

# Market Research Plan for Castor Oil and Derivatives.

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India is the leading supplier of castor oil for various applications in the world market. Almost three lakh tonnes of castor oil are being exported from India every year for the last several years consistently. Also, significant quantities of castor oil derivatives are being exported to various countries around the world. Castor oil is a commodity of agricultural origin and has very large number of applications in various industrial sectors and consumer products.

A large industrial corporation is eyeing this agricultural commodity market and plans to set up a manufacturing facility for making the derivatives of castor oil. To take the appropriate decision, the company has proposed to carry out a market research to estimate the global market for castor oil and derivatives. In this exploratory market research the company intends to estimate total global demand for castor oil and also identify the major derivatives of castor oil in terms of volume as well as value. This market research plan has been presented in the following pages.

## Castor Oil and Derivatives

Before going into the details of research design for market estimation of castor oil, it is important to understand the nature of product under consideration, its various derivatives and also their diverse applications.

Castor oil is obtained from the seeds of the castor plant, which are cultivated as a crop. The oil contains mainly the triglycerides of ricinoleic acid - a straight chain fatty acid with 18 carbon atoms, two double bonds and one hydroxyl group. The presence of this unique fatty acid gives special significance to castor oil. Many specialized applications of castor oil are based on this ricinoleic acid and its unique chemistry.

Castor oil is used directly in many applications as well as in the form of various derivatives. In the old days (and even today) it is used

as purgative and for lighting lamps. Many high technology products are made from castor oil. A few select companies using patented processes make these high technology products. Castor oil finds applications in nylon, plasticizers, soaps, lubricants, rubber treatment, and also serves as a replacement for mineral oil. The major applications of castor oil and its derivatives may be summarized as follows -

**Foods** - castor oil esters, viscosity reducing agents, conjugated fatty acids, medium chain triglycerides

**Cosmetics** - castor oil, castor oil esters, castor wax, emulsifiers, undecylenic acid, deodorant, medium chain triglycerides

**Perfumes** - heptaldehyde, heptanoic acid, heptyl alcohol, ethyl heptoate, heptyl acetate, undecylenic acid, undecylenic aldehyde,

**Pharmaceuticals** - castor oil, glycerine, hydrogenated castor oil, undecylenic acid, zinc undecylenate, calcium undecylenate, enanthic anhydride

**Textiles** - surfactants, pigment wetting agents, auxiliaries

**Paper** - defoamers, waxes, waterproofing agents

**Rubber and Plastics** - polyols, coupling agents, plasticizers, processing aids, nylon-11

**Electronics and Telecommunications** - castor oil, castor oil esters, polyurethane systems, polyamide resins, polyols, waxes for cable jelly, capacitor fluids

**Paints, Inks and Adhesives** - castor oil, glycerine, dehydrated castor oil (DCO), DCO fatty acids, ricinoleic acid, dimer acids, polyols, alkyd resins, polyamides, wetting and dispersing agents, water-thinnable resins

**Lubricants** - blown castor oil, castor oil esters, hydrogenated castor oil, ricinoleic acid, 12-hydroxystearic acid, methyl 12-hydroxystearate, dimer acid, heptanoic acid, sebacic acid, polyol esters, hydroxyamide waxes, metallic salts. Castor oil meal, i.e., the cake remaining after the oil extraction, is used as manure in agriculture.

The grades of castor oil and major derivatives of castor oil may be listed as follows. However, this list is not exhaustive.

1. Castor oil, general grade
2. Castor oil, medicinal grade (IP)
3. Blown castor oil
4. Dehydrated castor oil (DCO)
5. Dehydrated castor oil fatty acids (DCO fatty acids)
6. Hydrogenated castor oil (HCO)
7. Hydrogenated castor oil fatty acids (12-Hydroxystearic acid) and esters
8. Azelaic acid
9. Sebacic acid
10. Heptanoic acid and esters
11. Heptaldehyde
12. Dimer acids
13. Undecylenic acid and its salts
14. Ricinoleic acid

It should be noted here that these listed derivatives are mainly primary and secondary derivatives. These are further converted to tertiary and even quaternary derivatives for use in various applications. In the following study, for the sake of simplicity, only the above-mentioned grades and derivatives are considered.

Out of these castor oil grades and derivatives, in some cases, the same manufacturers produce several of these derivatives. In case of India, there may not be any producers of some derivatives, while for others, the technology may be available but a commercial plant may not have been set up due to the requirement of large capital and / or significant foreign competition. For the present market research, an attempt has been made to cover the representative cross-section of these manufacturers.

## Market Research Process

Market (marketing) research is the systematic and objective search for and analysis of information relevant to the identification and solution

of any problem in the field of marketing. The Board of Directors of the American Marketing Association has approved the following definition of marketing research - "Marketing research is the function which links the consumer, customer, and public to the marketer through information - information used to identify and define marketing opportunities and problems; generate, refine, and evaluate marketing actions; monitor marketing performance; and improve understanding of marketing as a process. " Marketing research specifies the information required to address these issues; designs the method for collecting information; manages and implements the data collection process; analyzes the results; and communicates the findings and their implications.

Thus, in market (marketing) research systematic approach and objectivity is of vital importance. The research should also be thorough. Of course, the thoroughness with which the research is conducted depends on the nature of the problem to be researched.

The market research for the products under consideration is of exploratory type and not decisional research.

The research process consists of a number of interrelated steps listed below -

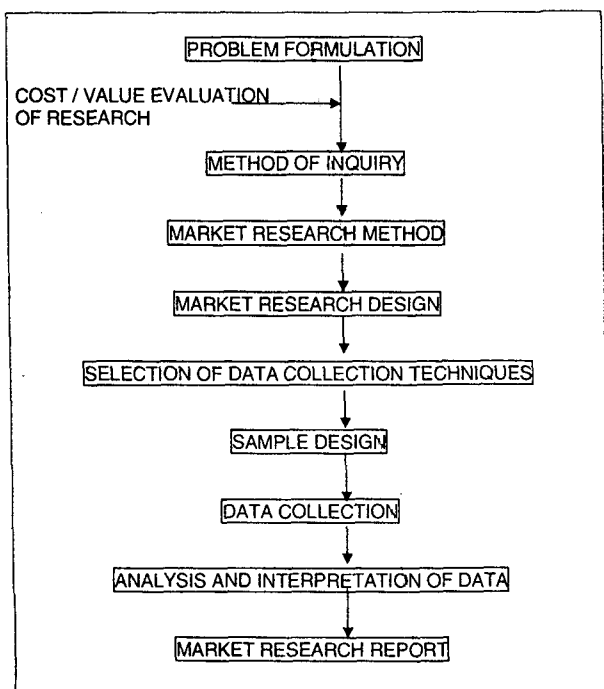
1. Problem formulation
2. Cost / Value evaluation of research
3. Method of inquiry
4. Market research method
5. Market research design
6. Select data collection techniques
7. Sample design
8. Data collection
9. Analysis and interpretation of data
10. Market research report

These market research process steps are shown schematically in Fig. 1.

Although these steps are listed in a particular order, in actual practice, some of the steps may be performed simultaneously.

It should be noted here that the market research process steps encompass all types of market researches. However, for a particular market research problem, the actual steps necessary may be less, i.e., all the steps listed above may not be

applicable. This is especially true for industrial market research, i.e., market research for industrial products.



**Fig 1. Market research process flow diagram**

In the following pages, the market research plan for estimation of castor oil market has been presented on the lines of the above steps.

### Problem Formulation

In market research, problem formulation is the most important step. The problem definition should be specific. If the problem is not formulated appropriately, then the market research process may go haywire and the investment in it will be wasted. The definition of problem should be very clear and the specifics of the problem as well as the expected outcome of the respective research for the problem must be thoroughly checked before going ahead with the market research. Thus, the problem formulation should be so in-depth that the expected outcome or data tables should be apparent at this step only. The market researcher should be able to draw up a list of contents of the final market research report even before starting the data collection in the market research.

As stated earlier, the overall objective of the present market survey is to estimate the global market size for castor oil and derivatives. At the end of the study, the company needs to have the market

volume and value of castor oil directly as well as those of its major derivatives listed above. Based on the resultant analysis, the company should be able to identify the major derivatives of castor oil, which offer significant benefit in the global market. After identifying such derivatives, the company can then carry out detailed market study of these derivatives and select some of them for production. Also, the outcome of this report may be used for guiding the research and development of the selected products at the company's research department. Thus, the market research will be exploratory type.

This market research is necessary due to the fact that there has been a significant decline in the consumption of castor oil during the last year the world over. This is evident from the declining exports of castor oil from India, in spite of sluggish supply from the competing countries of Brazil and China. Therefore, it has become necessary to carry out this exploratory market research to identify the major consuming sectors and derivatives of castor oil before commissioning a detailed market study of the significant derivatives in which the company intends to diversify.

### Cost / value Evaluation of Research

The cost and value evaluation of a market research is crucial. It has to be clearly defined before the actual market research is carried out. The cost of market research should be justified by the value of the benefits of the results obtained through the research. The market research should add value to the decision to be taken. There may be differences of opinion about whether the cost / value evaluation decision should be made using only experience, judgment, and existing knowledge or whether the decision should be delayed until the research is completed. The net expected payoff of market research is defined as the difference between the expected value of the additional information and the expected cost of acquiring it. Compared with determining the value of information, determining the cost of acquisition is relatively simple.

In many industrial market research cases, the value of the market research is very apparent and a separate, detailed cost / value evaluation is not necessary. The cost of market research is not very significant as compared to the amount of investments that are dependent on the results of the market research.

The value of the market research on castor oil will be significant considering the use of results of this market research. The company will ultimately decide where and how the investments will be allocated to maximize profits in shortest possible time. It will be used to take key decision on investment in new products development and their production facilities. The investments will be of the order of several tens of crores of Rupees. While the cost of carrying out this market research will be at the most a few lakhs of Rupees. Thus, the expenses of the market research are worthwhile and are justifiable. The results of the market research will be useful in avoiding potential losses.

The actual cost of carrying out market research may be classified into two types - operational and creative. Operational costs are those involved in implementing the project itself and include the items such as cost of mailing questionnaires, traveling, interviewing, and printing of research materials. Creative costs are those related to planning the project and include the items such as problem formulation, research design, sample selection, and analysis of the collected data. Operational costs can be determined easily since they are the direct costs, i.e., the costs that are incurred only because the project is undertaken. However, the creative costs involve cost categories that are more or less joint in nature, and to attach them to a specific project requires an allocation procedure. For example, the research personnel carrying out the research design etc. may be handling other market research projects as well and their salaries etc. may have to be loaded to all these different projects proportionately. The total cost of the market research project should include all direct and allocated joint costs.

In the present study, the secondary data will be collected through several sources, which may require some fund allocation. The mailing or faxing of questionnaires and traveling for interviewing selected contacts in India will require significant amount of funds. The producers of castor oil and its derivatives are mostly located in the states of Gujarat, Maharashtra and Andhra Pradesh. Therefore, an attempt will be made to select the contacts for interview from this region only.

The time frame for the intended market research will be about three to four months. The collection of secondary data will take up at least three to four weeks. Preparation of questionnaire and

selection of contact list will take about one to two weeks after that. To carry out the interviews within India and to get answers from foreign companies through emails or faxes will take up at least three weeks. Collating and interpreting the data collected should be finished in another two to three weeks. Preparation and finalization of report will require about two weeks.

## Method of Inquiry

Method of inquiry is either objective, subjective or Bayesian, i.e., a mixture of objective and subjective types. The fourth type is phenomenology. They follow the same steps - formulating a problem, developing a hypothesis, making predictions based on the hypothesis, devising a test of the hypothesis, conducting the test, and analyzing the test results. However, there are differences in the way in which the steps are performed and in the underlying assumptions of behavior. The method of inquiry resulting in the greatest degree of investigator independence is that of phenomenology. The difference between this and the other three methods of inquiry is with respect to the role of the explanatory hypothesis. The phenomenalist is opposed to the use of explanatory hypotheses. Hypotheses represent preconditioned ideas of the phenomenon and, as such, are viewed as leading to selective perception and distortion of measurement. Although there is no one universally accepted "method" as such, the following four steps are recognized as representative of the approach of phenomenology - suspension of prior conceptions, description of the phenomenon, determination of universal elements, and apprehending of relationships. This method of inquiry is analogous to what many researchers call a "fishing expedition" without knowing anything about the body of water. Some marketing research involves characteristics of this method; since the problem may represent desiring to know something that no one knows anything about.

Since the present market research is for industrial products, the method of inquiry will be of objective type. However, it is understood that there is some element of phenomenology, i.e., some unknown factor affecting the market may come up during the study and the researcher should look out for any sign of such factor.

Which is the appropriate method of inquiry for a research problem depends mainly on the na-

ture of the problem and the extent or level of existing knowledge.

The data to be collected for the present study may be divided into two types - primary and secondary. For obtaining the primary data, direct methods, such as interview and questionnaire will be required. The secondary data will be collected through published and publicly available sources.

At first, i.e., in the beginning of the study, secondary data, such as published production data, import-export data, etc. will be collected from various sources. Even the tentative list of contacts to be made for collecting the primary data will be evolved through this secondary data collected.

The primary data is to be collected from the end-users, producers and dealers or traders of the products. In the present study, the primary data collection will be required to be done for obtaining the production and consumption as well as trading data from the respective organizations and persons dealing in those products using questionnaires and / or interviews (mostly face to face). The personnel and organizations to be interviewed will be selected from the lists generated through secondary data collected for various products, derivatives of castor oil. The selection of samples and sample size will be decided depending on the quantities produced of those products / derivatives, the number of producers of those products and the geographical proximity to the city from which the study is to be undertaken.

## Market Research Method

In most market research cases, two main market research methodologies can be used - experimental and non-experimental research. The major difference between the two methodologies lies in the control of extraneous variables and manipulation of at least one variable by the intervention of the investigator in experimental research. In non-experimental research, there is no intervention beyond that needed for purposes of measurement.

The research method involved in this market study will be non-experimental. That is, no experiments will be carried out to collect the data on different variables affecting the market for castor oil and its derivatives. Only the past trends will be recorded through factual data and future projections will be sought from the interviewees based on their

experience in the market and industry.

## Market Research Design

A market research design is defined as the specification of methods and procedures for acquiring the information needed. It is a plan or organizing framework for doing the study and collecting the data. It is the overall operational pattern or framework of the project that stipulates what information is to be collected, from which sources, and by what procedures. A good market research design ensures that the information obtained is relevant to the research problem and it is collected by objective and economical procedures. Market research design can be described as a series of advance decisions that, taken together, form a specific master plan or model for the conduct of the investigation. Market research design may be divided into three classes as exploratory, descriptive and causal.

The major purpose of exploratory studies are the identification of problems, the more precise formulation of problems (including the identification of relevant variables), and the formulation of new alternative courses of action. An exploratory survey is generally the first in a series of projects that culminate in one concerned with the drawing of inferences that are used as the basis of management action. That is, an exploratory study is often used as an introductory phase of a larger study and results are used in developing specific techniques for the larger study. The design of exploratory research is characterized by a great amount of flexibility and ad hoc versatility. However, in exploratory research there are three distinct stages - (a) search of secondary information sources, (b) interviews with persons who are knowledgeable about the subject area being explored, and (c) the examination of analogous situations.

Market research, which is concerned with describing market characteristics and functions is called as descriptive study. These studies often involve the description of the extent of the association between two or more variables. Descriptive research, in contrast to exploratory research, is marked by the prior formulation of specific research questions.

Market research aimed at investigating the causes of a particular effect or occurrence is called as causal study. If the causes of the effects one

wants to predict are understood, the ability of both to predict and to control these effects is almost invariably improved.

The market research problem under consideration is of exploratory type. Therefore, the market research design for castor oil and derivatives may include the following steps -

- ✦ Desk research - to collect the secondary data required for the study
- ✦ Evaluation of the data collected by desk research
- ✦ Define the data required to be collected through primary data collection
- ✦ Select the sample size and actual organizations / persons to be contacted for interviews
- ✦ Design the questionnaires for various castor oil derivatives
- ✦ Conduct a pilot study of selected samples
- ✦ Evaluate the data collected and modify the questionnaire if needed
- ✦ Collect the primary data from all the selected respondents
- ✦ Collating the primary data collected
- ✦ Analyzing and interpreting the collected data
- ✦ Collecting the views of experts and checking the collected data (Delphi)
- ✦ Presenting the findings in the report format

## Data Collection

The data to be collected can be divided into two types as mentioned earlier - primary and secondary. The components of these data to be obtained and their sources are listed below -

### Secondary data

Secondary data is collected from secondary sources, such as published journals, directories, etc. Secondary data collection is a must before collecting the primary data. It can help in defining the information needs from the primary data collection and also supplement it. Mainly, it will help in identifying the sample respondents for obtaining primary data. However, it may sometimes negate the need for collecting the primary data. Secondary data is cheaper, readily available and gives past trends and history of a product and / or market. But it may not be exhaustive.

In the present study of castor oil and derivatives, the following secondary data will be

collected from various sources -

1. Technical information of castor oil and its selected derivatives
2. Applications - especially new - of castor oil and selected derivatives
3. Manufacturers of castor oil and its derivatives in India and other countries
4. Their capacities for various derivatives
5. Financial data of companies - Indian and foreign
6. Technologies used to produce various derivatives
7. Technology providers for castor oil derivatives
8. Plant and equipment suppliers for these products
9. Costs involved in setting up a project for making various castor oil derivatives
10. Production of castor oil and derivatives in the last three to five years
11. Countries producing castor oil and derivatives and their past trends
12. End-use pattern of castor oil and its derivatives
13. Imports and exports data of castor oil and derivatives
14. Importers and exporters in India and abroad
15. Import and export duty structure and benefits on these products
16. New projects announced and under implementation for making these products
17. Published market projections for castor oil and derivatives
18. Development of technologies for various products in companies and research institutes

The list of sources from which the above secondary data will be collected is presented below -

1. Directories of manufacturers in India and abroad
2. Various websites on internet
3. Directories of plant and equipment suppliers
4. Directories and databases of technology suppliers
5. Various encyclopedia and compendiums
6. Published review papers in trade journals
7. News reports in various newspapers and periodicals - Directly or through CD
8. Technical and commercial libraries at Pune and Mumbai
9. Important Chambers of commerce
10. Consulates and high commissions of major countries
11. Industry associations
12. Old market research reports prepared by other

- agencies
13. Government publications especially for the import-export data of Customs
  14. Full details of importers and exporters from private data supply agencies

All the secondary data collected from the above sources will be collated and studied thoroughly to identify the gaps in information and also for contradictory information.

Even though an attempt will be made to collect all the above data through desk research, all of it may not be available from the secondary sources. In case some information is not obtained from secondary sources, it will be obtained through questionnaire while collecting primary data.

### Primary data

Primary data, such as production, raw material requirements, exports, prices, etc. will be collected through a questionnaire. Producers, users, traders of castor oil and its derivatives under consideration will be asked to fill the questionnaire. Due to diverse nature of castor oil derivatives under study, there will be some variation in the questions to be asked of the interviewees. However, the basic structure of the questionnaire will remain the same.

The Indian interviewees will be contacted and interviewed face to face, while the international organizations will be contacted through email or fax to obtain information required through the questionnaire. The basic questionnaire design will be as follows -

### The Questionnaire

Name of the responding person and designation

Name of the Company

Address - Office and Factory (if any)

Telephone

Fax

Email

Products manufactured

Technologies used for these products

Production data for the last three to five years

Sale prices of these products - current and past three to five years

End uses of the products sold and their usage pattern

Future trends in the usage of these products

Products exported - quantities, prices and destinations, future projections for exports

Castor oil quantities and quality used as raw material

What are projections for the next three and five years for these products?

What are the growth rates of these products' markets - current and future?

What are the factors that affect the markets for these products? Past, present and future

What are the market sizes for the products manufactured?

What are your market shares?

Which are the leading companies in these products and other castor oil derivatives?

What are the industry trends? - Growing, Declining, Stagnant or Cyclical

What is the scope for a new entrant in castor oil derivatives business?

What are the investment requirements for such a business?

The list of contacts or interviewees will be drawn from the secondary data collected in desk research phase of this study. The first seven derivatives (including castor oil) are manufactured by a large number of producers while the other seven derivatives are specialty chemicals and are produced by a very few companies in India as well as worldwide. Therefore, for the first seven derivatives, the interviewees will be selected from the list available through secondary data. But for the second seven derivatives, all the reported producers will

be contacted and interviewed for the primary data required. Thus, the present survey will be of mixed type, for some products or derivatives, sample survey will be conducted while for the specialty derivatives a census survey will be carried out.

In the first phase of the study, a pilot survey of selected contacts will be carried out. After interviewing some of the selected contacts and collecting their data, all this information is collated and studied to identify any left out information. The questionnaire is modified accordingly to collect the complete data, in case any information is missing. Then further interviews will be conducted as per the modified questionnaire.

When all the interviews are over, the information contained in the responses will be collated together and analyzed.

After preparation of summary of findings, a few selected experts in the area of castor oil and derivatives will be contacted to verify and crosscheck these findings.

## Analysis and Interpretation

The collected data has to be consolidated, tabulated and edited before analyzing it. The data can be analyzed using different techniques, e.g., statistical techniques. The types of analyses that can be performed are a function of sampling procedures, measurement instruments, and data collection techniques used. Therefore, it is imperative that the techniques of analysis be selected prior to data collection.

The data collected will be collated to get overall view of the castor oil and derivatives market. The usage pattern of castor oil and its derivatives will be arrived at considering the responses from all these interviewees. The views of all the contacts and the experts will be studied and the status of current market as well as future projections for castor oil and its various derivatives will be arrived at.

The past trends in these products will be plotted on graph so as to enable future projections by trapolation. Extrapolation is the simplest technique of forecasting. It assumes that the market conditions will remain the same or stable as in the past.

Some of these products will be correlated

with their respective industry sectors and future projections by correlation will be attempted for these products. The industry sectors in which these derivatives are used will be taken into consideration.

Past trends in castor seed production are useful in projecting the future supply of castor oil. Correlation of castor production with monsoon, as well as production of groundnut will also be carried out to obtain accurate projections.

Any comments noted during interviews will be noted separately and studied to evaluate the truthfulness of them.

## Market Research Report Presentation

Any research must culminate into a research report. All the steps that have been carried out, the data collected, their analysis and interpretation, the conclusions as well as recommendations for courses of action are included in the market research report. These facets of market research should be presented in the report in sufficient detail, with clarity, accuracy and honesty. Two critical attributes of a market research report are that it provides all the information initiators of the research need using language they understand (i.e., completeness) and that at the same time the researcher must be selective in what is included (i.e., conciseness). These attributes, i.e., completeness and conciseness, are often in conflict with each other. The selection of information should be such that it should not jeopardize the completeness of the report. To avoid the conflict, two approaches have been recommended. One approach involves presenting two different reports - a technical report that emphasizes the methods used and derlying assumptions, and presents the findings in a detailed manner, and a popular report that minimizes technical details and emphasizes simplicity. The second approach is concerned with how the report is communicated. The report may be presented in typical written form and / or communicated to the management in the form of an audio-visual presentation.

Market research reports on industrial products, especially chemical products are generally prepared in detail - including the technical as well as the comercial findings. A brief summary of the findings and conclusions and recommendations is included as Executive Summary



in a separate chapter - generally the second one of the report. In addition to this written report, a brief audio-visual presentation is also given to the management at the time of submission of the report.

The findings of the market research will be presented in a report format. The report will broadly have the following contents -

**TITLE : GLOBAL MARKET SURVEY ON CASTOR OIL AND DERIVATIVES**

Chapter 1 : **INTRODUCTION**  
Origin of Castor Oil Market Study  
Problem Definition  
Scope of study  
Methodology

Chapter 2 : **EXECUTIVE SUMMARY**  
Summary of Findings  
Conclusions and  
Recommendations

Chapter 3 : **CASTOR OIL AND ITS DERIVATIVES**  
Castor Oil - Composition and Chemistry  
Applications of Castor oil  
Derivatives of Castor oil and their Applications  
Technologies Available  
New Developments

Chapter 4 : **INDIAN MARKET FOR CASTOR OIL AND DERIVATIVES**  
Overview  
Castor Oil - Producers and Production  
Castor Oil Derivatives - Producers and Production  
Castor Oil and Derivatives - Usage Pattern and Trends  
Imports and Exports of Castor oil and Derivatives  
Analysis and Future Prospects

Chapter 5 : **GLOBAL MARKET FOR CASTOR OIL AND DERIVATIVES**  
Overview  
Producers of Castor Oil and Derivatives  
Production Trends  
Usage Patterns of Castor Oil and Derivatives  
Global Trade in Castor oil and Derivatives  
Analysis and Future Prospects

APPENDIX 1 - List of Contacts  
APPENDIX 2 - Major End-Users of Castor Oil  
APPENDIX 3 - Major End-Users of Various Castor Oil Derivatives



Dr. Ajit Joshi, a Doctorate of Technology of Oils, Fats & Waxes from the UDCT (1992), has rich experience in Market Research for chemicals and also expertise in perfumes and cosmetic formulation. He has authored about 100 research and techno-commercial papers in various journal and also one chapter in a book. He was the Journal Secretary of Bombay Technologist for four years (1988-92). Currently he is Manager (Market Research), in Deepak Nitrite Ltd., Pune.