Dairy and Food Process & Products Technology
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Lecture – 09
Quality of Food (Contd.)

So, we continue on that quality aspect, right. Now, obviously, as we said in the beginning that we will be adhering into as much, but may not be possible all the time to adhere to the course means outline which was given right, because there are many like this quality which is a very important aspect on food. So, how could we minimize it as much as information we can disseminate to you that is much better for you. So, that is why I am still continuing on it. May be I do not know if I am not able to cover up today on that or in this class then we may be asking for, right. So, let us go.

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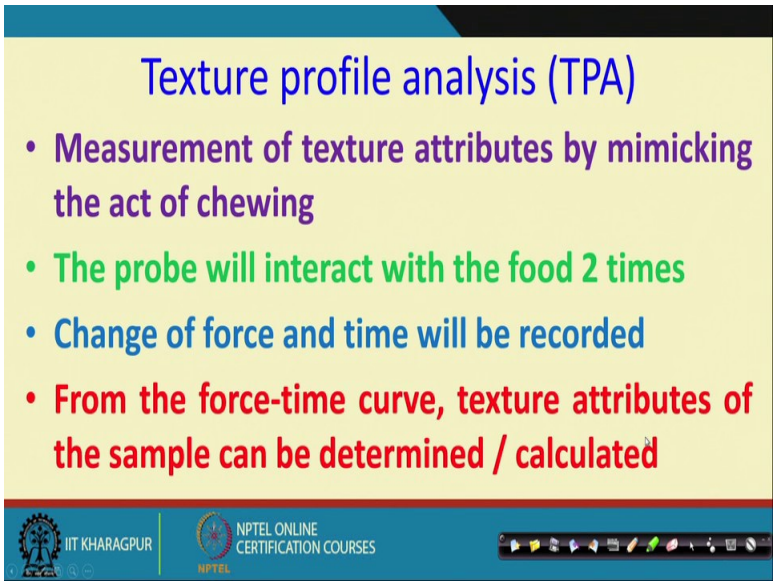

What is that on the other part?

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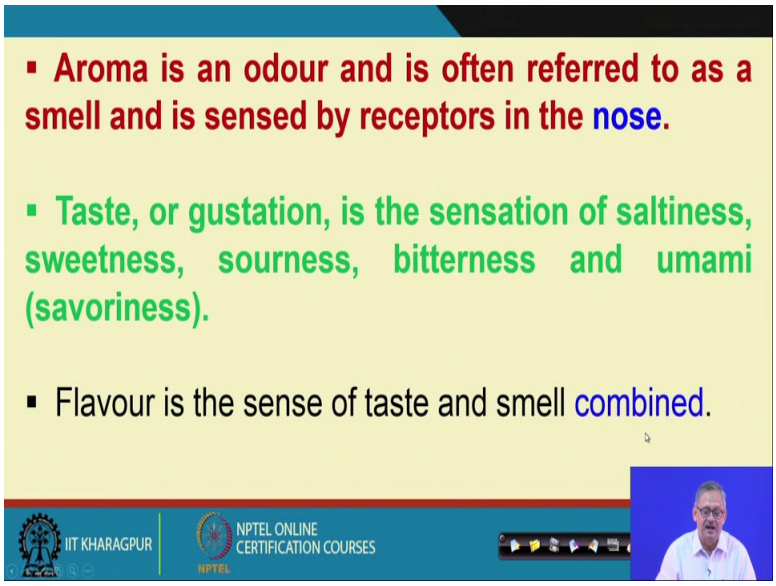

Aroma and flavor and taste which you were saying, right. So, aroma is an odour and is often referred to as a smell and is sensed by the receptors in the nose. So, as you know we this is called olfactory region, which we have this nasal and mouth cavity all put together. This is called olfactory region where you have lot many sensors lot many sensors which can sense because human being is the best creation of nature right they have so many things which yet to be copied, or yet to be fabricated equivalent to that.

But we know that in how many numbers of rather we can say. You can definitely differentiate between mango, mango aroma which is coming from mango or maybe coconut oil which is having another aroma even from the distance you can differentiate them, so right. So, it is sensed by the receptors in the nose and that is what is the aroma.

And taste or gustation that may be the sense that may be the sensation of saltiness or sweetness or sourness or bitterness and umami of the food material and that comes under the umbrella of the taste, right. We say this has this taste right whereas, flavour is the sense of taste and smell both in combination, right. So, it both in combination sense of taste and smell that comes under the purview of flavour, right. So, if you say aroma we also can differently say that yes the flavour of that. But you will see in most of the cases we use both for all both the purposes when saying aroma we can mean that flavour, when saying flavour we can mean the aroma that is the general connotation. So, aroma and flavour normally most of the people do not differentiate, but yes the aroma is through the

nasal part and this flavour is combination of both taste that is mouth organ and the result part in combination right.

So, if you look the other we said the other the other class that texture. The texture is normally analyzed through a texture profile analysis TPA, right. We said the UTM, universal testing machine, so this universal testing machine is normally different in different bodies are different manufacturers are made, but for our nowadays science has become so progress that different companies are making for this texture analyzers right. Many many companies are making typically for food texture analyzer, because other textures like everybody as texture, even you go to metallurgy they have the steel, iron these that so many textures there wherever you will get that texture. So, textures are the textile, texture is one of a vital word.

So, it depend where the application in food it is altogether a different umbrella and normally we set texture in terms of texture profile analysis and in that this force versus deformation curve right that gives us lot of input lot of information and utilizing that information we can define texture altogether useful for food material, right. So, TPA or texture is measurement of texture attributes by mimicking, we are mimicking the act of the chewing this I said that we chewing. So, this chewing we are mimicking by the help of the instrument and that is and this information is utilized subsequently for different terminologies in terms of texture. The probe will interact with the food two times right. I cannot show you that texture profile analyzer here, but the thing is that if this base right, if this is the base and if this is a probe and on that base if this is a food material kept on that, right.

So, this probe comes here and touches it and from there it is pressed or taken out. So, this is done twice, right. So, two times that is being done and then change of force and time change of force and time will be recorded and from the force time curve texture attributes of this sample can be determined or calculated. So, this that probe texture analyzer which has come and given some force to the food material so that will be that will be automatically going to that information to normally to some computer, and in that computer there is also nowadays those software's are available which will analyze that data and give you the result in terms your texture analysis in terms of texture profile analysis, right.

And typically a curve looks like that.

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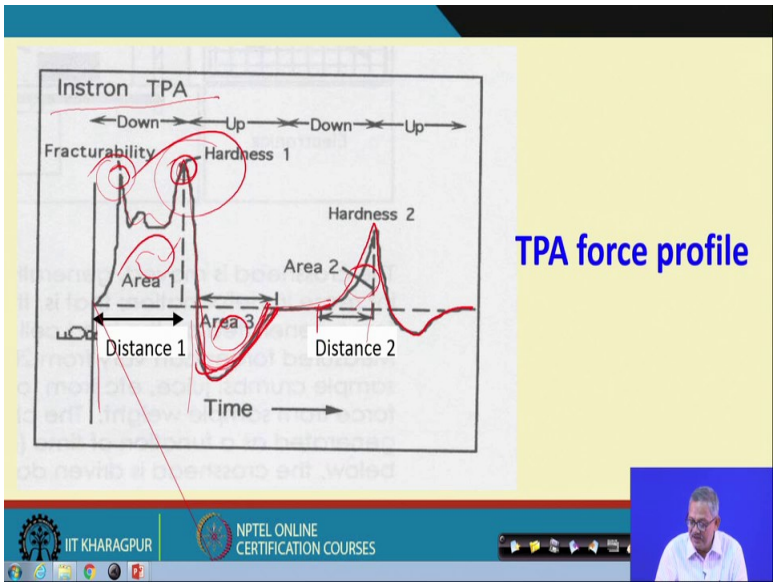

Texture profile analyzer curve looks typically like this right, and this is through an instron TPA. So, since instron is again one universal testing machine, instron is one instrumental or one company which makes like that there are many. But principal is all the principal is are same maybe they are their software's could be different, but by principal there like that. So, and there also as we texture many and many others do come in that, but we are not concerned about that much because we do not need much about the bending exercise forces etcetera.

But we would like to know how much like you have taken peanut, right. You have taken peanut in your mouth now you have to put pressure through your teeth right, how much teeth pressure is given that you are you are mimicking through this TPA or texture profile analysis, right. So, if you look at this, if you see that first this is the first point when it is at the time 0 here this your pro thing has come right and then, it is so sensitive you see I have put my hand here and, is very sensitive.

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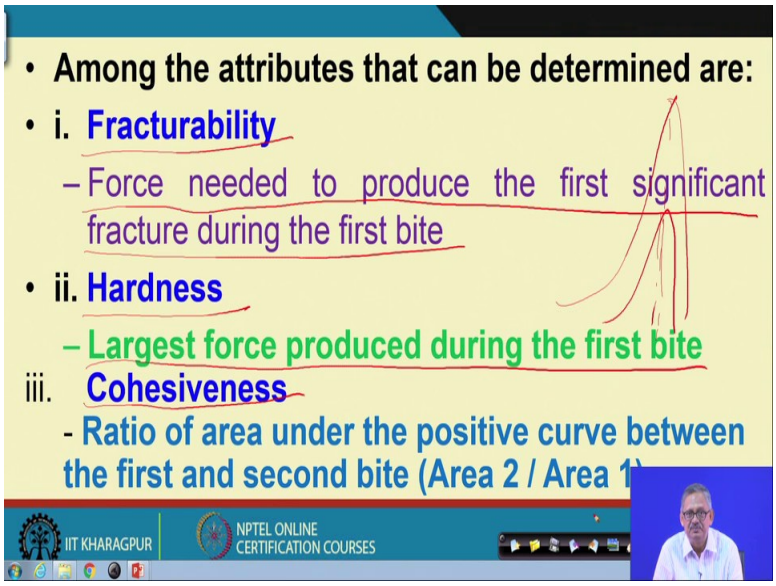

So, from there this pressure is going up right and then after this first deformation this has come out right and it is called the first bite or it is written as the Fructurability by which it has become fracture, right. Then it has come to this part this is called the again this is the first bite or this tells about the hardness right, hardness of the material that can be like that. Then it comes back to 0 and then it pulls, this is a reverse force you are applying. Here you are the direction of force which you are applying here it is the reverse right, and then following this, this again goes for the second right and comes like that, right. Now, these distances, these areas, like this, these areas, this distances all are and all are contributing to the development of different parameters on textures, right.

So, basically TPA looks like that we get area 1, area 2 and area 3 right. And we get to fix here one and here another and we get another small peak here and that is called fracture ability, right. The moment when the fracture comes in the typical product right and that is the fracture ability. How much hard it is it is called in terms of hardness how much hard it is right, how much pressure you have to put that is the hardness, then how much gumminess chewiness they are there. So, those things will be according to the either distance of this distance 1, distance 2 or area under A1, A2 and A3 so that we will discuss, right.

So, if you look at. So, among the attributes that can be determined by this TPA are first is the fracture ability right, which we just told first is the fracture ability. Now,

Fructurability we mean that this is the Fructurability this we mean that the force needed to produce the first significant fracture during the first bite, right. The force which is required to make the significant fracture in the product during the first bite that is the fracture ability, right. So, quantity, quantify, you can quantity you are able to quantify right you are now able to quantify.

Then hardness, hardness is the largest force produced during the first bite. So, largest force which is required during the first bite can be said as the hardness of the material right, the more harder the more this will go right and then fall. If it is less hard it will fall like that, so more harder this will be more this height or this height will be accordingly, right. So, more harder means more force you are required to put.

Then cohesiveness is nothing, but the ratio of area under the positive curve between the first and second bite, that is area under 2 by area under 1. So, this is the TPA.

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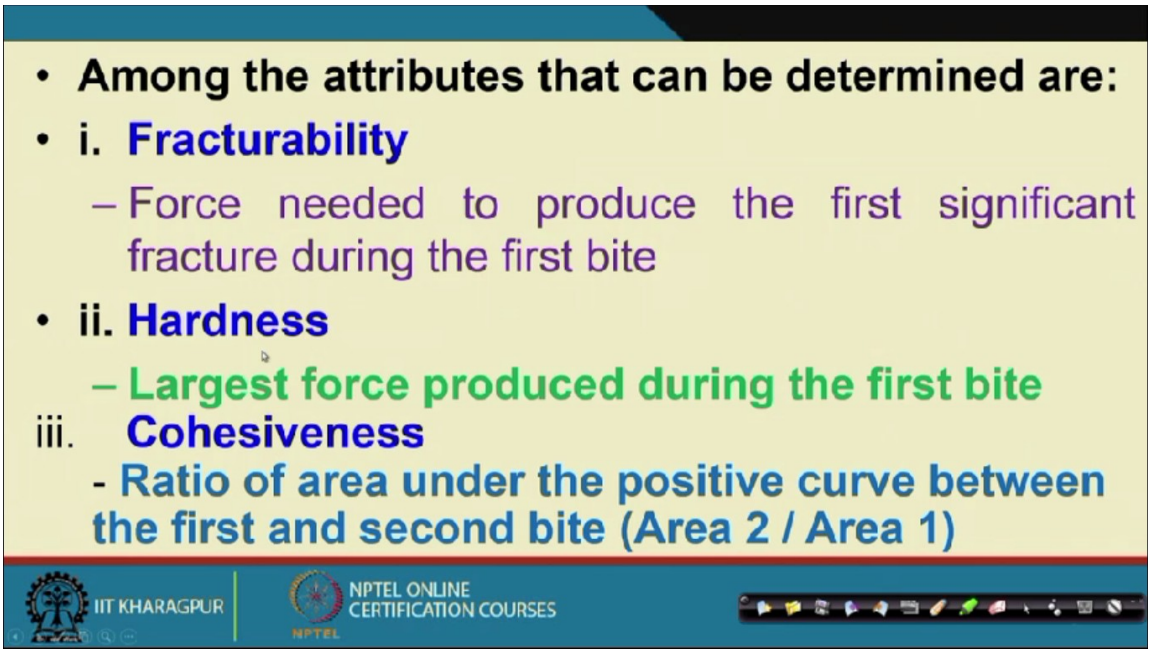

So, this was area under curve this was area under this curve area 1 right, this was area under curve 2, same during first bite same during the second bite, right. So, this area A1 and A2 this ratio that will tell us as you said the ah parameter which we just said that we will be, ok. So, this was cohesiveness.

The ratio of area A2 by area A1 right, I again go back because this becoming difficult that these 3 area we will remember A2, this A2 this and A3 this, right. So, this these are the two positive area that is why in definition we have said that the positive area ratio of area under the positive curve between the first and second bite that is area A2 by A1 is cohesiveness.

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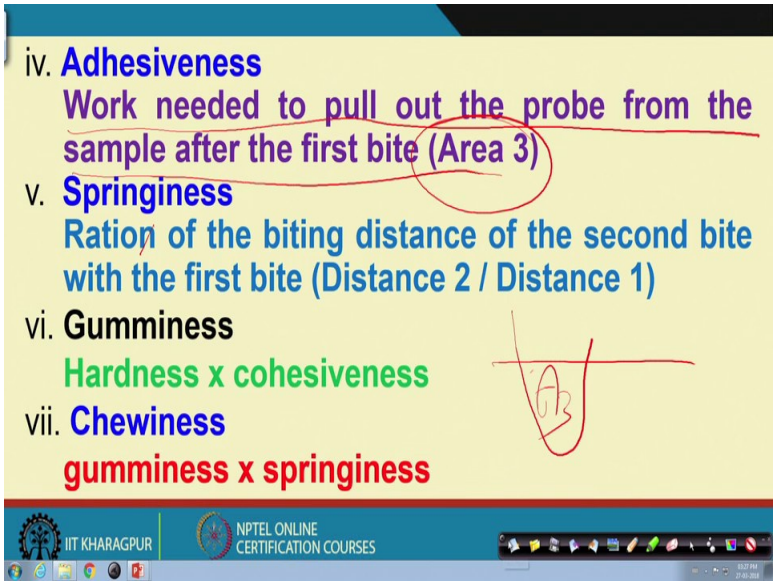

Others we can say adhesiveness right. Adhesiveness work needed to pull out the probe from the sample after the first bite. So, here made this, right. So, the whole material is between your teeth two teeth, right. So, it is stuck like that. So, after that when you are releasing right, how much force you are required to release so, that when you are releasing that will dictate the adhesiveness how adhesive it is, right. So, that is that what needed to pull out the probe from the sample after the first bite that is by area 3, you remember. So, this was that the lower part right, this lower part area 3 was, ok. So, this area will tell you that how adhesiveness it is.

Then comes springiness right, springiness this is ratio of ratio. So, ratio of the biting distance of the second bite with the first bite the distance 2 by distance 1, and again I go back to that if possible that, this is that this is the first bite. So, this distance again this distance this was the first bite this distance 1, distance 1 and this is the second bite because it started from here for second bite, right.

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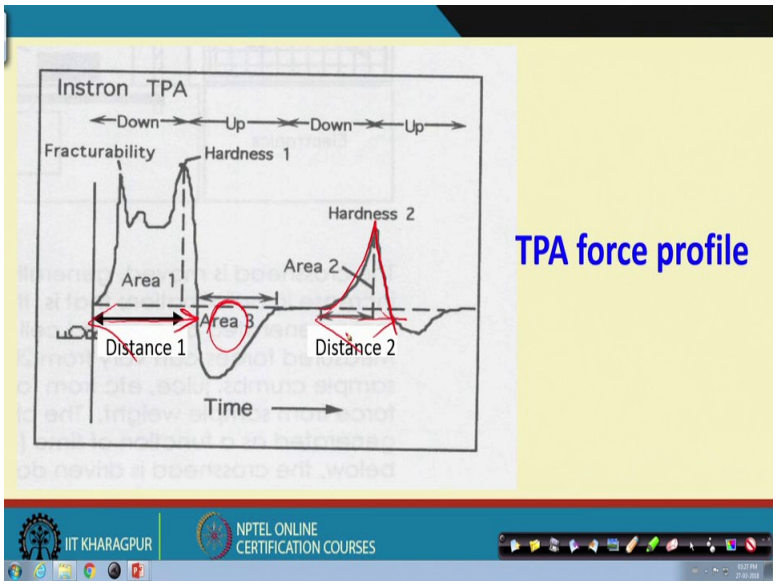

So, this the two distances will dictate, and this was area 3 which were used for cohesiveness, right. So, we have also seen that how much this distance this distance once we know that then we can say all the parameters, right.

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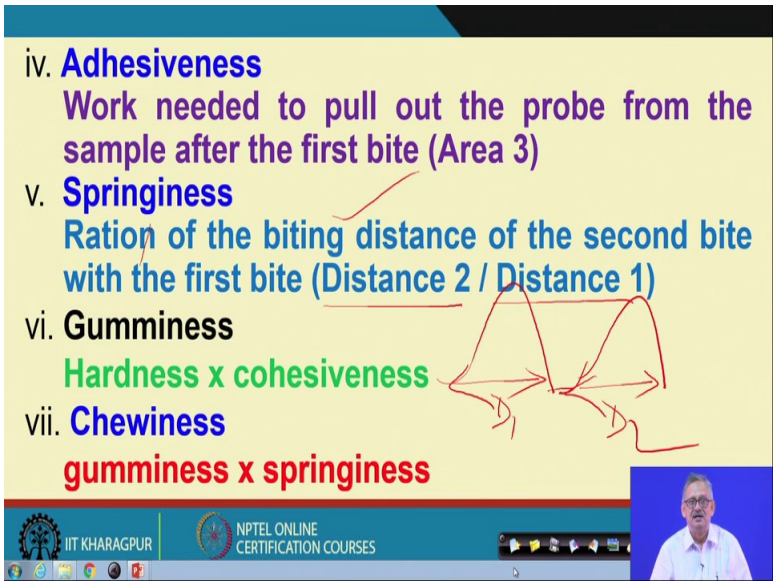

So, adhesiveness, cohesiveness is done. Then springiness, springiness is that the ratio of the biting distance of the second bite to that of the first bite, right. So, that is distance 2 by distance 1 right, distance 2 was this with the second bite and distance 1 was this for

the first bite right, this was that. So, this was d distance 1 and this was distance 2, right. So, D2 by D1 is the springiness.

Then gumminess, gumminess is the product of hardness and cohesiveness. And then chewiness is also a product of already measured that is gumminess into springiness is the chewiness right, gumminess into springiness is the chewiness.

So, once we know all of them then we can say that we are able to tell the texture properly, right. So, again I repeat one is fracturability, then hardness, then cohesiveness, and then adhesiveness, or springiness, gumminess and chewiness, all these we obtain from the texture profile analysis or TPA. So, you see you are able to measure, absolutely or calculate, absolutely for a definite food material what should be the quality parameters either before or after processing as and when you required. Obviously, this will be you will be implementing it whenever you are referring. So, you have so many parameters in hand to tell the quality.

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Then it comes really what about the product quality in terms of consumer point of view or in terms of retailer point of view.

Consumer wants that fresh tasty, variety and convenient food. Say, if you ask any consumer he will say I want quality in terms of freshness of the material or in terms of the taste of the material, variety of the material or convenience, how convenient it is. If

you say that I give you a product like this and now you do xyz etcetera steps to make it edible for you obviously, the consumer will check no may or may not be right. But if you say I give you this product you do not have to do anything to take home and open your covering that is the packaging material and directly consuming they like you like the most, right. So, from the point of view of the consumer he is liking in terms of quality will be that it should be as fresh as possible, it should be as tasty as possible or you should have various type of variety and also it should be convenient for the consumer. That is the consumer point of view quality you can say.

But the people who will be call retailers selling it will be selling it, right they will have also different quality parameters like they will say availability, obviously, a product which is very good, but not available so that they do not want because there to sell it. People will ask, consumer will ask and tell them, so there in terms of quality it will see it in the term of availability, then accessibility, then presentability, or then prolong shelf life how much shelf life it has, and also the conformance that how good, how bad it is, and that confirmation they want, right. That is from the point of view of the retailer.

Manufacturers will tell ok, we will meet the requirement of the whatever consumer wants or we will exceed the expectation of the consumer and the retailer that is what the producer or the manufacturer will target and tell to them for it is that right. But to the scientist as we have define is the quality parameters, right.

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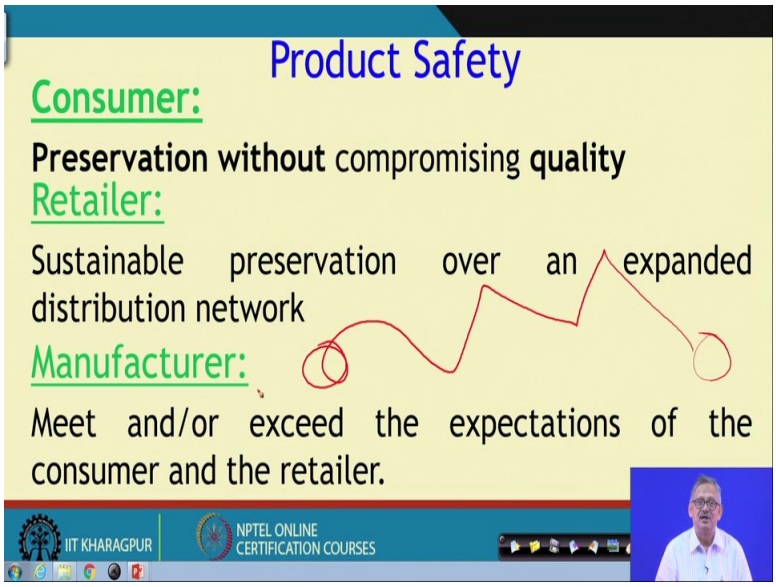

Then safety, how we can sell product safety? Consumer will tell the preservation without compromising quality it can be done is the safe, safest food. In terms of quality effect if I in terms of quality, if I do not have to forgo quality if I do not have to compromise with quality, and if the life can be extended to any desirable time then my safety is that, my safe food is that.

But retailer will say retailer means who is who is selling that if it is sustainable preservation over an expanded the distribution network right obviously, product could be product could be manufactured at a point so where, product could be manufactured at a point say here and then it will go from there to here then there to like that. So, this fellow will say to me my quality is should be sustainable in terms of preservation, over an extended distribution network right. And manufacture will say yes I will try, we will try to exceed the expectation of both consumer and the retailer and that can be safest food product, right.

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Then we come of course again it is another thing, today we have come almost to the end of the class very very limited time is available. So, before going into that emerging technology I feel let us recapitulate a little then going into the new topic that is the emerging technology which will take at least one period class.

So, if you look at then because again as I said that this is a very important material which we are dealt with today that this texture profile analysis or quality right, quality

parameter. This quality should have some parameters by the by the either consumer or by the retailer or by the producer.

So, in terms of them, there should be some quality parameters, but when as a scientist you are asked to judge a food material in terms of its quality then you should have defined parameters we said that the shape size and color of this, then flavor, aroma, they are then we also said texture, then we also said may be viscosity, if it is a liquid or semi liquid food and some other parameters like how long it can be extended and then how the packaging is coming in right because packaging is indirect. Why? Because packaging may help to extend the life directly or indirectly, so directly in the sense that if a product is not in contact with the environment outside that will save the product inside the packaging material to be contaminated, right. So, packaging plays an important role there.

Like that whatever you have discussed today, so fully you go through them very seriously and keep the quality term for the food products in mind, ok.

Thank you.