Poultry is used as a synonymous to chicken as they are more commonly found and are of great importance for meat and eggs. It acts as a key supplement to revenue from crops and other livestock enterprises, avoiding over dependency on traditional commodities with inconsistent prices. Poultry contributes to improved human nutrition and food security by being a leading source of high quality protein in the form of eggs and meat. Today poultry is a major source of meat in India. The total meat consumption is around 28 percent, which was 14 percent ten years ago. It has outpaced its two competitors – beef and veal, and buffalo meat. Through export of poultry products to neighboring countries it has a high potential in foreign exchange earnings (Lisa et.al., 2015).

Consumption of poultry meat and poultry meat products is increasing all over the world (Mielnik et.al., 2002). Chicken is one of India’s preferred non-vegetarian protein sources. Diets are changing in favour of products of animal origin. Considering India’s economy, the livestock sector is an important component in terms of income, employment and foreign exchange earnings. India has livestock population of 470 million, including 205 million cattle and 90 million buffalos. Processing of meat products is licensed under Meat Food Products Order. By more than 55 percent, the global demand for meat is predicted to rise between 1997 and 2020, reaching 455 million tons by 2050 (Alexandratos & Bruinsma 2012).

Demand for poultry primarily chicken which constitutes more than 90 percent of market value, is fuelled by similar economic factors (Ravindran, 2013). Worldwide, the poultry meat production increased from 9 million tons in 1960 to 105 million tons in 2012 (Speedy, 2003; FAOSTAT, 2012). As per capita incomes rises and urban families live in smaller units, the demand for processed meat products can be quickly cooked has been rising. Most of the production of meat and meat products continues to be in unorganized sector (Sateesh et.al., 2015).
Meat is a semi-solid medium that is high in protein and low in sugar, (Labadie, 1999). Indian Council of Medical Research (ICMR) has recommended daily allowance of meat as 34 grams per day. In India the per capita meat consumption is as low as 14 grams per day. According to Anthropological Survey of Indian study, more than 80 percent of Indian population is non vegetarian. The per capita consumption of meat is expected to increase in India by 2050 from its current level of 3.1 kg to up to 18 kg of which 12.5 kg would be chicken (Alexandratos & Bruinsma, 2012). The demand and consumption for poultry products in the country could further increase due to recent attempts to ban calf slaughter and beef products by some state governments of India (Rashid, 2015).

Meat preservation can be grouped into three broad categories based on control by moisture, by temperature and, more directly, by inhibitory processes (such as bactericidal and bacteriostatic), although a particular method of preservation involve antimicrobial principles. The control step is regarded as a hurdle against the microbial proliferation, and combinations of processes called hurdle technology (HT) can be devised to achieve specific objectives in terms of both microbial and organoleptic quality (Lawrie & Ledward, 2006).

Meat functionality has increased in relative importance especially because of the key role in determining the sensory quality of ready-to-eat products with increasing trends in further processing (Fletcher, 2002). The major poultry meat quality attributes determine the consumer's decision to purchase fresh meat products are appearance, texture, juiciness, flavour, colour, juiciness, flavor, functionality and texture/tenderness. Within these attributes, colour is the most important factor at the moment of purchasing (Aberle et.al., 2001). According to Wilkins et.al., (2000), the lack of uniformity of colour is considered as a negative aspect of chicken meat quality as colour differences would reduce product acceptability.

The main sensorial attributes that determine the global acceptability is tenderness and meat colour which is associated with acceptability at purchase (Bressan & Beraquet, 2002; Sanders et.al., 1997). In processing plants of many
countries a wide range of chicken breast fillet colours from very pale to very dark extremes was found (Quaio et al., 2001). Ph value can be considered as a valuable indicator for the quality assessment of meat. Living muscle has a pH value of 7.0 - 7.1 and more, after slaughter, muscle pH of scale relatively quickly, so after 12 to 24 hours reached a level of 5.4 to 5.6, up at a pH of 6.2, the meat is considered to be of high quality, but at a level of 6.2 to 6.7, its value decreases, because at a pH above 6.7 will not be consumable (Vacaru-Opris & col, 2004).

Chicken meat is an extremely sensitive food compared with other commodities during storage. Therefore, the producers traditionally focus on new preservation techniques (Gennadios et al., 1997; Maskat and Kerr, 2004). To capture the consumer demands, edible coating which is a biodegradable material is chosen to be eaten as a part of food material without any side effects by the food industries (Sathivel et al., 2005). Edible coating restrict oxygen permeability, solute movement and act a good barrier to moisture when it is applied to the surface of the product (Mchugh et al., 2000).

Whey proteins are versatile constituent of whey because of their excellent functional and nutritional properties (Huffman, 1996; Jayaprakasha & Brueckner, 1999). Rich & Foegeding (2000) indicated that by the addition of ribose or lactose, the sugars inhibit heat-induced aggregation of proteins with increased peak denaturation temperature of whey protein isolate (WPI) solutions.

Sorbitol is a sugar alcohol which is chemically unreactive and very stable. It does not participate in Maillard browning reactions and can withstand high temperatures (Nezzal, 2009). The mechanisms of sugars to stabilize proteins includes the promotion of preferential hydration facilitated by an increased surface tension of water during freezing, preservation of the native conformation through direct interaction between sugars and polar residues in the protein surface during drying, strengthening of hydrophobic interaction during heating (Yoo & Lee 1993).
Vacuum packaging is accomplished by evacuating the air from the package and ensuring that it continues not to possess an atmosphere prior to heat sealing. In the process of vacuum packaging, a pressure differential exists between the exterior and interior package. For fresh meat, vacuum packaging has proven to be efficient in preserving the sensory parameters inherent to the product for sufficiently long period for its turnover. The vacuum packaging has been most widely used in the institutional market for the distribution of whole pieces of the established meat packaging systems (Sarantópoulos et.al., 2011).

Vacuum packaged meats are quite stable at low temperatures (Labadie, 1999). The meat packaged with films that are highly permeable to oxygen has shelf life of approximately one week, while the vacuum-packaged meat has around 3 to 12 weeks when stored at 0°C (Egan et.al., 1983).

It requires freezing for preventing the growth of psychrotrophic bacteria (Holley et.al., 2005). In vacuum packaging, the meats suffered temperature abuse in processing and storage was initially detected with gas production or "blown pack" type deterioration (Hanna et.al., 1979). The long shelf life of vacuum packaged or modified atmospheric packaged meats allow the population of *L. monocytogenes* to reach unacceptable concentrations to more than 100 CFU/g. For chilled vacuum packed foods including cooked meats require temperature control regulations and must be stored and displayed at or below 8°C in retail premises (Food Hygiene, 2006).

The type of material used in the package and the initial gas mixture used influences atmospheres within the product. Some materials allow diffusion of gases in/or out of the package during storage whereas the films which are fully permeable, the atmosphere inside the pack becomes the same as the air outside. Packs for Modified Atmospheric Packaging (MAP) and vacuum packaging (VP) are made from one or more polymers which includes polyvinylchloride (PVC), polyethylene terephthalate (PET), polyethylene (PE), and polypropylene (PP) depending on the characteristics desired for the final use.
Introduction

Efforts must be made to ensure that the product does not become contaminated before final packaging or the shelf life should be reduced so that recontamination does not result in the growth of the organism to high numbers. When specifying the shelf life of the product, the performance of the proposed distribution chain should be taken into account (Chilled Food Association, 1993) and considering the refrigeration storage temperatures which will vary at pre distribution locations, retail premises, and a the consumer’s home.

Need of the Study

Technologies that increase food shelf life have become increasingly important due to the need of supplying safe products to final consumers including packaging. Therefore, products with consistent quality and safety standards should be offered to the consumers to maintain this market position. Storage and preservation methods must be improved in order to keep our competitiveness and expansion in the chicken meat market by supplying meat with adequate quality standards, long shelf life and widely accepted by the consumers.

Considering the influence of packaging on extending the shelf life of meat, the objective of the study was to evolve the best combination of packaging method, packaging material and the storage temperature to preserve the product quality and to determine the shelf life of the chicken under frozen and refrigerated storage. An evaluation of the use of whey protein isolate and whey protein concentrate with sorbitol directly on the food surface as edible coating is also part of this study.

Objectives of the Study

Meat and packaging industry must continue to work on systems that will ensure safe and palatable products. Based on the criteria, the study was undertaken with the following objectives;

- Study the physico-chemical properties of chicken and physical properties of selected packaging materials low density polyethylene (LDPE) of different thickness viz., 50, 62.5 and 80µm (200,250 and 300 gauge).
Optimize the suitable packaging material and storage temperature for extending the shelf life of chicken in vacuum packaging.

- Analyze the effect of edible coating (whey protein isolate, whey protein concentrate and sorbitol) on quality of chicken during storage.

- Sensory analysis of the cooked chicken, microbial load and the nutritional value of chicken before and after storage.

- Work out the cost effectiveness of vacuum packaged chicken.

**Hypothesis**

Based on the above objectives the following hypothesis has been framed.

- There is a significant effect on edible coating (whey protein isolate, whey protein concentrate and sorbitol) on the quality of chicken during storage.

- There is a significant effect on shelf life of chicken by optimizing suitable packaging material and storage temperature.