

**BHARATH COLLEGE OF SCIENCE AND MANAGEMENT**  
**PG AND RESEARCH**  
**DEPARTMENT OF NUTRITION AND DIETETICS**

SUBJECT NAME : BASIC FOOD PROCESSING AND PRESERVATION

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## UNIT – 5

### SUGAR CONCENTRATE

#### SUGAR WAX CONCENTRATE

Sugar concentrates are becoming ever popular due to their strength and purity. Bear labs has perfected the concentrate game with their outstandingly potent sugar wax. The concentrate produces a motivating buzz and uplifting high that's not to be missed. All sugar wax concentrates by bear labs contain amazing terpene profiles. The high is always smooth smoke that expresses hints of lemon, orange, undertones of sour cherry and fuel.

Bear labs has cannabinoid content that consistently goes over 75 percent. Independently tested by licensed labs, the concentrate passes through an ethical extraction process that assures quality and quality and safety that meet market standards.

Bear labs sugar wax cannabis concentrate high analgesic and anti-inflammatory effects. Its actually known to have beneficial healthy effects on the body.

#### PRINCIPLES OF GEL FORMATION

Gel formation is produced by the fruit relationship between pectin, water in the fruit, and sugar, under a controlled pH (less than 3.5) in the presence of sugar.

Normally fruit used for making jams and jellies has a low PH. Acid stabilizes the relation between pectin and sugar.

#### MECHANISM OF FORMATION OF PECTIN GELS

The most commonly accepted theory of gel formation is that the mechanism of jellying involves stacking of polysaccharide chains to form junction zones. For gel formation sugar, acid, water pectin must be present. Protons of the acid shift the equilibrium between ionized and unionized groups.

Added sugar further decreases the hydration of pectin by competing for water, there by lowering. Hence water is less free to solvate the polysaccharide and so there is increased. Finally when cooled the unstable dispersion of hydrated pectin form gel.

## **SUGAR**

Sugar is necessary for formation of pectin gels and must be present in minimum concentration. Most jellies are made with 65% of sugar. If amount is increased above 65% crystallization tends to occur on jellies surface and occasionally even with in the jelly.

## **CHEMICAL PRESERVATIVES**

Chemical food preservatives are substances which under certain conditions, either delay the growth of microorganisms without necessarily destroying them or prevent deterioration of quality during manufacture and distribution.

Interfere with the cell membranes of microorganisms,

Their enzyme activity or then genetic mechanisms.

## **PRESERVATIVES MAY ALSO SERVE**

- As antioxidants
- As stabilizers
- Firming agents
- As moisture retainers
- Chemicals that function to preserve the food are generally added after that food has been processed and before it is packaged.
- Different chemical preservatives are used, which involves
- Traditional chemical food preservatives
- Sugar
- Salt
- Acidulants
- Benzoic acid
- Sorbic acid
- Lactic acid
- Gaseous chemical food preservatives/leavening agents
- Sulphur dioxide and sulphites
- Carbondioxide

## **ROLE OF FOOD PRESERVATION**

### **DEFINITION**

Food preservatives play a vital role in preventing deterioration of food, protecting against spoilage from mold, yeast, life-threatening botulism and other organisms that can cause food poisoning .By extension, preservatives reduce food cost , improve convenience, lengthen shelf life and reduce food waste.

### **IMPORTANCE OF FOOD PRESERVATION**

Elimination of micropes

Increasing shelf life of food

Making seasonal fruits available to them throughout the year

Adding variety to the diet

Saving time and energy

Improving nutritional value of foods

Controlling prices

### **PICKLES**

Pickles are easy to prepare with right ingredients and can be preserved for months. pickles serve as a flavor enhancer and consumed typically in small quantities along with usual meal.They add to palatability of a meal, aid in digestion and are good appetizers.

There are a wide variety of different pickles made and each is usually made with a mixture of fruits or vegetables which are chopped and immersed in a liquid (often oil or lemon juice) and a variety of different spices and salt. Varieties of pickles include, pickles from lemon, mango, amla, ginger, green chilly, mix vegetables , cucumber, cabbage , garlic, carrot and sometimes fish, prawns, eggs or meat etc.

### **PH**

Most pectic products do not form jellies until PH is lowered to 3.5. The firmness of jellies increases as PH , the amount of pectin required is very less and satisfactory gel still formed.

## **FERMENTATION**

Fermentation is any metabolic process in which microorganisms activity creates a desirable change in food and beverages, whether its increasing flavor, preserving food stuffs, providing health benefits or more. The word ferment comes from the latin word fevere.

### **FERMENTATION WORK**

Microorganism survive using carbohydrates ( sugars, such as glucose) for energy and fuel.

Organic chemicals like adenosine triphosphate deliver that energy to every part of a cell when needed.

Microbes generate ATP using respiration. Aerobic respiration , which requires oxygen , is the most efficient way to do that.

Glycolysis where glucose is converted into pyruvic acid. Fermentation is similar to anaerobic respiration- the kind that takes place when there is not enough oxygen present.

Fermentation leads to the production of different organic molecules like lactic acid , which also leads to ATP , unlike respiration , which uses pyruvic acid.

Depending upon environmental conditions , individual cells and microbes  
Have the ability to switch between the two different modes of energy production.

Organisms commonly obtain energy anaerobically through fermentation, but some systems use sulphate as the final electron acceptor in the electron transport chain.

### **FERMENTATION PROCESS**

Fermentation occurs in the absence of oxygen (anaerobic conditions ) , and in the presence of beneficial microorganisms (yeast, molds and bacteria) that obtain their energy through fermentation.

If enough sugar is available, some yeast cells, such as *saccharomyces cerevisiae*, prefer fermentation to aerobic even when oxygen is abundant.

During the fermentation process, these beneficial microbes break down sugars and starches into alcohols and acids, making food more nutritious and preserving it so people can store it for longer periods of time without it spoiling.

Fermentation products provide enzymes necessary for digestion. this is important because humans are born with a finite number of enzymes, and they decrease with age .Fermented foods contain the enzymes, and they decrease with age. Fermented foods contain the enzymes required to break them down.

Fermentation also aids in pre-digestion. During the fermentation process, the microbes feed on sugars and starches, breaking down food before anyone even consumed it.

## **ADVANTAGES OF FERMENTATION**

Fermented foods are rich in probiotics, beneficial microorganisms that help maintain a healthy gut so it can extract nutrients from food.

Probiotics aid the immune system because the gut produces antibiotic, anti- tumor , anti- viral, and antifungal substances, and pathogens donot do well in the acidic environment fermented foods create.

Fermentation also helps neutralize anti-nutrients like phytic acid, which occurs in grains, nuts, seeds, and legumes and can cause mineral deficiencies.

Phytates also make starches , proteins , and fats less digestible , so neutralizing them is extremely beneficial.

Fermentation can increase the vitamins and minerals in food and make them more available for absorption.

Fermentation can increases B and C vitamins and enhances folic acid, riboflavin, niacin ,thiamine and biotin.

The prebiotics enzymes , and lactic acid in fermented foods facilitate the absorption of these vitamins and minerals into the body.

## **WINE MAKING**

There are five basic stages to the wine making process which begins with harvesting or pickling. After the harvest ,the grapes are taken into a winery and prepared for primary ferment .At this stage red wine making diverges from white wine making .

Red wine is made from the must of red or black grapes fermentation occurs together with the grape skins, which give the wine its colour. white wine is made by pressing crushed grapes to extract a juice the skins are removed and play no further role. Occasionally

whitewine is made from red grapes. This is done by extracting their juice with minimal contact with the grapes skins are removed. Rose wines are either made from red grapes where the juice is allowed to stay in contact with the dark skins long enough to pick up a pinkish colour or by blending red wine with white wine. White and rose wines extract little of the tannins contained in the skins.

To start primary fermentation yeast may be added to the must for red wine or may be added to the must for red wine or may occur naturally as ambient yeast on the grapes on the air. Yeast may be added the juice for white wine. During this fermentation, which often takes between one and two weeks, the yeast convert most of the sugars in two weeks, the yeast converts most of the sugars in the grape juice into ethanol and carbon dioxide. The carbon dioxide is lost to the atmosphere.

After the primary fermentation of red grapes the free run wine is pumped off into tanks and the skins are pressed to extract the remaining juice and wine.

The press wine is blended with the free run wine at the wine makers discretion. the wine is kept warm and the remaining sugars are converted into alcohol and carbon dioxide.

The next process in the making of red wine is malolactic conversion. This is a bacterial process which converts crisp green apple malic acid to soft creamy lactic acid softening the taste of wine.

Red wine is sometimes transferred to oak barrels to mature for a period of weeks or months.

This practice imports oak aromas and some tannin to the wine. The wine must be settled or clarified and adjustments made prior to bottling.

The time from harvest to drinking can vary from a few months for wines to over twenty years for wine of good structure with high levels of acid, tannin or sugar.

Only about 10% of all red and wine 5% of white wine will taste better after five years then it will after just one year.

Depending on varieties on the above procedure exist with the sparkling wines such as champagne an additional, secondary fermentation takes place inside the bottle dissolving trapped carbon dioxide in the wine and creating the characteristic bubbles.

Sweet wines or off dry wines are made by arresting fermentation before all sugar has been converted into ethanol and allowing some residual sugar to remain.

This can be done by chilling the wine and adding Sulphur and other allowable additives to inhibit yeast activity or sterile filtering the wine to remove all yeast and bacteria.

In the case of sweet wines, initial sugar concentrations are increased by harvesting late freezing the grapes to concentrate the sugar allowing or encouraging botrytis cinerea fungus to dehydrate the grapes or allowing the grapes to rot.

The grapes to raisin either on the vine or racks or straw mats. Often in these high sugar concentrations and rising concentration of ethanol retard the yeast activity.

Similar in fortified wines such as port wine high proof neutral grape spirit is added to arrest the ferment and adjust the alcohol content when the desired sugar level has been reached.

In other cases the wine maker may choose to hold back some of the sweet grape wines. Port wine high proof neutral grape spirit is added to arrest the ferment alcohol content when the desired sugar level has been reached.

In cases the wine maker level may choose to hold back some of sweet grape juice and add to the wine after the fermentation is done a technique.

The process produces waste water ,pomace and less the require collection,, treatment ,and disposal or beneficial use.

Synthetic wines , engineered wines or fake wines are a product that do not use grapes at all and start with water and ethanol and then adds acids, amino acids ,sugars, and organic compounds.

## **COMMON FERMENTED FOODS**

- Kefir
- Sauerkraut
- Tempeh
- Natto
- Cheese
- Kombucha
- Miso
- Kimchi



## **BENFFITS OF FERMENTED FOODS**

- Improves digestion
- Increases Immunity
- Restores good bacteria in gut
- Increase vitamin content of food
- The proliferation of lactobacilli in fermented vegetables enhances their digestibility and increases vitamin levels. These beneficial organisms produce numerous helpful enzymes as well as antibiotic and anti carcinogenic substances.
- Their main by product , lactic acid, not only keep vegetables and fruits in a state of perfect preservation but also promotes the growth of healthy flora through the intestine.
- Increased nutrient absorption
- Improved brain function
- Healthy skin
- Fortified immune system
- Easier weight loss
- Reduce risk of some cancers

Idly for example is a fermented food of india which is prepared by steaming a fermented black gram and rice batter .It makes an important contribution to the diet as a source of protein, calories and vitamins especially b complex vitamins, compared to the raw unfermented ingredients.

It can be produced locally and used as a dietary supplement in developing countries to treat people suffering from protein calorie malnutrition and kwashiorkor.

Example: curd , lassi, buttermilk ,dosa , kanji,appams