CHAPTER 2 - REVIEW OF LITERATURE

2.1. Introduction

The literature has been reviewed for reputed journals of both national and international journals pertaining to Packaging and related issues. The literatures have also been reviewed from text books, magazines and websites.

2.2 History of Packaging and Food packaging

Steel Can Recycling Information Bureau (2006) (SCROB) says that millions of years ago folks sought after for food and ate it immediately. Shortly they understood that they can maintain their food longer if they secured it. Thus from animal skins, leaves, coconut shells the journey of packaging material grew and as the men advanced the newer packaging material came to existence.

Kenneth R Berger (2002) states that there are excellent packaging resolutions for every requirement of the products. Although packages are frequently taken for approved, they are the consequence of several years of Improvements.

Sara J Risch (2009) summarizes that food packaging has progressed from basically a container like device to contain food that can play a vigorous responsibility in maintaining food value. Packaging has approved right of entry to numerous foods year around that otherwise might not be conserved. Various packaging has produced novel group in the supermarket for example microwave, popcorn, fresh cut produce, etc.

Packaging.com (2005) details an approximate chronology of advances of Packaging from > 20,000 years ago up to the 20th Century

Design board (2012) one of the subsidiary of Procter and Gamble in Belgium describes packaging as the result of a long development process. The article also summarises the function of packaging, how packaging keeps step with our changing lifestyles, myths and reality itself
Paula Hook and Joe E (2006) Heimlich briefs a review of more popular packaging development and states that a assortment of powers will be mandatory to generate the packages of the expectations.

Anon (2006) briefs about succession of the most vital progress in packaging ever since 1000 years.

2.3 The Packaging Market

Alice Louw & Michelle Kimber (2004) found that in most recent times packaging has urbanized on form away from its unique role as simply a way of product security and currently plays a vital promotion responsibility in building upon shelf appeal, giving product information and creating trademark representation and alertness. As the responsibility of packaging in the marketing mix achieves impetus, research, progress or modernization this area turns out to be more and more imperative.

An Overview by MCG India (2009) indicates the Global packaging market as US $ 480 Bn and Asian Packaging market as US $121 Bn . India is one of the top 5 country in Asian packaging Market world packaging industry growing at a rate 3-5 pa. The packaging sector is likely to grow

A survey conducted by Indo- Italian Chamber of commerce and industry (2008) summarizes the classification of Packaging Industry in India and states that with the growing middle income group of people and increasing revenue level, the outlines of utilization are bound to alter and there would be the consumption of branded products. Flexible packaging finds a diverse utilization for the reason that its strength to provide resistance to moisture and oxygen, preserve odour etc. There is a tremendous growth in flexible packaging

Ghalla Bhansali Stock Brokers Pvt. Ltd (2009) States that for the Packaging Industry FMCG segment is the major consumer of packaging materials. Quite a lot of improvements
are far-reaching from corner to corner of the packaging industry. Packaging is used as a way of distinguishing the manufactured goods in the marketplace.

Packaging today.com (2002) details about the history of plastics which emerged in the prewar period and could not come to use until after the war for example acrylic, polyethylene etc

Trend and growth of the plastic industry (2003) smallb In describing the evolution of packaging, global and Indian trends in packaging

Wikipedia, (2004) the free encyclopedia, states that India has observed a considerable expansion in the utilization of plastics and the growth grew exponentially in 1990’s. Between 2000 and 2030 the consumption will amplify approximately six times.

CIPET (2007) states that India has made significant progress in packaging. On the buying power uniformity basis the country is likely to be positioned at number three by the twist of this decade of this decade. The requirement of plastic will come out as one of the best ever emerging market

CIPET (2009) states that still with the existing universal deceleration, Indian petrochemical requirement is expected to explain strong. Liberalization of business guidelines and lesser tax facilitated the local industry to fight with the international petrochemical industry.

NIIR Board (2010) in this book explains the methods and procedure at the back of the packaging of diverse precise products which are used in everyday living.

A bulletin released by World Packaging Organisation (2009) states that international packaging industry can donate to a great extent to amplify wealth and sustainability in the human race by certifying that generously proportioned quantities of food reach more consumers, conserved in a method that ends in enhanced quality and lesser losses.
Nerlita M Manalili, Moises A Dorado and Robert Van Otterdijk (2011) states in their study conducted for the international congress that Packaging sector across developing regions is limited to meet international market requirement, however there are great potential for development.

2.4 Flexible packaging Market

UFLEX Ltd (2009) indicates that Flexible packaging is fast replacing rigid packaging owing to superior qualities at competitive price. Estimated growth is 20%.

Erin Hoppe (2009) found that the reputation of flexible packaging and film for packaging is mainly based on the several scientific advances that have been over and done with in the field. Presently there are diverse film materials, a variety of forms of modern progression and know-how. Innovative Packaging method have been urbanized to increase the shelf-life and flexible film works excellently for these new systems.

Shailesh Sheth (2010) states that India’s retail industry is organized growing phenomenally. Packaging plays a vital role in this industry. Today, there are many products that use flexible packaging. The largest user of flexible packaging is the food and beverage industry. One area in which flexible packaging industry can be of great help to the government is in reducing the wastage of food.

A PCI report (2011) indicates India as a land of opportunity as she is poised for huge growth within the retail sector. Within Indian Cities retailing is expected to expand. Presently only 5% of food is packaged, with the expansion of retailing there is opportunity for flexible packaging industry to grow enormously.

Positive packaging Industries Ltd (2009) made presentation at the flexible packaging Symposium on 2009 that 80% of the packaging consumed by 20% of the population and 80% of the population has access to only 20% of packaging. Per capita expenditure of packaging in
India is 9 US$ as against world average of 74 US$. The packaging industry is growing at 12%. The trend is bulk to retail, conventional to the new system

The report (2007) summarizes the polymer consumption in India and growth driver of polymer consumption in packaging.

The study conducted by CRISIL (2005) indicates the opportunity and benefits of plastics in India and suggests a road map for various stakeholders.

An equity report from Paper products Ltd (2012) indicates that there is a strong demand in the Indian Packaging Industry for flexible materials and the growth rate of the packaging industry is estimated at the rate of 15% per annum.

PCI Films Consulting Ltd (2011) indicates in their report the total demand for flexible packaging in India approach $ 3 Billion representing 5% of world flexible packaging. The growth rate of 2015 in the flexible industry is estimated at 15% per annum.

In the paper presented at the India Packaging Show (2006) indicates the world flexible demand versus the Indian flexible demand. The current Indian capacity and the future trends are also indicated. It also indicates the new opportunities in India for flexible packaging converters.

The report by Paper products Ltd (2012) indicates the steady state demand from the consumer staple industry and there is a growing popularity of flexible packaging over rigid packaging.

The article published in Paper, film and foil converters association journal (2010) for functionality states that there is a strong demand for flexible packaging because of the low cost of material and production and the broad range of applications. They are replacing the rigid containers.
2.5 Packaging Technology Trends & Developments, Innovations, Sustainable packaging etc.

Kelly Kovack and Larry Paul (2010) states that Eco-Friendly packaging will Continue as fast growing trends.

A book on Plastic in packaging (2003) indicates that if plastics are used wisely and thoughtfully, they should not cause any discarding and environmental difficulty.

Bobst Group At Pack Age (2010) conference on trends has pointed out that packaging expenditure of a regular Indian is expected to grow up fourfold by 2025.

India Packaging show (2010) Glaxo Smithklen presented a paper which indicates that in case of food trend is towards convenience features such as easy to handle easy to carry ready to eat etc and in case of pharma anti counterfeit features are the trends.

India Packaging show (2010) Amit Ray President & CEO UFLEX Ltd. presented a paper which indicates that the shift in trend as seen in the last 3 decades is from rigid packaging to flexible packaging and the trend is also towards convenience feature in packaging.

Neil farmer (2008) States that innovation in packaging have given a great deal. Major developments are barrier technology, oxygen scavenger technology, special coating, smart/intelligent packaging, active packaging, nano technology etc.

M/s CavinKare (2009) explains packaging as a game changer and explains consumer demand is for a reduction in cost and not in value.

Pradeep Sardana (2006) explains modern packaging trend in retail and supply chain management. He also explains how the packaging is a marketing tool and consumer demand for trouble-free packaging to handle, to store, to consume and to dispose type of packaging.
Veena Mathur (2006) explains the importance of packaging in food retail and the emerging trend is shifting from loose to pack, rigid to flexible, commodity products are packed and there are new technologies in food packaging like nitrogen flushing, active packaging, intelligent packaging etc.

V Pathak, Z F Bhat, S Bukhari, S K Kotwal and R R Kumar (2005) states the reason that the delicate nature of the meat product Packaging of meat and meat produces has forever been difficult. Contemporary meat packaging know-how struggles to improve the food security and superiority in as accepted technique as much as possible.

Report submitted by Klockner Pentaplast (2003) of America Inc. explains about high barrier films used for unit dose packaging which is latest, cost efficient, with improved performance.

David Gibson (2004) reports that to supply packaging material to the pharmaceutical industry with superior barrier properties, lot of improved properties can be supplemented to PVC or other polymer substrates that will give protection against high moisture. With the introduction of new drug delivery system, the prerequisite for supplementary barrier properties has been increasing progressively.

UFLEX Ltd (2008) states that recent trends is a flexible packaging need to be is a barrier, shelf appeal and functionality.

A paper published by WPO (April 17, 2008) states that purposeful and suitable packaging are the pathways to pursue in budding markets. Moreover the pakaging need to be active and smart in order to have an appropriate e business.

Export bulletin no 4 published from the International Trade Centre (2012) states trend is towards lightweight packaging material, gusseted pouch, packaging material with an improved
heat seal, single serve packaging, materials with improved barrier properties active packaging systems etc.

A book on Plastics in Food packaging (2003) The article details about the intelligent and smart packaging technology and applications

P Suppakul, J Miltz, K Sonneveld, S W Bigger (2003) states that market demand is towards an active packaging system and antimicrobial migrating and non migrating system

Semih otles, Buket Yalcin (2008) explains that intelligent and smart packaging systems are innovative technology. This technology has been developed to widen shelf life, develop eminence, improve protection and give information.

Aaron L Brody (2003) states nano composites appears to be capable of converting plastic into super barrier material, which is essential in food packaging.

Andrew H Dent (2011) states that there is a number of starch based plastics accessible for packaging purposes. Novel minimum packaging benefits the environment business success etc.
A report by Plumat (2003) indicates that the proportion of plastic containers on the market for primary packaging is growing and the percentage of parental filled with glass bottles is declining.

S Natarajan, M. Govindrajan, B. Kumar (2009) in their book have mentioned the importance of packaging and packaging materials and have also indicated that the package must be customer educative conforming to statutory needs and features the functional design and evolution of packages.
Stanley Sacharow(1999) have mentioned in their book the packaging development, value of packaging materials and the economics and future of packaging.

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**Walter Soroka (1999)** has detailed in their book the evolution of new packaging roles, packaging in the 20th century and the modern packaging industry.

**Joseph F. Hanlon, Robert J Kelsey, (1999)** has given a brief about the packaging functions, packaging materials, and innovations in plastic materials.

**Ron Goddard (1998)** has given information on the use of packaging materials and their selection.

**G.Bureau ,J L Multan (1995)** presents a comprehensive background on the development of packages and the packaging system for food.

**A.S Athalye (1992)** describes the different plastics used in the field of packaging.

**Colourtone Aries (2012)** highlights some of the trends emerging in the field of packaging.

**A Emblem (2012)** discuss fundamental issues relating to packaging such as its role in society and its divers function, environmental and marketing issues. Principal packaging materials and packaging process, packaging machinery are also discussed.

**J P Kerry (2012)** provides a comprehensive review of current and emerging technologies for the effective and packaging of muscle food, developments in packaging system.

**K L Yam (2012)** reviews advances in packaging materials, and packaging systems, process etc.

**Laurette Hoover (2006)** observes that presently a relentless change from rigid structure packaging to flexible substrates packaging in the food packaging sector.
ACG Worldwide (2011) presents benefits of unit packaging system, Blister Package, developments and materials used

NIIR Board (2012) features in this book the packaging material for processed food, complete explanation of food packaging and preservation of the food for a long time

WPO publication details (2008) about the progression of packaging demands, trends, development in packaging material etc

World Packaging Oranisation publication details (2008) the full fledged development of packages for seniors and disabled people, food safety and reassurance.

World Packaging Oranisation (2009) states that novelty, extension of knowledge and transmit of knowledge are vital essentials in packaging progress and packaging would have the benefit of an enhanced status if the factual performance of packaging with respect to the general public, finances and the atmosphere were understood better

World Packaging Oranisation (2009) gives guideline for packaging and food safety in the changing market demands.

Prof.dr.ir.Peter Ragaert (2010) states in his presentation trends in food packaging innovation towards functionality resources and bio-plastics.

Aaaron L Brody, Betty Bugusu, (2008) presents a general idea of most recent innovation in food packaging and an existing and up-and-coming advance in active and intelligent packaging

CDF Corporation reports (2007) that the chemical industry has long been a target of health officials’ environment groups and the trade organizations. The hazardous composition of chemicals has provoked these groups to promote alternative consumer friendly solutions.

John Yuva (2003) points the environment and authoritarian problems disturbing packaging. The problems require being well thought-out with out of the country packaging and regarding the upcoming inclinations.

UFLEX (2009) explains in their presentation regarding packaging innovation.

Pradeep Tyle (2011) states in his presentation a flexible packaging is the most significant sector of the packaging industry and it stand for the outlook of the packaging industry owing to its benefit, cost-efficiency and sustainability.

Giulio Ghisolfi (2010) presents in his presentation the main trends in packaging namely brand packaging, retro packaging convenience packaging, active smart sustainable and aseptic packaging.


N Farmer (2009) has reviewed significant advances that had taken place in packaging material and technologies in the international market.

2.6 Bio degradable packaging material

Gerald Scott (2002) discusses about various degradable polymers which are he need of the next generation.

Girish Bhat (2010) summarises that there is a requirement for specific resins conveying precise properties to the flexible packaging to offer most excellent quality and enhance shelf
appeal. Next generation film can facilitate the film converters deal with confronts connected to film life appeal concurrently.

Catia Bastioli (2005) has compiled various articles on biodegradable polymers

Aristippos Gennadios (2002) has compiled information on films and coatings from renewable biopolymers

Prof. S.P. Gautam (2009) has discussed on production of bio-degradable polymers in India with an emphasis on the manufacturing technologies and on the environment issues.

M Kolybaba, L.G. Tabil, (2003) provides a brief outline in the area of a biodegradable polymer, development, the scientific theory behind these materials etc.


Sriman (2011) discusses about the biopolymers types, properties, application and the perspective.

2.7 Sustainable packaging

Colourtone Aries (2012) highlights demands from marketers from such sustainable, environment and functional packaging.

R S Ramkumar (2011) presented the importance of sustainable packaging. He has also discussed about principles of sustainable packaging.

World Packaging Oranisation (2009) explains the principles for how packaging can support a sustainable society and how they can be applied in practice.

Sustainable packaging alliance (2002) reviews on sustainable packaging research and initiatives.


The article by CDF Corporation (2012) focuses on Innovative solutions that reduce cost while improving a company's carbon footprint.


Breit technologies (2008) focus on the Packaging Sustainability that has improved its wakefulness since all garbage comes from packaging.

2.8 waste management and recycling

Francesco La Mantiahas (2002) compiled articles based on the current state of the art recycling of post consumer plastic material and on the advantages and disadvantages of these recycling processes.

Nabil Mustafa (1993) has detailed about plastic waste management

World Packaging Oranisation (2009) gives background about life cycle assessment, Eco labeling and environmental performance of packaging

Kenneth Marsh and Betty Bugusu (2007) states packaging know-how must equilibrium food security and other problems such as power and material cost, common and ecological awareness and severe directives and clearance of civic solid squander