A PROJECT FEASIBILITY STUDY ON THE MAINUFACTURE. OF PLASTIC RESIN MADE OF FEATHER

Feasibility Study

JAYSON A SORIANO KENNETH JAY T. MINE

College of Engineering and Information Technology

CAVITE STATE UNIVERSITY

Indang, Cavite



A PROJECT FEASIBILITY STUDY ON THE MANUFACTURE OF PLASTIC RESIN MADE OF FEATHER

A Feasibility Study Submitted to the Faculty of the Cavite State University

In Partial fulfillment
of the requirements for the degree of
Bachelor of Science in Industrial Engineering



A project feasibility study on the manufacture of plastic resin made of h⁷⁹ 47 Sob 2008 DP-285

JAYSON A. SORIANO KENNETH JAY T. MINE April 2008

EXECUTIVE SUMMARY

A study was conducted to present the viability and feasibility of producing plastic resin made of feather for some municipalities in Cavite.

A company named KJFR will be established to engage in the production of high quality plastic resin from chicken feathers. The product will be established in 2008 and will be named after the company name. The main office and plant will be established in Tanza, Cavite. The socio-economic desirability and the income contribution of the project to the target area and community to which the project will be located are given a consideration as a probable risk. Specifically, this study will cover the following: the marketing aspect, the management and organization aspect, the technical aspect, and the financial aspect.

Plastic resin is composed of the following raw materials: sodium sulfite, glycerol, DI-H2O(distilled water) and feather. Plastic resin is pilletzed for making plastic. The finished product will be packed in a sack/bag.

The marketing aspect includes the introduction of the plastic resin which is new to the market because it uses a special raw material, the chicken feather. Based on the demand and supply analysis of the product it has the potential to enter the plastic resin industry.

The technical aspect presents the machineries and equipment to be used for the manufacture of plastic resin such as the weighing machine, mixer machine, pelletizing machine, automatic bagger, bag closer machine, drying machine, grinding machine, plastic container, extruder machine, and blending machine. It also includes the production

process of plastic resin, the plant location and plant development of the company which is in Tanza, Cavite.

For the management and organization aspect, KJFR will operate as a corporation.

The manpower requirements of the company, the qualifications and job descriptions of key personnel and the compensation package for the workers are also presented.

For the financial aspect, this study includes the capital requirements of the project, the initial investment of the project, the gross sale of the project for the first year of operation, the return of investment and the projected income for the last year of operation.

The socio-economic aspect discusses the social and economic acceptability of the project in the form of revenues generated in the community.

The project is feasible and financially viable. Therefore, it is strongly and highly recommended that the project proposal should be implemented as soon as possible.

TABLE OF CONTENTS

	Page
BIOGRAPHICAL DATA	iv
ACKNOWLEDGEMENT	v
EXECUTIVE SUMMARY	vii
LIST OF APPENDIX TABLES	xiv
LIST OF APPENDIX FIGURES	xx
INTRODUCTION	1
Background and Needs Assessment	2
Objectives of the Study	3
General objectives	3
Specific objectives	3
Scope and Limitation	5
Significance of the Study	
REVIEW OF RELATED LITERATURE	
METHODOLOGY	
Sources of Data	
Primary Data	
Secondary Data	
Research Instruments	
Treatment of Data	18

Time and Place of the Study	18
MARKETING ASPECT	
Product Description	20
Target Market	20
List of plastic manufacturers in the Philippines	21
Demand Analysis	22
Supply Analysis	22
Demand and Supply Analysis	23
Sources of Feather	24
Factors Affecting the Market	28
Price Study	29
Marketing Program	30
TECHNICAL ASPECT	33
Project Time Table	33
Product Technical Requirements	34
Feather as Raw Material	35
Manufacturing Process of Feather Resin	36
Cysteine Content of Feather Kearatin	38
Ratio of Materials needed	39
Machine and Equipment	39
Packaging	42
Testing of Feather Plastic	43

	Procurement of Land Building and Venicle	44
	Non Production Factory Equipment	44
	Machinery and Equipment	44
	Office and Factory Furniture and Fixtures	44
	Office Equipment	44
	Factory Equipment	44
	Plant Uniform	45
	Office Tools and Utensils	45
	Janitorial and Maintenance Supplies	45
	Project Location	45
	Location Planning	46
	Waste Disposal	46
ORGA	ANIZATION AND MANAGEMANT ASPECT	47
	Form of Business Enterprise	47
	Background of Key Personnel	49
	Definition of Functions	53
	Compensation Plan	59
FINAN	NCIAL ASPECT	60
	Major Assumptions	60
	Total Project Cost	62
	Source of Funds	62
	Pre – Operating Cash Flow Statement of KJFR	62
	Financial Analysis	63

Liquidity	63
Working capital	63
Current ratio	64
Quick ratio or acid test ratio	64
Measure of Ability to Sell Inventory and Collect Receivable	64
Receivable turnover	64
Number of days sales in receivables	65
Finished goods turnover	65
Owner's Equity to Total Assets	65
Total Liabilities to Total Assets	65
Owner's Equity to Total Liabilities	66
Debt – Equity Ratio	66
Measure of Profitability	66
Gross margin	66
Profit margin	67
Return of investment	67
Return on total assets	67
Return owners equity	67
Operating expense	68
Measures of Investment Proficiency	68
Rate of return on assets	68
Measures of Operating Efficiency	68
Fixed assets turnover	68

Asset turnover rate	69
Measures of Economic Profitability	
Payback period	69
Break-even analysis	69
SOCIO - ECONOMIC ASPECT	70
Social Desirability	70
Improvement in the quality of life	70
Contributions to social development	70
Revenue generation	70
Economic Desirability	
Generation of income	71
Increased employment	71
Contributions to the community	71
Increased spending	71
Tax generation	72
FINDINGS, CONCLUSIONS, AND RECOMMENDATOINS	73
Findings	73
Conclusions	73
Recommendation	74
BIBLIOGRAPHY	75

LIST OF APPENDIX TABLES

Appendix Table	P	age
1.1	Historical demand (in mt) from 2003 - 2004	77
1.2	Projected demand (in mt) for 2008 – 2012	77
1.3	Total production of resin in the Philippines	78
1.4	Historical supply (in mt) 2008 - 2012	78
1.5	Projected supply for (in mt) 2008 - 2012	79
1.6	Projected demand gap (in pcs) for 2008 – 2012	79
1.7	Projected market share from 2008 to 20012	80
1.8	Prices of four principal types of resins in 2006	80
1.9	Estimated price of KJFR from 2008 - 2012	81
2.0	Projected gross sales from 2008 to 2012	81
2.1	Procurement of land, building, and vehicle	82
2.2	Machinery and equipment	82
2.3	Acquisition cost of factory furniture and fixtures	83
24	Acquisition cost of office furniture and fixtures	84
2.5	Acquisition cost of office equipment	84
2.6	Acquisition cost of factory equipment	85
2.7	Acquisition cost of uniforms	85
2.8	Acquisition cost of office tools and utensils	86
2.9	Acquisition cost of janitorial supplies	87
3.0	Required and shifting of employees of KJFR	88

3.1	Projected initial monthly salaries of employees	89
3.2	Projected monthly salary of employees	90
3.3	Projected annual salary of employees	92
3.4	Projected 13 th month pay of employees	94
3.5	Projected monthly SSS contribution	96
3.6	Projected annual SSS contribution	98
3.7	Projected monthly PHILHEALTH contribution	100
3.8	Projected annual PHILHEALTH contribution	102
3.9	Projected monthly PAG-IBIG contribution	104
4.0	Projected annual PAG-IBIG contribution	106
4.1	Total projected annual SSS, PHILHEALTH and PAG-IBIG contribution	108
4.2	Total project cost	109
4.3	Projected sales discount and net sales	110
4.4	Projected cash sales and sales on account	111
4.5	Projected accumulated allowance for doubtful accounts	111
4.6	Payment of purchase of KJFR	112
4.7	Summary of depreciation expenses	112
4.8	Summary of annual utilities expense and distribution	113
4.9	Projected insurance expense	114
5.0	Projected taxes, licenses and permit expense	114
5.1	Depreciable life and salvage value	115
5.2	Allocation of depreciation expenses	115
5.3	Projected computation of factory overhead	116

5.4	Projected operating expenses of KJFR	118
5.5	Other expenses	119
5.6	Income tax	120
5.7	Income tax payable	120
5.8	Total project cost	120
5.9	Pre – operating cash flow statement of KJFR	121
6.0	Working capital of KJFR	122
6.1	Current ratio	123
6.2	Quick ratio	124
6.3	Receivable turnover	124
6.4	Number of days sales in receivables	125
6.5	Finished goods inventory	125
6.6	Equity ratio	126
6.7	Debt ratio	126
6.8	Equity – debt ratio	127
6.9	Debt – equity ratio	127
7.0	Gross margin rate	128
7.1	Profit margin rate	128
7.2	Return of investment	129
7.3	Return of total assets	129
7.4	Return on owner's equity	130
7.5	Operating expense ratio	130
7.6	Ratio of return on sales	131

7.7	Fixed assets turnover	131
7.8	Assets turnover rate	132
7.9	Annual cash flow	132
8.0	Payback period	133
8.1	Break even analysis	133
8.2	Projected gross sales	135
8.3	Projected sales discount and net sales	135
8.4	Projected cash sales and sales on account	136
8.5	Projected bad debts expense	136
8.6	Projected accumulated allowance for doubtful accounts	137
8.7	Projected collection from sales	137
8.8	Projected accounts receivable – end	138
8.9	Summary of annual administrative expense	138
9.0	Summary of annual indirect labor expense	139
9.1	Summary of annual Direct Labor Expense	139
9.2	Depreciation expense of company truck	140
9.3	Book value/accumulated depreciation of company truck	140
9.4	Depreciation expense of factory machineries and equipment	141
9.5	Book value/accumulated depreciation of factory machineries	141
9.6	Depreciation expense of factory equipment	143

9.7	auxiliary machineries and equipment	142
9.8	Depreciation expense of factory furniture and fixture	143
9.9	Book value/accumulated depreciation of factory furniture and fixture	143
10.0	Depreciation expense of office equipment	144
10.1	Book value/accumulated depreciation of office equipment	144
10.2	Depreciation expense of office furniture and fixtures	145
10.3	Book value/accumulated depreciation of office furniture and fixtures	145
10.4	Depreciation expense of office tools and utensils	146
10.5	Book value/accumulated depreciation of office tools and utensils	146
10.6	Depreciation expense of factory building	147
10.7	Book value/accumulated depreciation of factory building	147
10.8	Amortization/organization cost	148
10.9	Utilities expense – electricity and water	149
11.0	Utilities expense – gas and fuel	149
11.1	Utilities expense – telephone	150
11.2	Projected marketing and promotions expense	150
11.3	Projected office tools and utensils expense	151
11.4	Projected janitorial supplies expense	151
11.5	Projected uniforms expense	152
11.6	Projected miscellaneous expense	152

11.7	Projected repair and maintenance expense	153
11.8	Projected taxes, licenses and permit expense	153
11.9	Projected representation expense	154
12.0	Projected cost of direct materials of KJFR per mt	154
12.1	Projected cost of indirect materials	155
12.2	Direct materials to be use by KJFR- sodium sulfite	155
12.3	Direct materials to be used by KJFR – glycerine	156
12.4	Direct materials to be used by KJFR - DI- H ₂ O	156
12.5	Direct materials to be used by KJFR – feather	157
12.6	Indirect materials to be used by KJFR – sacks	157
12.7	Summary of direct and indirect materials inventories (Php)	158
12.8	Payment of purchase of KJFR	159
12.9	Cash disbursement for purchases of KJFR	159
13.0	Projected cost of goods manufactured	160
13.1	Finished goods inventory	160
13.2	Cost of goods sold	161
13.3	Projected income statement of KJFR	162
13.4	Cash disbursement for income tax	164
13.5	Cash flow statement	164
13.6	Projected balance sheet of KJFR	166
13.7	Projected liabilities and owner' equity	160

LIST OF APPENDIX FIGURES

Appendix Figure		Page
1.1	Market share from demand gap, 2008	171
1.2	Market share from demand gap, 2009	171
1.3	Market share from demand gap, 2010	171
1.4	Market share from demand gap, 2011	172
1.5	Market share from demand gap, 2012	172
1.6	Project time table for the feather resin production	173
1.7	Production flow diagram of feather resins	174
1.8	Grinding machine	175
1.9	Oven machine	175
2.0	Pelletizing machine	175
2.1	Automatic bagger	175
2.2	Bag closer machine	176
2.3	Extruder machine	176
2.4	Blending machine	176
2.5	Plant layout	177
2.6	Site development	178
2.7	Organizational chart	179

A PROJECT FEASIBILITY STUDY ON THE MANUFACTURE OF PLASTIC RESINS MADE OF FEATHER 1/2

Jayson A. Soriano

Kennet Jay T. Mine

¹/₂ A feasibility study submitted to the faculty of the Department of Industrial Engineering and Technology, College of Engineering and Information Technology, Cavite State University, Indang, Cavite, in partial fulfillment of the requirements for graduation for the Degree of Bachelor of Science in Industrial Engineering with contribution no. BSIE–2007–2008–011. Prepared under the supervision of Engr. Liza R. Bauyon.

INTRODUCTION

Researches revealed that chicken feathers contain a substance that can be used as resins or raw materials in making plastic products. Such findings gave the authors an idea to do a feasibility study in manufacturing resins made out of feathers.

For every vacuum-packed, shrink-wrapped pound of chicken in the supermarket, a handful of feathers have been left behind somewhere. Chicken feathers do not weigh much, but considering that the U.S. poultry industry produces more than eight billion broiler chickens every year, such volume would accumulate over the years.

Rough estimates put the amount of feather waste generated by the poultry industry between two to three billion pounds per year. Getting rid of those feathers is more difficult than, say, making a few million feather dusters. The feathers are either