43**	**23.71**	**27.00**	**30.82**
GROSS PROFIT RATIO	**17.05%**	**17.95%**	**18.52%**	**18.91%**	**19.43%**
Salary to Staff	3.12	3.59	4.13	4.75	5.22
Interest on Term Loan	1.24	2.00	0.78	0.47	0.17
Interest on working Capital	0.88	0.88	0.88	0.88	0.88
Rent	4.80	5.04	5.29	5.56	5.83
Selling & Administration Expenses	1.44	1.71	2.56	2.14	2.38
TOTAL	**11.47**	**13.21**	**13.64**	**13.80**	**14.48**
NET PROFIT	4.86	7.22	10.07	13.20	16.34
Taxation	0.12	0.57	1.14	2.09	3.03
PROFIT (After Tax)	**4.74**	**6.65**	**8.93**	**11.12**	**13.31**
NET PROFIT RATIO	**4.95%**	**5.84%**	**6.98%**	**7.79%**	**8.39%**

PROJECTED CASH FLOW STATEMENT **(in Lacs)**

PARTICULARS	1st year	2nd year	3rd year	4th year	5th year
SOURCES OF FUND					
Own Margin	2.29				
Net Profit	4.86	7.22	10.07	13.20	16.34
Depriciation & Exp. W/off	2.08	1.77	1.50	1.28	1.09
Increase in Cash Credit	8.00	-	-	-	-
Increase In Term Loan	12.60	-	-	-	-
Increase in Creditors	3.54	0.48	0.50	0.52	0.54
Increase in Provisions & Other liabilities	1.00	- 0.50	0.10	0.12	0.14
TOTAL :	**34.36**	**8.96**	**12.17**	**15.12**	**18.12**
APPLICATION OF FUND					
Increase in Fixed Assets	14.00				
Increase in Stock	8.33	1.38	1.21	1.26	1.33
Increase in Debtors	4.79	0.90	0.71	0.74	0.79
Increase in loans and advances	1.75	0.25	0.50	- 0.40	0.90
Repayment of Term Loan	1.40	2.80	2.80	2.80	2.80
Drawings	2.50	3.50	5.50	7.50	10.00
Taxation	0.12	0.57	1.14	2.09	3.03
TOTAL :	**32.89**	**9.40**	**11.85**	**13.99**	**18.85**
Opening Cash & Bank Balance	-	1.48	1.03	1.35	2.49
Add : Surplus	1.48	-0.44	0.31	1.14	-0.74
Closing Cash & Bank Balance	**1.48**	**1.03**	**1.35**	**2.49**	**1.75**

CALCULATION OF D.S.C.R

PARTICULARS	1st year	2nd year	3rd year	4th year	5th year
CASH ACCRUALS	6.81	8.41	10.43	12.40	14.40
Interest on Term Loan	1.24	2.00	0.78	0.47	0.17
Total	8.05	10.41	11.21	12.87	14.57
REPAYMENT					
Instalment of Term Loan	1.40	2.80	2.80	2.80	2.80
Interest on Term Loan	1.24	2.00	0.78	0.47	0.17
Total	2.64	4.80	3.58	3.27	2.97
DEBT SERVICE COVERAGE RATIO	**3.05**	**2.17**	**3.13**	**3.93**	**4.91**
AVERAGE D.S.C.R.					**3.44**

REPAYMENT SCHEDULE OF TERM LOAN							
					Interest		11.00%
Year	Particulars	Amount	Addition	Total	Interest	Repayment	Closing Balance
ist	Opening Balance	-					
	1st month		12.60	12.60	-	-	12.60
	2nd month	12.60	-	12.60	0.12	-	12.60
	3rd month	12.60	-	12.60	0.12	-	12.60
	4th month	12.60	-	12.60	0.12	-	12.60
	5th month	12.60	-	12.60	0.12	-	12.60
	6th month	12.60	-	12.60	0.12	-	12.60
	7th month	12.60	-	12.60	0.12	0.23	12.37
	8th month	12.37	-	12.37	0.11	0.23	12.13
	9th month	12.13	-	12.13	0.11	0.23	11.90
	10th month	11.90	-	11.90	0.11	0.23	11.67
	11th month	11.67	-	11.67	0.11	0.23	11.43
	12th month	11.43	-	11.43	0.10	0.23	11.20
					1.24	**1.40**	
2nd	Opening Balance						
	1st month	11.20	-	11.20	0.10	0.23	10.97
	2nd month	10.97	-	10.97	0.10	0.23	10.73
	3rd month	10.73	-	10.73	0.10	0.23	10.50
	4th month	10.50	-	10.50	0.10	0.23	10.27
	5th month	10.27	-	10.27	0.09	0.23	10.03
	6th month	10.03	-	10.03	1.00	0.23	9.80
	7th month	9.80	-	9.80	0.09	0.23	9.57
	8th month	9.57	-	9.57	0.09	0.23	9.33
	9th month	9.33	-	9.33	0.09	0.23	9.10
	10th month	9.10	-	9.10	0.08	0.23	8.87
	11th month	8.87	-	8.87	0.08	0.23	8.63
	12th month	8.63	-	8.63	0.08	0.23	8.40
					2.00	**2.80**	
3rd	Opening Balance						
	1st month	8.40	-	8.40	0.08	0.23	8.17
	2nd month	8.17	-	8.17	0.07	0.23	7.93
	3rd month	7.93	-	7.93	0.07	0.23	7.70
	4th month	7.70	-	7.70	0.07	0.23	7.47
	5th month	7.47	-	7.47	0.07	0.23	7.23
	6th month	7.23	-	7.23	0.07	0.23	7.00
	7th month	7.00	-	7.00	0.06	0.23	6.77
	8th month	6.77	-	6.77	0.06	0.23	6.53
	9th month	6.53	-	6.53	0.06	0.23	6.30
	10th month	6.30	-	6.30	0.06	0.23	6.07
	11th month	6.07	-	6.07	0.06	0.23	5.83
	12th month	5.83	-	5.83	0.05	0.23	5.60
					0.78	**2.80**	

4th	Opening Balance						
	1st month	5.60	-	5.60	0.05	0.23	5.37
	2nd month	5.37	-	5.37	0.05	0.23	5.13
	3rd month	5.13	-	5.13	0.05	0.23	4.90
	4th month	4.90	-	4.90	0.04	0.23	4.67
	5th month	4.67	-	4.67	0.04	0.23	4.43
	6th month	4.43	-	4.43	0.04	0.23	4.20
	7th month	4.20	-	4.20	0.04	0.23	3.97
	8th month	3.97	-	3.97	0.04	0.23	3.73
	9th month	3.73	-	3.73	0.03	0.23	3.50
	10th month	3.50	-	3.50	0.03	0.23	3.27
	11th month	3.27	-	3.27	0.03	0.23	3.03
	12th month	3.03	-	3.03	0.03	0.23	2.80
					0.47	**2.80**	
5th	Opening Balance						
	1st month	2.80	-	2.80	0.03	0.23	2.57
	2nd month	2.57	-	2.57	0.02	0.23	2.33
	3rd month	2.33	-	2.33	0.02	0.23	2.10
	4th month	2.10	-	2.10	0.02	0.23	1.87
	5th month	1.87	-	1.87	0.02	0.23	1.63
	6th month	1.63	-	1.63	0.01	0.23	1.40
	7th month	1.40	-	1.40	0.01	0.23	1.17
	8th month	1.17	-	1.17	0.01	0.23	0.93
	9th month	0.93	-	0.93	0.01	0.23	0.70
	10th month	0.70	-	0.70	0.01	0.23	0.47
	11th month	0.47	-	0.47	0.00	0.23	0.23
	12th month	0.23	-	0.23	0.00	0.23	-
					0.17	**2.80**	

DOOR TO DOOR	60	MONTHS
MORATORIUM PERIOD	6	MONTHS
REPAYMENT PERIOD	54	MONTHS

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