



AMET
ACADEMY OF MARITIME EDUCATION AND TRAINING
DEEMED TO BE UNIVERSITY
(Under Section 3 of UGC Act 1956)

ACADEMY OF MARITIME EDUCATION AND TRAINING(AMET)

(Declared as Deemed to be University u/s 3 of UGC Act 1956)

135, EAST COAST ROAD, KANATHUR, CHENNAI - 603 112.

TAMILNADU, INDIA

PRESERVATION BY SALT AND SUGAR

A Report on Internship

In

Department of Food Processing Technology

By

KEERTHIKA. S
AFP18001

April 2020



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ACADEMY OF MARITIME EDUCATION AND TRAINING
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(Under Section 3 of UGC Act 1956)

INTERNSHIP ALLOCATION REPORT 2019-20

Name of the Department: Department Of Food Processing Technology

(In view of advisory from the AICTE, internships for the year 2019-20 are offered by the Department itself to facilitate the students to take up required work from their home itself during the lock down period due to COVID-19 outbreak)

Name of the Programme : Bachelor of Technology- Food Processing Technology
Year of study and Batch/Group : 2nd year and III/I
Name of the Mentor : Mrs. Priya Sethuraman
Title of the assigned internship :

EXTRUSION TECHNOLOGY IN FOOD PROCESSING

Nature of Internship : Individual

Reg No of Students who are assigned with this internship:

AFP18008

Total No. of Hours Required to complete the Internship: 48 hours

Signature of the Mentor	Signature of the Internal Examiner	Signature of HoD/Programme Head

Head of the Department (i/c)
Department of Food Processing Technology
ACADEMY OF MARITIME EDUCATION AND TRAINING (AMET)
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Kanathur-603 112, Chennai. INDIA



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INTERNSHIP EVALUATION REPORT 2019-20

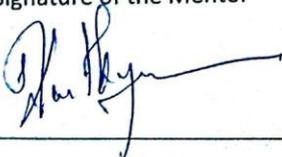
Name of the Department: F.P.T.

(In view of advisory from the AICTE, internships for the year 2019-20 are offered by the Department itself to facilitate the students to take up required work from their home itself during the lock down period due to COVID-19 outbreak)

Name of the Student	<u>KEERTHIKA . S</u>
Register No and Roll No	<u>AFPI8001</u>
Programme of study	<u>B.TECH</u>
Year and Batch/Group	<u>2nd / III</u>
Semester	<u>II / IV / VI / VIII</u>
Title of Internship	<u>PRESERVATION BY SALT AND SUGAR</u>
Duration of Internship	<u>36</u>Hours
Mentor of the Student	<u>Mr. S. KARTHIKEYAN.</u>

Evaluation by the Department

Sl No.	Criterion	Max. Marks	Marks Allotted
1	Regularity in maintenance of the diary.	10	9
2	Adequacy & quality of information recorded	10	9
3	Drawings, sketches and data recorded	10	9
4	Thought process and recording techniques used	5	4
5	Organization of the information	5	4
6	Originality of the Internship Report	20	14
7	Adequacy and purposeful write-up of the Internship Report	10	9
8	Organization, format, drawings, sketches, style, language etc. of the Internship Report	10	9
9	Practical applications, relationships with basic theory and concepts	10	9
10	Presentation Skills	10	9
Total		100	90

Signature of the Mentor 	Signature of the Internal Examiner 	Signature of HoD/Programme Head 
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Head of the Department (i/c)
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ABSTRACT:

Salting as well as sugaring is an old-fashioned curing or fermenting process for preserving fruit, vegetable and meats. This process was very popular food preservation method in the early twentieth century, especially during the 1st and 2nd World Wars. Layering food with salt to preserve seasonal vegetables was promoted as an alternative to canning in order to conserve glass, fuel and metal needed for war effort.

It has been used since ages, salt in higher concentration attracts the available water in the food, this process is called as osmosis. As available of free water increase the growth of microorganism as every living organism needs water to grow and water is also required for chemical and biochemical reaction.

Sugar also provide an indirect form of preservation by serving to accelerate accumulation of antimicrobial compounds from the growth of certain other microbial organisms.

Examples include the conversion of sugar to ethanol in wine by fermentative yeasts or the conversion of sugar to organic acids in sauerkraut by lactic acid bacteria by the process fermentation. Salt or sugar itself doesn't preserve food it undergoes the process called as osmosis which causes dehydration of food help in preserving food.

In this report, I analyse the self-life of cured vegetable and fruits. The sensory evaluation of those fruits and vegetables is also done to know about their organoleptic properties.

INTRODUCTION:

Food preservation refers to any technique which involves in preventing food from spoilage including microbial or enzymatic or by the other physical activity. There are several techniques that helps to preserve food from spoilage including pasteurization, curing, canning, smoking, pickling, irradiation, smoking, addition of chemical etc.

Curing is any of assorted food preservation and flavouring processes of foods like meat, fish and vegetables, by the addition of salt or sugar, with the aim of drawing moisture out of the food by the method of osmosis. Because curing increases the solute concentration within the food and hence decreases its water potential, the food becomes inhospitable for the microbial growth that causes food spoilage.

Curing is traced back to antiquity, and was the first method of preserving meat and fish until the late-19th century. Dehydration was the earliest variety of food curing. Many curing processes also involve smoking, spicing, cooking, or the addition of combinations of sugar, nitrate, and nitrite.

Untreated meat decomposes rapidly, if it's not preserved, at a speed that depends on several factors, including ambient humidity, temperature, and also the presence of pathogens. Most meats cannot be kept at temperature in more than some days without spoilage.

If kept in more than this point, meat begins to alter colour and exude a foul odour, indicating the decomposition of the food. Ingestion of such spoiled meat can cause serious food poisonings, like botulism.

Salt-curing processes are developed since antiquity so as to make sure food safety without looking forward to artificial anti-bacterial agents.

While the short period of fresh meat doesn't pose a major problem when access to that is simple and provide is abundant, in times of scarcity and famine, or when the meat must be carried over long voyages, it spoils very quickly. In such circumstances the usefulness of preserving foods containing nutritional value for transport and storage is apparent.

Curing can significantly extend the lifetime of meat before it spoils, by making it inhospitable to the expansion of spoilage microbes

PRESERVATION BY SALT:

Salt contributes flavour for the food. It is used for its preservative effect. Salt controls the microbial activity of the food by means of osmotic dehydration. Salt can be in the form of granular or rock forms. The only difference is the quantity of NaCl in the salt.

There are two techniques to preserve food by use of salt.

- Wet salting technique- Salt is dissolved in water to form saturated solution called brine. The chemical formula for brine solution is $\text{NaCl} + \text{H}_2\text{O}$. Brine solution is then added to the food. High concentration of salt will undergo osmotic dehydration in food
- Dry salting technique- Dry salt is directly added to the food, which attract the free water from the food and the it will form the brine. Here, osmotic dehydration plays an important role.

SALTING FOOD PREVENTION OF VARIOUS FOODS:

- Vegetables such as zucchini, summer squash, cabbage, onions are fermented by using salt. Some vegetable like runner beans and cabbage are often preserved in this manner called kimchi.
- Salt cured food are salted fish such as dried and salted cod and salted herring.
- Salt cured meats are bacon, salt pork, prosciutto (sea salt added to raw ham)

ADVANTAGE AND DISADVANTAGE OF SALTING:

Salt is cheap and effective preservation technique and it does not destroy nutrients. There will be no microbial growth at all. It increases taste and enhance flavour to the food. Pathogenic organism can't live in salted food due to its hypertonic nature of salt.

Salting is a long-term process. May cause food poisoning with poor storage.

PICKLED MANGO:

Here I used dry salting technique to preserve raw mango by using table salt.

Table salt- it is refined salt which contain about 97 to 99 percent sodium aluminosilicate or magnesium carbonate are added to make it free-flowing. Iodized salt, containing potassium iodide, is widely available.

Dry salting techniques:

It includes chopped or shredded vegetables with salt, packed them in a container which helps to remove the oxygen and allows the vegetable to ferment (low salt) are cure (high salt).

PRESERVATION BY SUGAR:

Sugar contributes a unique flavour and add taste to the taste. It provides a source of energy for nitrate converting bacteria.it lowers the acidity of the food.

It can be added in form of:

- Sucrose (table sugar/brown sugar).
- Dextrose (refined corn sugar).
- Corn syrup solids

Usage of powdered sugar -finer particle size is easier to dissolve in water. Commercial cures use of corn syrup solids because they are cheaper and may require more to get same flavour.

SUGARING FOOD PRESERVATION OF VARIOUS FOODS:

- Fruits like apple, pears, cherry, plum, apricot, and peaches are the popular fruits that are commonly preserved by sugaring method. These fruits are either dries before preservation or glazed in sugar syrup. Using fruits jams, jellies, marmalade or wines also prepared with the help of sugar.
- Vegetables-ginger and carrot are the most common vegetable that are often sugared to prepare relishes or sweet pickles. These candied vegetables are popularly served as condiments
- Angelica is a herb which is widely used as flavouring agent. However, sugar preserved or candied strips of angelica are popular as cake decorations.
- The peels of citrus fruits like lemon and amla (Indian gooseberry) are often candied to form relishes. However, “murabba”- Indian candied dish includes whole amla.

ADVANTAGE AND DISADVANTAGE OF SUGARING:

Sugaring has few advantages over other preservation methods, as this process does not require large number of ingredients and often the sugar extract or glaze is used to sweeten various other foods as well. It is also an easy preservation method with less time involvement. There is a risk in this method as sugar is believed to attract moisture very fast. When the atmospheric moisture is high in content, the yeast present in the environment starts its action and sugar starts fermenting into carbon-di-oxide and alcohol. Although fermented food is also a preserved food, the sugared foods should be prevented from fermenting, as it may lead to an unpleasant taste.

MAKING OF MARMALADE:

Marmalade is made of juice and peel of citrus fruits boiled with sugar and water. Marmalade is generally distinguished from jam by its fruit peel. Most commonly marmalade is prepared from bitter oranges, but it is also made from lemons, limes, grapefruits, mandarins, and other citrus fruits or a combination.

To make marmalade I used oranges and table sugar(sucrose)

Table sugar: sugar is the common name for sweet – tasting, soluble carbohydrates, many of which are used in food. Table sugar, granulated sugar, or regular sugar is referring to sucrose which is a disaccharide composed of glucose and fructose.

METHODOLOGY:

PROCESS INVOLVED IN PREPARATION OF PICKLED MANGO:

- I chose fresh raw hand-picked mangoes in this peak condition.
- The mangoes are washed and chopped into large chunks.
- After that, the mangoes are introduced into an air tight conductor.
- For about two cups of chopped raw mangoes, I added half cup of table salt (it might conduct from additives) to it.
- I repeated this process twice, so I can get two samples I named one sample A and another as sample B.
- I kept sample A under the sun for drying I repeated this for a week to get maximum drying.
- Sample B has not kept under the sun, the lid of the sample B was closed and the container was kept in a dark place.

OBSERVATION:

- Sample B which kept in a dark place came to form fungi within five days.
- The mango which I kept for control was spoiled within fifteen days.
- Sample A which I kept under the sun turned into a tangy pickle.

REASON:

- Addition of salt to sample A and B- salt extract water from the raw mangoes and it forms a brine solution.
- Control- the raw mangoes kept for control get rotten this may due to some primary culprit like air, moisture, light, temperature, and microbial growth. The available of free water and nutrients in the raw mangoes help the micro-organism for their growth, energy and reproduction. Or else the higher activity of the enzymes maybe responsible for browning of the tissues.
- In sample A and B- the dry salt attracts the free water present in mango and combined with it to form the brine.
- Sample B- it forms fungi this may due to introduce of atmospheric air to it (failure of air tight container).
- Sample A- due to high concentration of the salt the raw mango turned into a tangy pickle with the help of its own acidic nature and effective sun drying is the

major reason for the preservation of mango. Thus, salt is used to reduce the moisture content of food partially which is as pre- treatment before drying process

PROCESS INVOLVED IN PREPARATION OF MARMALADE:

- I chose fresh ripped hand-picked oranges to make marmalade.
- The oranges are washed and skin of oranges are peeled off and removed the spongy white stuff which is present between the zest and the fruit to avoid the bitterness. The juice is extracted from the fruit. The extracted juice is filtered by using a batch filter to separate the solid particles from the liquid.
- The zest of the orange is shredded and used to add flavour to the marmalade.
- The concentration of the juice is increased by using heat which is produced by the burner.
- For 2 cups of juice and 1 cup of zest about 1 cup of sugar is added. The ratio of juice: zest: sugar is 2: 1: 1.
- Mix in low heat until the sugar melts.
- Wait until it starts to thickening (all fruit contain some pectin which provides thickening or gel formation) and mix unceasingly.
- Once when it attains its consistent, switch off the flame and allow it to cool.
- Pour the mixture in an air tight container.
- I poured this mixture in two containers so I can get two samples I named one as sample A and another as sample B.
- Sample A is refrigerated and sample B is kept in room temperature.
- I kept a whole orange in room temperature as my control.

OBSERVATION:

- The orange which I kept as control was started to decay after 7 days.
- Sample B which I kept in room temperature is still fresh and tastes good even after a period of one month.
- Sample A which I refrigerated is also seems to fresh and tastes good which is similar to sample B.

REASON:

- Control- the ripped oranges kept for control starts to decay this may due to some primary components like air, moisture, light, temperature, and microbial growth. The available of free water and nutrients in the ripped oranges help the micro-organism for their growth, energy and reproduction.
- Sample B which is kept in room temperature is still fresh due to high concentration of the sugar and increased concentration of the juice due to evaporation of water by means of heat. Sugar draws available water from the food undergoes simple osmosis or dehydration which help in inhibiting microbial activity.
- Sample A which is refrigerated is still fresh is due to high concentration of sugar and increased concentration of the juice. Here sugar plays an important role in preserving the marmalade which is similar to sample B. Also, refrigeration helps in preserving food by storing at low temperature to slow down decay and other natural metabolic process.
- The shelf life of the sample A will be more than the sample B because sample A is refrigerated which will slow down the process of ageing.

SENSORY EVALUATION:

9point hedonic scale: The **9-point** Hedonic Scale. The most widely used scale for measuring food acceptability is the **9-point** hedonic scale.

GRADE	SCORE
Like extremely	9
Like very much	8
Like moderately	7
Like slightly	6
Neither like nor dislike	5
Dislike slightly	4
Dislike moderately	3
Dislike very much	2
Dislike extremely	1

This test has been performed after a week to check the organoleptic properties by using scale: (shown in fig 17)

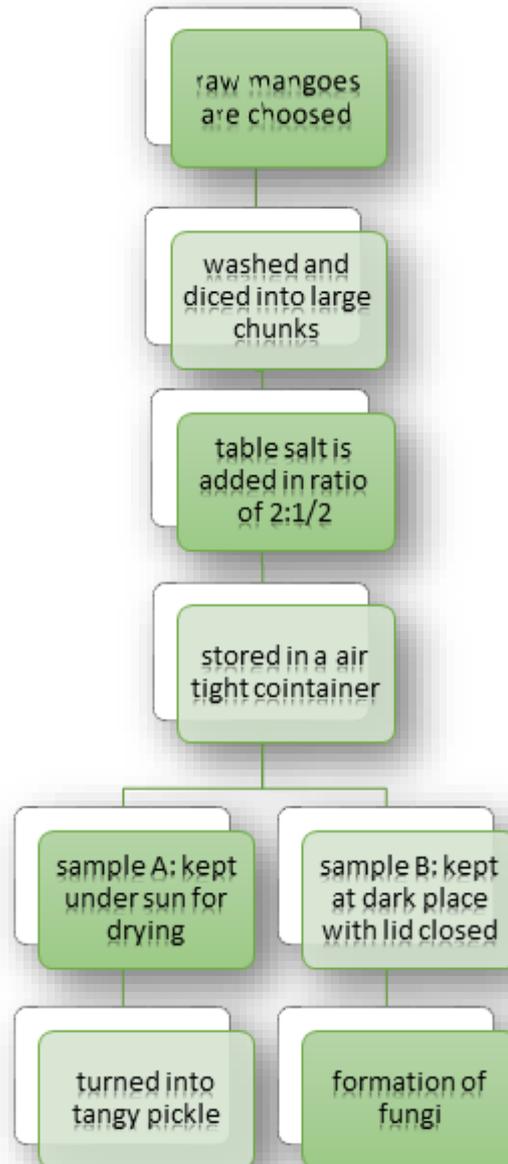
CONCLUSION:

The sensory evaluation is used to evaluate the flavour, texture, aroma, appearance and taste. It is also used to determine whether the food is edible or not.

On the whole, This Internship was a useful experience. I have gained new knowledges. I achieved several of my learning goals. Related to my study I had learned more about home preservation techniques by using simple ingredients. This helped me to define what skills and knowledge I have to improve in the coming time. At last this internship has given me a new insights and motivation to pursue a career in product development.

LIST OF PHOTOGRAPHS, FLOWCHARTS & TABLES:

PICKLED MANGO (FLOW CHART):



PICKLED MANGO (PHOTOGRAPH):



Fig 1: raw mangoes



Fig 2: washed and diced



Fig 3: salted in ratio 2:1/2



Fig 4: forms brine after a day



Fig 5: sample A sun dried



Fig 6: sample B fungus formed

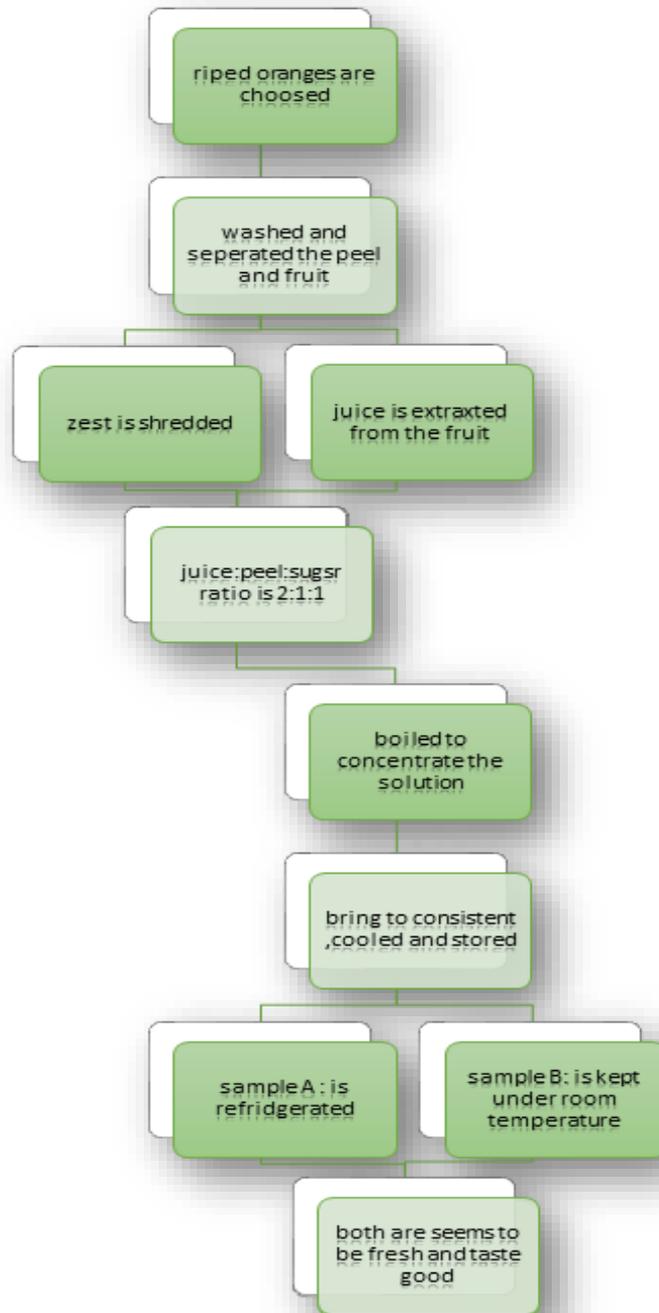


Fig 7: controlled-decayed



Fig 8: completely dried and edible

MAKING OF MARMALADE (FLOWCHART):



MARMALADE (PHOTOGRAPH):



Fig 9: ripped oranges



Fig 10: fruit separated from peel



Fig 11: orange peel



Fig 12: juice extracted from fruit



Fig 13: shredded peel



Fig 14: fruit: peel: sugar=2:1:1



Fig 15: boiled to consistence



Fig 16: stored in container

SENSORY EVALUATION:

	Pro cess	VEGET ABLE/ FRUIT	COL OUR	APPEA RANCE	TA ST E	OD OU R	MICR OBIAL GROW TH	EDI BLE
Con trol	-	Raw mango	Dark brow n 1	Shrined skin 2	1	3	yes	no
A	Salt	Raw mango	Light brow n 3	Dried up 6	8	8	no	Yes
B	Salt	Raw mango	Pale yello w 4	3	1	2	yes	no
Con trol	-	Ripped orange	Brow n	2	1	3	Yes	No
A	sug ar	Oranges	Light brow n	Good 8	8	7	No	Yes
B	sug ar	oranges	Light brow n	Good 8	7	7	no	yes

Fig 17



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TAMILNADU, INDIA

TITLE OF INTERNSHIP

A Report on Internship

In

Department of Food Processing Technology

By

Student Name: - Prathiksha R
Register Number: - AFP18004

Month & Year: - July 2020



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INTERNSHIP ALLOCATION REPORT 2019-20
Name of the Department: Food Processing Technology

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Name of the Programme : Bachelor of Technology
Year of study and Batch/Group : 2nd year and III/I
Name of the Mentor : Mrs. Priya Sethuraman
Title of the assigned internship :

PRESERVATION BY SALT AND SUGAR

Nature of Internship : Individual

Reg No of Students who are assigned with this internship:

AFP18001

Total No. of Hours Required to complete the Internship: 48 hours

Signature of the Mentor	Signature of the Internal Examiner	Signature of HOD/ Programme Head.

Head of the Department (i/e)
Department of Food Processing Technology
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INTERNSHIP EVALUATION REPORT 2019-20

Name of the Department: FPT

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Name of the Student	R. PRATHIKSHA
Register No and Roll No	AFP18004
Programme of study	B.TECH
Year and Batch/Group	2nd / IA
Semester	II / IV / VI / VIII
Title of Internship	FILTRATION
Duration of Internship36.....Hours
Mentor of the Student	Mr. S.KARTHIKEYAN.

Evaluation by the Department

Sl No.	Criterion	Max. Marks	Marks Allotted
1	Regularity in maintenance of the diary.	10	8
2	Adequacy & quality of information recorded	10	8
3	Drawings, sketches and data recorded	10	8
4	Thought process and recording techniques used	5	3
5	Organization of the information	5	3
6	Originality of the Internship Report	20	16
7	Adequacy and purposeful write-up of the Internship Report	10	8
8	Organization, format, drawings, sketches, style, language etc. of the Internship Report	10	7
9	Practical applications, relationships with basic theory and concepts	10	7
10	Presentation Skills	10	7
Total		100	75

Signature of the Mentor 	Signature of the Internal Examiner 	Signature of HoD/Programme Head
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Kandamangalam, Chennai - 605 006, INDIA

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ABSTRACT:-

Filtration is a process in which the solid particles are removed from the liquid or gaseous fluid through a medium called filter. It is usually done through simple filtration, using filter paper in a glass funnel, where the insoluble solid particles are strained by the filter paper and the liquid goes right through by action of gravity. Suitable mixture of liquid and insoluble solid is poured over the layers for filtration, where the solid particles are filtered in the medium. It is used for removing turbidity and suspended particles which are lesser than 30 micron. Filtration could be a physical, biological or chemical operation that separates solid matter and fluid from a mix with a filter medium that incorporates a advanced structure through that solely the fluid will pass. Fluted filter papers are used as medium for filtration. In this filtration, the filtrate has multilayer of different materials of variable sizes. The solid substance that is in the filter medium is known as oversize whereas the liquid that passes through the medium is known as filter. It is must that the apparatus used for filtration must be heated that the filtered substance does not crystalline in the apparatus blocking the filtration. Stemless funnels are preferred because there is less surface are for crystallization. The funnels have a plate with holes in it, as we can see below, and they are usually used when the substance to be filtered is small in volume. This kind of filtration is done by rotating the substance to be filtered at very high speed by centrifugation. Filter cones, fluted filters, or filtering pipets can be used depending upon what we have on hand. The mixture is immersed in ice bath for rapid cooling of the fatty acids. Due to the centrifugal rotation, the more dense matter is separated from the less dense matter. This type of filtration occurs when the mixture is poured from a higher point to a lower one. In vacuum filtration, a vacuum pump is used to quickly filter the fluid through a filter. Cold filtration is used to quickly cool a solution, promoting the formation of small crystals. This method is usually used for crystalline substances which contain impurities. Hirsch funnels and Buchner funnels, they are same kind but in two different sizes, are used along with filter paper. The crystalline substance is melted first; later the impurities are removed in liquid state and again crystallized as a pure substance. Filtration keeps the product fresher, by prolonging its shelf life. Either solid or liquid would be required product. In some product both filtrate and the recovered solid cake are the required product. Filter paper is a quantitative paper used for filtration. It is made of pure cellulose treated with hydrochloric acid and hydrofluoric acid. It burns mostly without leaving ashes (0.0001g ash).

INTRODUCTION:-

Filtration is a unit activity where division of insoluble solids from a strong fluid suspension is finished with the use of mechanical or gravity power through a permeable layer. The solids are held in the permeable medium and structure a layer, called channel cake. The fluid that goes through the permeable medium which is liberated from any strong particles is called as filtrate. The permeable medium is known as channel medium. The ideal stage can be either cake or filtrate. In filtration of natural product squeeze, the filtrate is the reasonable juice which is the necessary stage. The main thrust for the detachment of the two stages might be gravity power or mechanical power. Weight is made at the upstream or vacuum at the downstream to cause the progression of filtrate through the medium. Explanation is a term utilized in food enterprises which is equivalent to filtration; the main distinction is that, the suspension contains not many strong particles. Microfiltration is the division of little particles, which are difficult to isolate by ordinary filtration. The main impetus for filtration is regularly the weight distinction. In the start of the filtration process, filtrate streams effectively through the medium with least opposition. The pace of filtration which is the proportion of filtrate volume and time of filtration is high first and foremost. Be that as it may, as the filtration advances, the layer of cake affidavit upstream step by step increments. In this way, presently the filtrate not just should go through the medium, yet in addition it should cross the layer of cake. Henceforth, there is a consistent pressure drop over the medium and it increments with time. After certain time, the filtration for all intents and purposes stops. Two methodologies can be made in filtration process. One can either follow channel process at steady weight drop or at consistent stream rate. On the off chance that consistent weight is received, the pace of filtration step by step diminishes. On the off chance that later case is taken, one needs to expand the weight with time to keep up a steady stream rate. The weight drop relies upon the two stages through which filtrate passes. These are channel cake and channel medium. In this way, the weight drop is a component of cake attributes like explicit surface territory and porosity and medium qualities. Two fundamental kinds of channel media are utilized in labs: a surface channel, a strong strainer which traps the strong particles, with or without the guide of channel paper (for example Büchner channel, Belt channel, Turning vacuum-drum channel, Cross-stream channels, Screen channel); and a profundity channel, a bed of granular material which holds the strong particles as it passes (for example sand channel). The principal type permits the strong particles, for example the build-up, to be gathered flawless; the subsequent sort doesn't allow

this. In any case, the subsequent sort is less inclined to stopping up because of the more prominent surface zone where the particles can be caught. Additionally, when the strong particles are fine, it is frequently less expensive and simpler to dispose of the tainted granules than to clean the strong strainer. Channel media can be cleaned by flushing with solvents or cleansers. On the other hand, in designing applications, for example, pool water treatment plants, they might be cleaned by discharging. Self-cleaning screen channels use purpose of-pull discharging to clean the screen without intruding on framework stream. Certain channel helps might be utilized to help filtration. These are frequently incompressible diatomaceous earth, or kieselguhr, which is made fundamentally out of silica. Additionally utilized are wood cellulose and other dormant permeable solids, for example, the less expensive and more secure perlite. These channel helps can be utilized in two unique manners. They can be utilized as a precoat before the slurry is sifted. This will keep coagulated sort solids from stopping the channel medium and furthermore give a clearer filtrate. They can likewise be added to the slurry before filtration. This expands the porosity of the cake and diminishes opposition of the cake during filtration. In a rotating channel, the channel help might be applied as a precoat; therefore, flimsy cuts of this layer are cut off with the cake. The utilization of channel helps is generally constrained to situations where the cake is disposed of or where the accelerate can be artificially isolated from the channel. The channel medium might be a surface channel, which is a strong that traps strong particles, or a profundity channel, which is a bed of material that traps the strong. Filtration is normally a flawed procedure. Some liquid stays on the feed side of the channel or inserted in the channel media and some little strong particulates discover their way through the channel. As a science and building method, there is in every case some lost item, regardless of whether it's the fluid or strong being gathered. There are different types of filtration. Which method is used depends largely on whether the solid is a particulate (suspended) or dissolved in the fluid. They are vacuum filter, general filtration, cold filtration, hot filtration. Now and then channel helps are utilized to improve move through a channel. Instances of channel helps are silica, diatomaceous earth, perlite, and cellulose. Channel helps might be set on the channel preceding filtration or blended in with the fluid. The guides can help keep the channel from stopping up and can build the porosity of the "cake" or feed into the channel. The fundamental prerequisites for filtration are: (1) a channel medium; (2) a liquid with suspended solids; (3) a main thrust, for example, a constrain contrast to make liquid stream; and (4) a mechanical gadget (the channel) that holds the channel medium, contains the liquid, and grants the utilization of power. The channel may have uncommon arrangements for

expulsion of the channel cake or other strong particles, for washing the cake, and potentially for drying the cake. The different strategies utilized for rewarding and expelling the cake, for evacuating the explained filtrate, and for making the main thrust on the liquid have been joined in different manners to deliver an extraordinary assortment of channel hardware. Channel media might be partitioned into two general classes: (1) slight hindrances, exemplified by a channel material, channel screen, or normal research facility channel paper; (2) thick or as once huge mob boundaries, for example, sand beds, coke beds, permeable earthenware production, permeable metal, and the precoat of channel help which is frequently utilized in the mechanical filtration of liquids that contain coagulated accelerates. The types of filtration are Vacuum Filtration, Centrifugal Filtration, Gravity Filtration, Cold Filtration, and Hot Filtration. There are many factors affecting filtration. The filtration rate is given by Darcy's equation. The filter types vary according to the product to be filtered. The liquid to be sifted will go through the channel medium just if some main impetus is applied. This power might be brought about by gravity, centrifugation, utilization of weight on the liquid over the channel, or use of vacuum beneath the channel or by a mix of such powers. Gravitational power alone might be utilized in enormous sand-bed channels and in basic research center filtrations. Rotators containing a bowl with a permeable channel medium might be considered as channels in which gravitational power is supplanted by diffusive power ordinarily more prominent than gravity. On the off chance that a research facility filtration is troublesome a fractional vacuum is normally applied to the holder beneath the channel medium to build the pace of filtration. Most mechanical filtration forms include the utilization of weight or vacuum, contingent on the kind of channel utilized, to build the pace of filtration and furthermore to diminish the size of the gear required.

METHODOLOGY:-

liquid are evacuated by the utilization of a channel medium that allows the liquid to go through yet holds the strong particles. Either the explained liquid or the strong particles expelled from the liquid might be the ideal item. In certain procedures utilized in the creation of synthetic concoctions, both the liquid filtrate and the strong channel cake are recuperated. Other media, for example, power, light, and sound, additionally can be separated. Filtration could be a physical, natural or synthetic activity that isolates strong issue and liquid from a blend in with a channel medium that consolidates a propelled structure through that exclusively the liquid will pass. Filtration is a procedure where the strong particles are expelled from the fluid or vaporous liquid through a medium called channel. The strong substance that is in the channel medium is known as larger than usual while the fluid that goes through the medium is known as channel. Either strong or fluid would be required item. In some item both filtrate and the recuperated strong cake are the necessary item. Filtration keeps the item fresher, by drawing out its time span of usability. The decay of drink is additionally decreased. It assists veggies with smelling and taste increasingly satisfactory. They are vacuum filter, general filtration, cold filtration, hot filtration.

Vacuum Filtration:-

In vacuum filtration, a vacuum pump is used to quickly filter the fluid through a filter. *Hirsch funnels* and *Buchner funnels*, they are same kind but in two different sizes, are used along with filter paper. The funnels have a plate with holes in it, as we can see below, and they are usually used when the substance to be filtered is small in volume.

Centrifugal Filtration:-

This kind of filtration is done by rotating the substance to be filtered at very high speed by centrifugation. Due to the centrifugal rotation, the more dense matter is separated from the less dense matter.

Gravity Filtration:-

This type of filtration occurs when the mixture is poured from a higher point to a lower one. It is usually done through simple filtration, using filter paper in a glass funnel, where the insoluble solid particles are strained by the filter paper and the liquid goes right through by action of gravity. Filter cones, fluted filters, or filtering *pipets* can be used depending upon what we have on hand.

Cold Filtration:-

The mixture is immersed in ice bath for rapid cooling of the fatty acids. The fatty acids are crystallized which is removed later. It is mostly used in beverages to reduce the natural fatty acids. This method is used when the solid is mixed initially. Cold filtration is used to quickly cool a solution, promoting the formation of small crystals.

Hot filtration:-

This method is usually used for crystalline substances which contains impurities. The crystalline substance is melted first; later the impurities are removed in liquid state and again crystallized as a pure substance. It is must that the apparatus used for filtration must be heated that the filtered substance does not crystalline in the apparatus blocking the filtration. Stemless funnels are preferred because there is less surface are for crystallization. Fluted filter papers are used as medium for filtration.

Multilayer Filtration:-

In this filtration, the filtrate has multilayer of different materials of variable sizes. The most common materials are coal sand or gravel. Suitable mixture of liquid and insoluble solid is poured over the layers for filtration, where the solid particles are filtered in the medium. It is used for removing turbidity and suspended particles which are lesser than 30 micron.

Factor Affecting Filtration:-

- Density
- Viscosity
- Corrosiveness
- Particle Shape
- Particle size
- Rigidity
- Portion of solid in slurry
- Pressure Drop

Filtration Rate:-

The filtration rate is given by Darcy's equation.

$$\frac{dV}{dt} = K \frac{A\Delta P}{\eta H}$$

Where,

dV/dt is the volumetric flow rate of filtrate through a filter cake in time t

A is the filter area

ΔP is the pressure drop across the filter cake

η is the liquid viscosity

H is the cake thickness

K is the rate constant referred to as permeability.

$$K = \frac{\epsilon^3}{kS^2(1-\epsilon)^2}$$

Where

ϵ is the cake porosity

S is the specific surface area of the particles

K is the Kozeny constant.

After the formation of the cake, the cake compression and water expression follow. The case is that the saturated capillary state, with all the pores stuffed with water. Beneath these conditions, a capillary pressure opposes air entry, and only the applied pressure exceeds the capillary pressure will the removal of water from the cake start.

According to Hagen–Poisenille’s law, the capillary rise can be calculated by:-

$$h = \frac{2\gamma \cos \theta}{g\rho r}$$

Where

h is the capillary rise

- γ is the liquid/air surface tension
- θ is the liquid/solid contact angle
- r is the capillary radius
- g is the acceleration due to gravity vacuum or pressure
- ρ is the liquid density.
- The above equation gives the information about the pressure to be applied for expelling the liquid from the filter pores.

Filter Types:-

1. Compressed Air Filters
2. Dust Collection Filters
3. HVAC Filters
4. Liquid Process Filters
5. Press Cloth Filters
6. Pressure Leaf Cloth
7. Reverse Osmosis Filters

8. Sanitary Filter Housings
9. Steam Filters

Day To Day Examples:-

- Rice filter
- Tea filter
- Filter coffee
- Coconut milk extraction
- Fruit juices

CONCLUSION:-

Filtration is a process that removes particles from suspension in water. Removal takes place by a number of mechanisms that include straining, flocculation, sedimentation and surface capture. Filtration is a process used to separate solids from liquids or gases using a filter medium that allows the fluid to pass through but not the solid. The term "filtration" applies whether the filter is mechanical, biological, or physical. The fluid that passes through the filter is called the filtrate. The blends are of two primary sorts: homogeneous blends and heterogeneous blends. A homogeneous blend is a blend that is uniform all through. A heterogeneous blend is a blend that isn't uniform all through, i.e., elements of the blend is dispersed inconsistent. Various kinds of channels are utilized to purge and for division of blends from the contaminants.

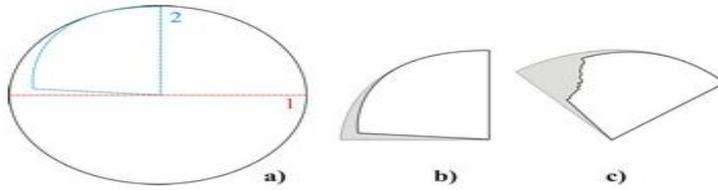
A filter medium must have the following requirements:-

- I. It should efficiently remove the suspended solids giving a clear filtrate
- II. There should not be any clogging of pores during filtration
- III. The washing of cake from the medium should be easy
- IV. It should have sufficient strength and chemically inactive to the suspension.

Table 1:-Filter Paper

<u>Goal</u>	<u>Product</u>	<u>Filtration Process</u>
It is used to remove odour and also improves better taste	Activated carbon filter CN04 Series – A string wound pre-filter section over an activated carbon impregnated nonwoven section DCB Series – A string wound pre-filter section over a coconut carbon block DWC Series – Activated carbon impregnated nonwoven filter CCB Series Filters – Activated coconut carbon block	It removes molecular contaminants.
De-colorization	Activated carbon filter CN04 Series – A string wound pre-filter section over an activated carbon impregnated nonwoven section DCB Series – A string wound pre-filter section over a coconut carbon block DWC Series – Activated carbon impregnated nonwoven filter CCB Series Filters – Activated coconut carbon block	It removes the natural organic pigments.
Increased shelf life	Pleated filter PPA Series – Absolute rated pleated polypropylene filters	It is used to remove spoilage organisms.
Visual clarity	Depth filter or pleated filter MB series melt blown polypropylene DW Series string wound filters and PPA Series pleated polypropylene absolute rated filters	It helps to remove sediment and particles
To prepare wash water	Pleated filter, carbon filters PPA Series pleated polypropylene absolute rated filters, CN04, DCB, DWC, and CCB Series activated carbon filters	It helps in removing organisms, and/or odour-causing molecular contaminants

Protect membranes	MB series melt blown polypropylene DW Series string wound filters DHF Series Multi Pleat High Flow filter cartridges	It removes membrane fouling particles that reduce flow and decrease flux through RO and nano filtration membranes.
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Ways of folding a filter paper