Dairy and Food Process & Products Technology
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Lecture - 07
Food Additives

If you look at your outline, which we are given in the beginning of course we are given a tentative out line, it is not that always that outline can be adhered to with the classes or time frame. The one of the reasons for that is this is very, very difficult that which one will be more useful for you, or which one will be less useful to you to identify them, right.

Not only that, in many cases this may be prerequisite for your next class or some other classes may be either your some descriptive like this one or some engineering classes. This may act as a pre requisite this idea this knowledge may help you; that is why as and when we will be coming across, we from our my experience that this part may be more useful to the students, then maybe in the second week which we had given laws they are absolutely what we can termed as dry.

Because laws yeah there are many, but it is less to be highlighted or highlighted. I do not say that they are having less importance it is equally important, but this is the our more dry in the sense not so much to understand, but more to remember memorize.

So, that will go very, very quickly rather than explaining like this, what we are doing even in the first week what you are supposed to which we have not. So, today we are coming to another important one. So, let us see which one is that this is our dairy and food process and products technology so, it remains same.

So, let us go into in today's some topic ; that is, additives right, this was on the first week yes, this is important which will tell as additive, which will tell as preservative etcetera .

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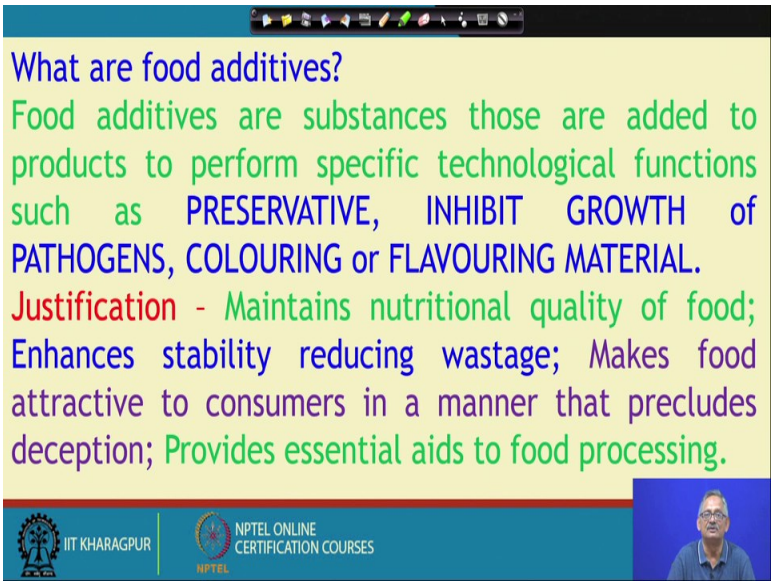

So, additives we can define that substance, those are added to products to perform specific technological functions such as say it may act as a preservative, or it may act as inhibitor to the growth of organisms or pathogens, or it may act as coloring material, or it may add a flavor to the material. So, depending on what you are using where so, you can then additive is the big umbrella, right.

So, depending on what you want accordingly this may be termed as a preservative, if you want to, if you have seen mummies doing something at home at, and sometimes it is adding something for keeping it for a longer time so, then it can be termed as a preservative, right.

In some cases, you will also have seen that some things are added for the betterment of the appearance in terms of color or maybe some odour which is liked by you or flavor that is being added. So, depending on what is your requirement, what is your goal, what do you want to do accordingly the thing the substance which is added can be termed as additive.

So, additive we can define as a substance that is added to either extend the life or to improve the color, or to impose some flavour or order to impart some flavor or order to the specific food, or maybe to inactivate some enzymatic reactions. So, those or to maybe keep away the pathogenic organisms from the food material; so, those substances may be called as the additive, right.

Now, justification is why should we do, that this maintains the nutritional quality of the food material, and this enhances the stability reducing wastage makes food attractive to consumer, in a manner that that precludes deception provides essential aids to food processing, right?.

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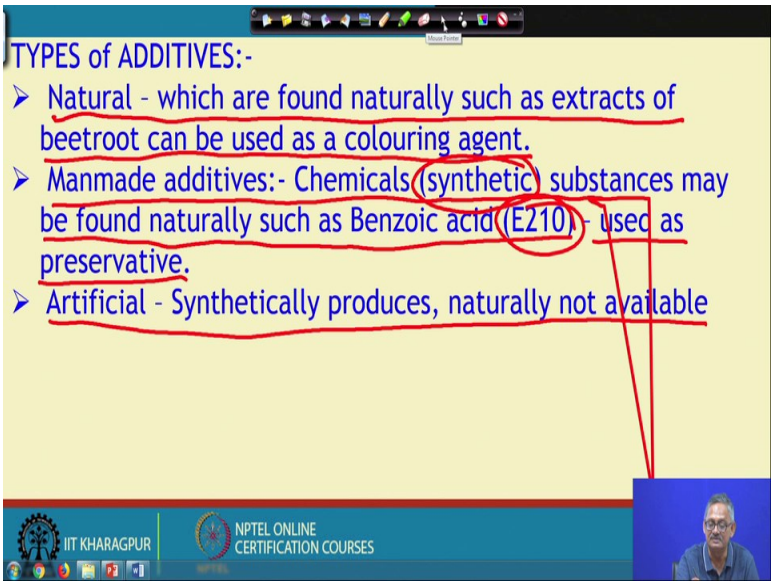

So, types of additives then how many types there, that can be natural, can be artificial or can be manmade, right. So, natural which is available in the in nature, in many many in many many cases, many food materials do have this additives by it is nature, or you can extract you can utilize them as a natural resource, right? In some cases, maybe you have made it by you and then added. And in some cases, it might have been synthetically obtained and you might be adding them.

So, depending on that what is the source. So, we can divide them into three types, one is natural which are found naturally, and such as extracts beetroot that can be used as a coloring agent. This is an example or manmade additives.

So, it is manmade additives are chemicals, or it can be chemicals or synthetic directly, it can be or it can be synthesized substances may be found naturally such as benzoic acids, it has a name E210, right; or used as preservatives; that is, or artificial that is synthetically produced or naturally are not available. This is not naturally available, they are synthetically produced. So, they can be called as artificial, right.

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Now, food additives as a whole we can say that food additives are any substitute or any substance, that becomes part of a food product either directly or indirectly during processing storing or packaging. So, this in one umbrella, we can say that food additives are substance or substitute that becomes part of a food product either directly or indirectly during the processing or storage or packaging, right?

Now, some terms which we come across called GRAS; that is generally recognized as safe.

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This comes under the purview of dis additive. So, there are some substances which are generally recognized as safe and that can be safely utilized or added. This was first established in 700 places on the list of without going through testing, right. So, if those list is your item it falls under those list, generally recognized as safe, then you can directly add it without testing, right.

Now, those substances are being re-evaluated of course, because this is what is science, what was not known yesterday is known today or may be knowing tomorrow; So, depending on the availability of the information. So, this list may go on changing adding or deleting, the reason being some which were found long back was very good, but nowadays it might have been seen, that it has some other effect which are not desirable.

So, non-desirable effects so, for that that typical things might be typical chemicals, might be either unlisted or enlisted. So, depending on the use and if it is again coming on the in the list of the generally recognized as safe, list then you can as when we come to the law in some time. So, that time you will see, that you can directly use without going for any bindings like that, ok.

So, after generally recognized as safe, let us look into what is required to become a food additive, what are the requirements.

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So, we see that these six things which we can say safely, that the minimum requirement to for any substance to become additive to the food is it should provide additive is effective what do you are adding must be effective, other is what is the purpose why should you add it, right. So, it must be effective so, that is one requirement for to become additive, I should prove to be add it additive that can be detected and measured in final products.

So, we should be able to detect whatever we have added in even in the final product, such that it is not making some chemical or some binding reactions so, that it is it cannot be identified. So, that should not be so, it is another requisition, that it should be having some way or other it should be measurable in the product also.

Then to the study the effects of the substance on animals in large doses, whenever any additives are being added, right I tell it of the cup, but please do not take it in that, because not yet established. Some of our students are working on it, that some plant origin materials are being also added to say product like to increase the life as well as self-life, as well as the for the nowadays in diabetes has become very much, I mean in a bad shape, and it is going up the people who are suffering from that.

So, to cater those kinds of people, some chemist some plant origin materials, for students our students are rather my students are working. And there it maybe I this things are applicable, this things can be said that if it is not effective, if it cannot be identified even in the product at the product stage, or things like that we cannot call that to be additive.

As well those should be also seen with the help of some animal tests, right. So, here doing with the dual test like your test with mice and a rats and others, such that what is the effect on that, then only it will be looked into the mankind how whether it is having really any harmful, or any better effect or not.

Then submit results to validate the findings, and schedule a public hearing and either federal department of adulterations different agent I should say different agencies depending on the nation, different agencies may approve or reject to become a food additive.

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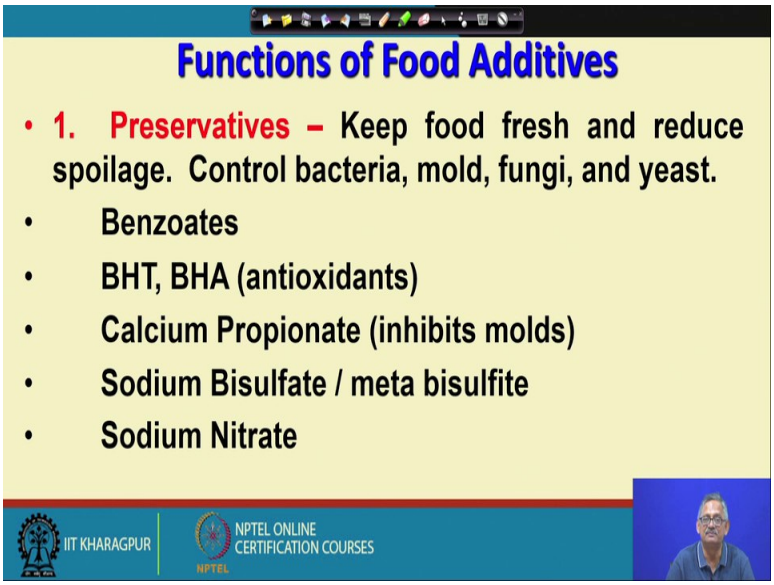

Then functions of the food additives what it does, food additives it acts as a preservatives number 1. Now, to keep the food material fresh and reduce the spoilage, this can be added. And this can control the bacteria and mold fungi and yeast any such things that can be controlled by resistance. Activity of those microorganisms that can be done, and in this case, we add many such preservatives as it is the. So, the first function of the additive is as to act as a preservative.

Example benzoate in many cases benzoates are added right, or BHT that is Butylated hydroxytoluene and Butylated hydroxylanisole right. So, in that case, this is called as the antioxidant or calcium propionate that inhibits molds. So, this can be additives or preservatives, and then sodium bisulfate or meta bisulfite.

In many cases, they are also used as the preservative, right? May be in jam, jelly or marmalade when you make at home, mean by may adding this type of preservatives, either sodium benzoate or may by meta bisulfite. They are whatever is available it is added, sodium nitrate in some previous class we had also told that yes it acts as a preservative, right, then other things then processing aids.

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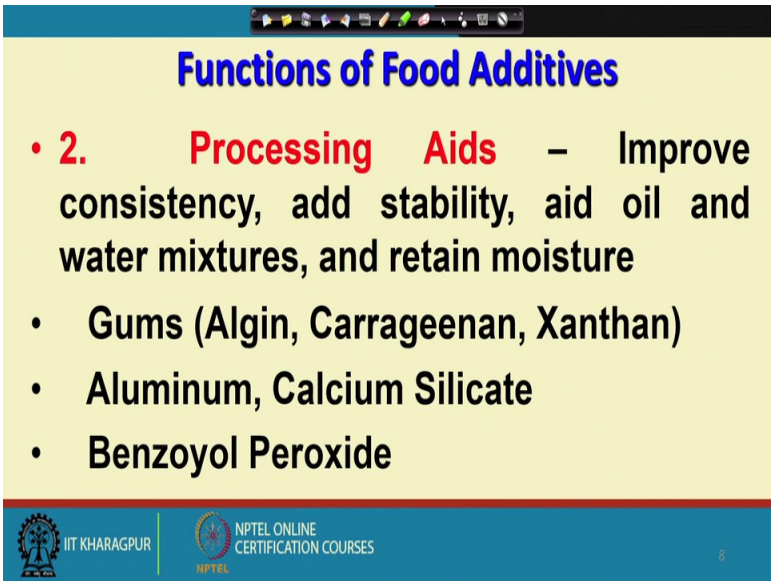

Processing aid it may help in the processing to improve the consistency to add the stability or to aid oil and water mixtures and retain moisture. Any of these, it can be right so, the purpose is to improve the consistency of the of the not only product consistency of the processing unit so, that your desirable things are achieved, right.

It adds the stability, and aid oil and water mixtures, and also it can retain the moisture of the product, right, for any such we can call to it to be the processing aid, right, the additive which are being used.

For example, see in many cases gums are used that can be alginate, or the carrageenan or xanthan. So, this is algin or may be that product is algin, but the chemical could be alginate, right. In some cases, it could be aluminum, calcium silicate, they also help to improve the stability, right or consistency. In some benzoyol peroxide there also added.

So, these are aided, either to increase the stability or the consistency or a good behavior of oil in and water mixture. And oil water mixtures we will come across very well, when we see that milk when will be dealing with directly.

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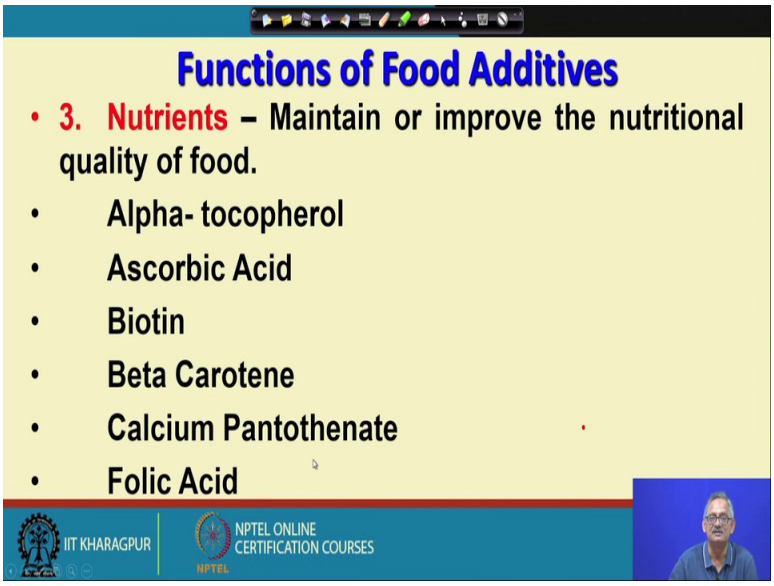

That time you will see that this oil water mixture is primarily affected, because oil and water they are not miscible, right that we know very well. That water and oil they are not miscible. So, if they are not miscible, then how to bring them close, how to keep them together.

So, for that an intermediate or friend of both right a friend of both either water and the oil is added or is maybe naturally there. So, that acts as the additive right so, that may be added ok. So, the third function is that to act as the nutrient, right to act as a nutrient which maintain or improve the nutritional quality of the food, for example, alpha tocopherol, ascorbic acid, biotin, beta carotene, calcium pantothenate or folic acids, these are added as nutrients in many products, right. These are some example, this is does not mean beyond this is not list is not there, right.

These are some examples of different types like alpha tocopherol, tocopherol. We know this is an anti-oxidant, right, ascorbic acid that is also in many cases added in such that in the during the process; if the ascorbic acid content is minimized, then that process maybe in cases termed that not so suitable, because ascorbic acid is also one very heat sensitive product.

So, your processing might not have been tolerating such conditions which you are preventing right. So, next is folic acid or calcium pantothenate. So, beta carotene, biotin, they are all added as the addition so that the nutritive value can be increased, right. So,

the 4th function of the additive can be that it can be act as flavor aiding or favor improving material, right.

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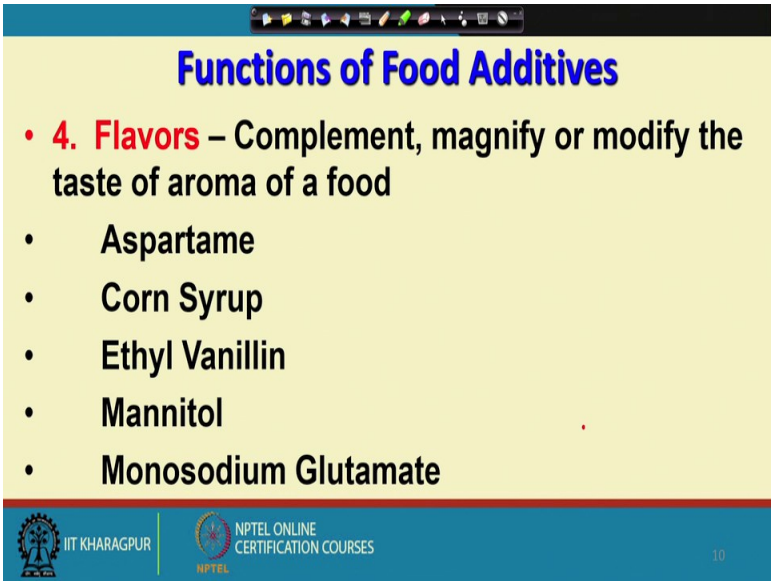

So, as a flavor improving material in that the complement is that, it may add to be flavor right, and if I.

I remember normally we are happy with any and every kind of ice cream, right during my stay at in ice cream industry. I saw that there they had added some flavor, like pan I hope you betel leaf if you know. So, right after the end of the any party or any such huge feast, if you will do take pan as the end product at the as the end of the end of the food.

So, there this flavor pan who was added to the ice cream such that the both ice cream and ice cream you are getting the on pleasure of taking it, as well the you are taking getting the pressure of taking the pan, because that flavor was added in it like these are some typical examples, ok.

So, to complement magnify or modify the test or aroma of the food this may be flavor aiding or flavor enhancing agent, right. For example, aspartame corn syrup, ethyl vanillin, mannitol, monosodium, glutamate of course, MSG monosodium glutamate this was also taken as the flavoring material. But nowadays, as I said in some earlier class that or today I said that sometime that in the list things are getting added or getting deleted depending on time and again, it is being by the respective this organization, it is

functions are being evaluated and if they are found that not so suitable, then or some bad effects are there, then they are withdrawn or if it is found to be very good then they are being added.

So, one such example is that mono sodium glutamate or MSG known normally. So, it is normally nowadays people are trying to avoid because of these not so good cause. So, good effect on I am not saying effect on the food it is ok, but post affect on the human being may not be that much good. So, it is not being utilized nowadays monosodium glutamate, but they are all flavor enhancer or flavor enhancing material so, this we have to keep in mind, right.

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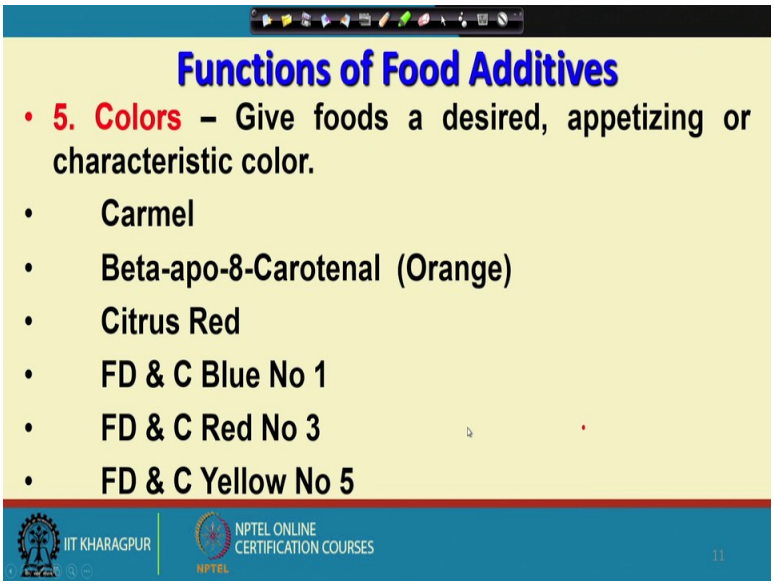

Then colors; in many cases that as we said colors are added. So, for example, to give foods are desired appetizing or characteristic color they are added, right. May be not so good in taste, but it is color is so appealing that the product is being sold, right. Because they are so appealing so that is why color is our appearance, color is in other words primarily associated with the appearance.

So, a color is attractive, then the product first is chosen, and then they find whether it is good or bad. So, for from the consumer point of view, consumer level this color has to be attractive or colors is having a primary effect on the selection.

Some colors are added like caramel Beta-apo-8-Carotenal, which is orange in color caramel color we just said many times; Citrus red, FD and C blue number 1, FD and C red number 3, FD and C yellow number 5. These are some coloring materials, right. Some common some common preservatives to which are to active are that can we seen that, chemicals right how they are effective.

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Some chemicals for example, chemicals sulfites, right in a way it is applicable in insects and microorganisms, action is as antioxidant and used in dried fruits and wines. For like that many such chemicals which are getting affected, we are listing here sodium nitrate propionic acid, sorbic acid, benzoic acid, etcetera.

Then clostridia mold, yeasts and molds, organisms where it is being active, or the function is that anti-microbial, here it was anti-oxidant, right. In cured meats or bread and cakes, cheese cheesecake salads etcetera. So, addressing soft drinks or some addressing ketchup, all this they may be applicable they may being used, right. So, this is in one now product quality. I think, this is an another one which we need a longer time. So, today it being very small, almost we are on the verge of the end of the class.

So, I think we should talk about in the next class, but I repeat that we had given you the framework or the syllabus. It is not likely all the time we will adhere, week by week the same topic depending on I the our experience or my experience with the students, how

much they like and which is more important or less important; depending on that we will highlight somewhere more somewhere less, ok.

Thank you.