Script

TOMATO PRODUCTS

Hello,,,,,,, welcome to the presentation on the topic entitled “Tomato Products” This episode consist of five divisions they are

1. **Origin of Tomato**
2. **Nutrients of tomato**
3. **Tomato Processing**
4. **Processed Tomato Products and**
5. **Market Potential**

1. Origin of Tomato

Many of today's most common and delicious dishes can be traced back to ancient times and to the exchange of food plants between the Old and New World. The tomato is a native of the lower Andes, cultivated by the Aztecs in Mexico. The Aztec word, 'tomato' means simply "plump fruit" and the Spanish called it "tomate". The tomato, along with maize (corn), potatoes, chilli peppers and sweet potatoes was introduced to Spain in the early sixteenth century with the voyages of Columbus. The tomato probably arrived first in Seville, a major centre of international trade, especially with Italy. In 1544, the Italian herbalist Mattioli referred to the yellow fruits of the tomato plant as the golden apple, and later, in 1554, he mentioned a red variety. Dodoens, a Dutch herbalist, gave a

detailed description in 1554 and the fruit earned a reputation as an aphrodisiac. Also thetomato explains as 'pomme d'amour' in French, 'pomodoro' in Italian and the 'love apple' in English. During 1692 Spanish-style published Neapolitan recipe, for 'tomato sauce. The transformation from herbal to a common culinary ingredient began slowly in the 1700's. National and international dietary guidelines recommend as healthy diet as an increased consumption of fruits and vegetables so that we eat at least five servings a day. Tomatoes are fabulous fruits for a quick, healthy, nutritious snack or as part of a creative recipe.

2. Nutrients of tomato

Tomato is a rich source of minerals, vitamins, organic acid, essential amino acids and dietary fibers. Tomato is known as productive as well as protective food. It is a rich source of vitamin A, vitamin C and folate, it also contains minerals like iron, phosphorus.Tomato contains Lycopene and Beta-carotene pigments.It is also believed that it gives protection from or reduces the risk of contracting chronic degenerative diseases. Tomato is the principal source of lycopene in our diet. It had been found to be a significant potent antioxidant with a quenching rate constant on singlet oxygen almost twice as high as that of ß-carotene. Regular consumption of tomato in our diet could provide protection against a broad range of epithelial cancers and cardiovascular diseases. The consumers are sensitive to health and diet, thus food product processors had provided an opportunity to enlarge the tomato processing industry and

established a market for pharmaceutical grade, thereby an added value to tomato production was generated.

Tomatoes are also the most important source in the diet of a red pigment called lycopene, which has antioxidant properties and may be anticarcinogenic. Higher plasma lycopene levels are associated with reduced incidence of some cancers, especially prostate cancer. Uptake into the body depends on the type of product consumed. Lycopene uptake into the blood plasma is significantly higher when derived from heat processed tomato products than when the same amount is eaten as fresh tomatoes. Likewise, the bioavailability of the lycopene from heat-processed tomato juice is greater than from raw tomato juice.

Tomato is also a key role for the carotenoid diet in human. The improvement in quality of tomato attributes, towards the contents of antioxidants, and various health factors related to this fruit or vegetable need to be seriously considered. A higher level of antioxidant in the factory grade for fruit is desired during the processing for higher preservation of antioxidant activity.

3. Tomato Processing

There is a constant demand for tomato processing usually arises to preserve the tomato products for home use inclusion in stews, soups, curries etc out of season or to add value for extra income. Traditionally, the most important methods for tomato processing used are concentration (to a paste or purée) and drying either fruit pieces or to a powder. These methods remain the most

suitable processes for many people to use and form the bulk of this brief. In addition you will find information for making ketchup, chutney, leather, juice and tomato jam. It should be noted that high quality 'salad' tomatoes have the highest value when sold fresh and in good condition. These would not normally be used for processing, unless for home use to save excess at the height of the season.

3.1. Raw material quality

Tomatoes qualities are an important to process tomato products, the tomatoes should be ripe, red, firm to soft, free of all mould growth (by cutting out infected parts) and free of stems, leaves, dirt and other soils. The under-ripe fruit can be left to ripen and used at a later date. It is less important ifthe tomatoes have surface blemishes or splits or cracks as in mostprocesses they will be cut or pulped.

3.2. Drying

Traditional methods in hot, dry regions include sun drying. Tomatoes are halved and either placed on a clean flat surface with the cut side facing up or threaded onto strings which hang in the sun from a branch or beam. In both cases, drying is relatively rapid which depending on the temperature and humidity of the air, but there may be contamination of the product by insects, dirt and dust. This can be reduced by covering the tomatoes with fine muslin cloth or mosquito netting. The end product is dark, red, leathery pieces with a strong tomato

flavour. Re-hydration of the dried tomatoes is relatively slow, but this may not be important in cooking applications. Provided that the humidity is low, the dried product will keep without special packaging for several months. If the humidity rises the product will go mouldy and should be protected, either by suitable packaging e.g. sealed plastic bags - preferably polypropylene or thick polythene - or in sealed pottery jars. Alternatively, the pieces can be dried slowly over a fire to allow moisture content. It is important that the tomatoes are far enough away from the fire since pieces will be fully dried when they are hard and brittle.

3.3. Preparation of tomato pulp

Tomato pulp can be prepared using a pestle and mortar, some types of mill, a hand held mouli machine or a small pulping machine. It is usually necessary to remove the seeds and skins which can be done by sieving through a medium mesh (eg 1-2mm holes) or, in the case of pulpers, skin parts are separated by the machine. The pulp can be used for a number of differentproducts to make a concentrated puree or paste, jam, juice or fruit leather. Tomato pulp can be boiled to evaporate the water. Depending on how much water is removed andwhat other ingredients are mixed into the pulp, it is possible to make a variety of products.

Tomatoes are consumed either fresh or as processed products.Tomato processing method is very important to preserve for long time. The large and

small industrial units are engaged in processing of tomato in various forms at a using temperature gradient of 70 °C to isolate peel and seed from pulp.

There are many methods of tomato processing involving engineering and technological means.

3.4. **Cold pulping process;** A process called **cold pulping** is one important method to remove pulp with affecting on tomato seeds. **This method** is an ample scope of exploring the ways to establish a machine which may operate under normal temperatures to isolate pulp; seed and skin (peel) from fresh tomato crop avoiding heating activity. The machine parameters, such as the size of rollers, roller surface, flat and serrated, variation in clearances and rotational speed should maintainfor proper experimentation of cold pulping of tomato. The crop parameters such as variety, ripeness to redness, size of fruit, physiochemical characteristics, etc.Green agriculture is another factor commanding and demanding endeavor to develop such amachine which could extract pulp under normal temperature conditions and be able to avoidseed rupture during processing activity, thus saving seed viability. Also the machine sodevelop may increase pulping rate and percentage by efficiently removing peel during theextracting and spinning process.

3.5. High Pressure Processing

Another new technological method, High Pressure Processing (HPP), it is a non-thermal food processing technology that allows tomato-based products with a longer shelf-life and safer, preserving nutrients, fresh taste and appearance. On this sector of vegetable-derived products, the pressure range used is between 65,267 psi and 87,000 psi over 1 to 5 min, at refrigerated or room temperature. Regarding to a physico-chemical effect on food, the High Pressure Processing technology is softer than a thermal treatment: it does not break or create covalent bonds, and does not create new compounds by molecule degradation, such as in a conventional thermal process. However, High Pressure Processing is able to break, or create, weak bonds like hydrophobic and electrostatic interactions;therefore only macromolecules such as proteins and polysaccharides are present in this technique. It allows microorganism inactivation without modifying the food nutritional quality and without significantly altering enzymatic activities. To minimize the growth of residual microorganism, the enzymatic reactions and changes in sensory attributes, tomato products must be stored at chilled temperature.

There are many reasons that make the High Pressure Processing technology beneficial:

- Safer food products with a longer shelf-life with the inactivation of vegetative microorganisms like bacteria, yeasts and molds.

- Sensory food quality is maintained, keeping the fresh-like taste of homemade products.
- Nutritional quality is preserved.
- This process permits removal of chemical preservatives.

3.6. Tomato Acidity

Although tomatoes are considered a high-acid food ie pH below 4.6, certain conditions and varieties can produce tomatoes and tomato products with pH values above 4.6. When this happens, the product must be canned in a pressure canner as a low-acid product or acidified to a pH of 4.6 or lower with lemon juice or citric acid.

Research has found several conditions that can reduce the acidity of tomatoes. These include decay or damage caused by bruise, cracks, blossom end rot or insects, and over ripening. Tomatoes grown in the shade, ripened in shorter hours of daylight, or ripened off the vine tend to be lower in acidity than those ripened in direct sunlight on the vine. Also, tomatoes attached to dead vines at harvest are considerably less acidic than tomatoes harvested from healthy vines. Decayed or damaged tomatoes and those harvested from frost-killed or dead vines should **not** be home canned.

To ensure safe acidity in whole, crushed or juiced tomatoes, add lemon juice or citric acid when processing in a boiling water bath. Add 2 tablespoons of bottled lemon juice or 1/2 teaspoon of citric acid per quart of tomatoes. For pints, use 1

tablespoon bottled lemon juice or qurter teaspoon citric acid. Acid can be added directly to the jars before filling with product. Add sugar to offset the taste, if desired. Four table spoons of 5 percent acidity vinegar per quarter can be used instead of lemon juice or citric acid. However, vinegar may cause undesirable flavor changes.

4. **Processed Tomato Products**

Tomato is a valuable raw material used for processed products such as juice, puree, paste, ketchup or sauce, and canned whole. Among these products puree, juice, ketchup are commonly used commodities in households, hotels and restaurants. These items are used to enhance the taste of different foodproducts. Tomato puree is used as a substitute of fresh tomato in cooking. Ketchup is a sweeter and diluted version of puree. Tomato sauce tastes sweet and sour. Both sauce and ketchupare consumed with food and snacks.

Process Carefully to Avoid Spoilage

The most common reasons for spoilage in home-canned tomato products are under processing and incomplete seals. Tomatoes that have not been processed long enough to destroy molds and heat-resistant bacteria may spoil during storage. One of the common spoilage organisms, ***Bacillus coagulans***, is very heat resistant and causes flat-sour spoilage. The jar lid may still be sealed and the product may appear normal, but the tomatoes will smell sour because of

lactic acid produced by the growth of *B. coagulans* in the product. Never use tomatoes or tomato juices with off-odors.

Molds can grow on the surface of improperly processed tomato products and may eventually reduce the acidity to a point where botulism-producing spores can grow and produce a deadly toxin. Because even minute amounts of botulism toxin can cause fatal illness, discard without tasting any canned products that show mold growth on the surface. Discard them where they cannot be eaten by other people or animals.

The processing times in this fact sheet are designed to ensure sufficient destruction of bacteria and molds. Where appropriate processing recommendations for both water bath and pressure canning are given. In general, a pressure canner results in higher quality and more nutritious canned tomato products.

Preparation of tomato products

Tomato Juice

Fully ripe well developed colour tomatoes are washed, trimmed, steamed, crushed in a crusher or cut into pieces with knives. The crushed pieces are heated in the steam jacketed kettle till they become quite soften. The heated tomatoes are passed through the pulping machine using a fine mesh sieve to separate juice from seeds and the skin. The sugar and salt @ 1% is added and

heated to 85-90ºC. The hot juice is then filled in bottles, sealed immediately and processed sterlised in boiling water for about 30 minutes and cooled.

Tomato Puree

The juice obtained as above is concentrated under vacuum to about 9% to 12% total solids so as to get tomato puree. The product is filled in bottles, crown corked and processed in boiling water for 30 min. and cooled.

Tomato Ketchup

The juice obtained as above is concentrated with spices, salt, sugar, etc. The spices like cloves, cardamom, pepper, cinnamon and other ingredients etc. are tied loosely in a muslin cloth and placed in boiling juice in steam Jacketed Kettle. The sugar, salt and vinegar or acetic acid, etc. are added later on.

Generally concentration is done threefold.

It is concentrated to 28 to 30% solids in which 12% are tomato solids.

The final product could be preserved by addition of sodium benzoate @ 750 ppm.

The tomato ketchup is filled hot into clean, dry bottles, crown corked and processed in boiling water for 30 minutes and cooled at room temperature.

Quality Control and Standards

The manufacture of processed fruits and vegetables is controlled by the Fruit Products Order FPO-1955 of the Govt. of India. The Fruit Products Order, 1955 is mandatory for tomato products.

The FPO specifications are as follows:

i) Tomato Juice: 5% total solids.

ii) Tomato Puree: 9% total solids. Sodium Benzoate 250 ppm

iii) Tomato Ketchup: 25% total solids. Acidity: 1.0% Sodium Benzoate: 750 ppm

The Bureau of Indian Standards has laid down the following specifications for tomato products:

i) Tomato Juice: IS:3881 : 1966.

ii) Tomato Ketchup: IS:3882:1966.

iii) Tomato Puree: IS: 3883:1966.

5. MARKET POTENTIAL

Due to increasing standards of living in the cities and the rapid urbanization taking place in the rural areas, consumption of tomato based products is expected to go up steadily. At present, the market of ketchup or pureeespecially in the urban areas is dominated by brands likes MEGGI and KISSAN. Some Medium and Small Companies are also engaged in its production. Estimated production of puree, Sauce, Ketchup in North India was around 12000 MT in

2005. The estimated demand for the products for the same period was 10000 MT which is expected to grow up to 20000 MT by 2020 AD.Thus there is ample scope for a unit to come up in this product sector to cater especially to the semi urban and rural sectors of India. Tomato processing in India is still not very significant. Recently, there was a steady rise in production due to the entry of multinationals with better market infrastructure and sales promotion campaigns. With high fluctuation in market prices of fresh tomatoes in the urban market, there are good prospects for tomato juice and tomato puree in place of fresh tomatoes in household sector. Besides the boom in the food service sector including fast food chain, has widened the demand potential for tomato ketchup and soups. Experiments have shown that advertisement and publicity have influenced the pattern of consumption of tomato products. Besides, tomato products have good export potential especially in the Middle East.

Import Trends

Recent Trends in Processed Tomato Product Imports, in 1999, total imports of processed tomato products up 193,082 tons. Among these, imports oftomato puree and tomato paste increased 98,794 tons.A look at trends in imports in the medium term shows that imports of processed tomato products havebeen steadily raising in recent years. By product, tomato puree and tomato paste account for 50 to 60% of theimports with the remainder consisting of tomato

ketchup, tomato juice, etc. The liberalization of tomatopuree and tomato paste in 1972 led to a drop in domestic production of processing use tomatoes and adecline in production of fresh tomato juice using domestic ingredients, fresh tomato directly juiced. At thepresent time, the majority of the processed tomato products are made using imported intermediateingredients such as tomato puree and tomato paste.

Conclusion

Tomato is one of the most commonly utilizing vegetable in daily food products around the world. It contains special nutrient values enriched with different minerals, vitamins, organic acid, essential amino acids and dietary fibers. It is a rich source of vitamin A, vitamin C and folate, it also contains minerals like iron, phosphorus.Tomato contains Lycopene and Beta-carotene pigments.Tomato processing is very important step in the preparation of tomato products because tomato product should be able to keep for long time. Traditionally, the most important methods used are concentration to a paste or purée and drying either fruit pieces or to a powder.Processed tomato can be used for processed products such as juice, puree, and paste, ketchup or sauce, and canned whole. Among these products puree, juice, ketchup are commonly used commodities in households, hotels and restaurants. Due to increasing standards of living in the cities and the rapid urbanization taking place in the rural areas, consumption of tomato based products is expected to go up steadily.