Organic Farming for Sustainable Agricultural Production

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Lecture – 36
Organic Food and Human Health

So, welcome to the next lecture 36, Organic Food and Human Health. So, by now we have discussed the quality of the food materials irrespective of the organic farming or chemical farming. So, based the ORS value oxygen radical absorbance capacity of the fruits and vegetables and we have discussed specifically the organic produce, the organic farming by organic farming and that gives the higher ORS value or the higher oxygen radical absorbance capacity as compared to the producer the chemical farming.

So that means, the consuming the fruits or vegetables having high ORS value, the daily intake as a natural sources of antioxidants; so, that can the control many diseases in human health. So, this lecture specially discuss the how the organic foods that can that can helpful for combating or the controlling the some chronic diseases in human health. So, coming this one as you discussed earlier, so, only the free radicals. So, the mechanism you also have discussed, but still a glimpse this one. So, as you see the free radicals so, these are the unpair is the free radicals unpaired electrons.

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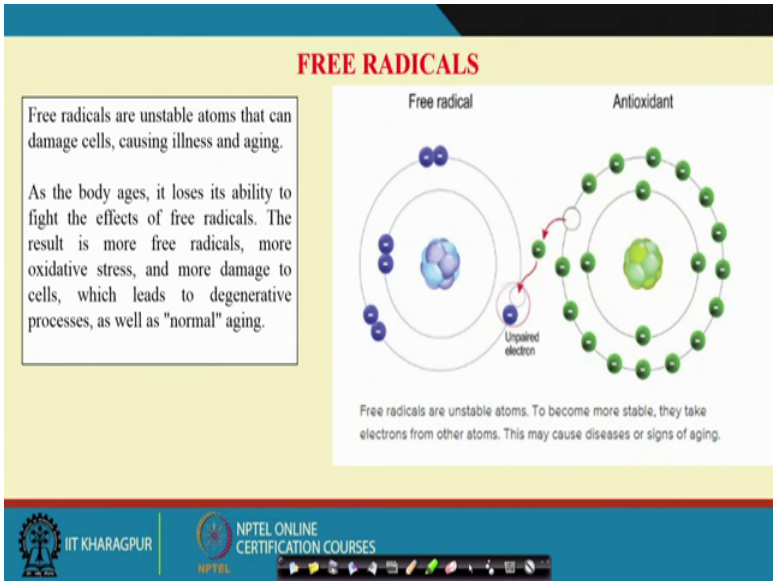

So, they needs the because this unpaired electrons so, they cause the cell damage, either damage of DNA because this is very reactive species as a unpaired electron so, reactive one. So, they do cause cell damage they have this challenging activity. So, they can damage the DNA. So, to make it the non-reactive so, it needs one electron that could that should come from other sources. Antioxidant what they do they do provide the release the electrons so, that it can neutralize these free radicals; that means, free radicals are unstable these are unstable atoms. So, to become them more stable they take electrons from other atoms and they make so, in that process they cause damage.

So, this the this can be made stable by providing electron. So, antioxidant role is that donate electrons so, that can neutralize the free radicals and that can scavenge the free radicals the free radicals can become inactive. So, that the you can minimize the damage the health problem. So, this is what the free radicals, free radicals are unstable atoms that can damage cells causing illness and the aging also because, when the higher formation of free radicals that can cause the aging. So, as the body adjusts it loses its ability to fight the effects of radicals. So, the result is more, so more free radicals, so, more oxidative stress and more damage to cells which leads to degenerative process as well as the normal aging.

So, you can see so, the aging comes because of the more formation of free radicals in the body so, that causes aging. So, usually we have to take the regular intake of the natural antioxidants. So, you know the Japanese so, they have the higher longevity and you cannot also the understand the years from Japanese people because, they take regular the no green tea. Green tea is a good source of polyphenols as a regular intake of the green tea that say polyphenols antioxidants. So, that we or any antioxidant see either the amla or any natural sources of antioxidants can take regularly. So, that you can minimize the formation of free radicals also these as a aging problem.

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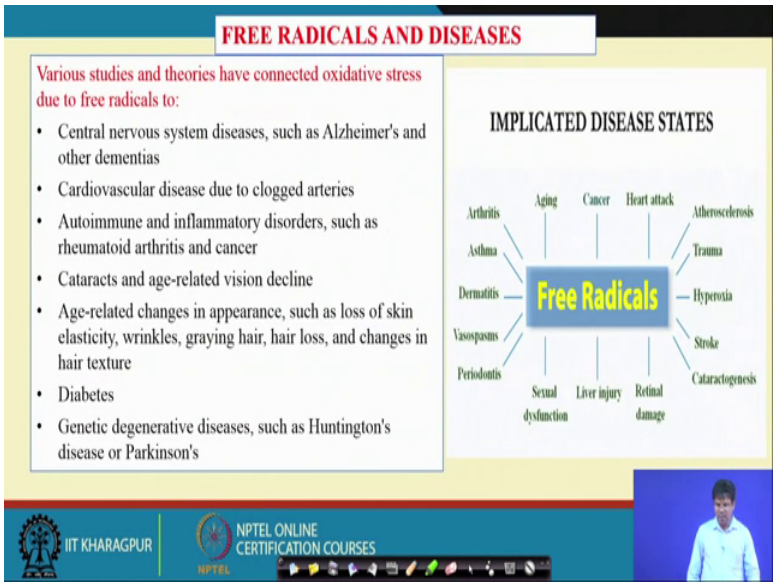

So, the free radicals and the what are the disease due to the free radicals we can say the various studies and theories have connected to oxidative stress due to the free radicals to what they have; what they in the effect of free radicals central nervous system disease such as Alzheimer's and other dementia that disease knows due to formation of the free radicals. Then of course, the cardiovascular disease due to clogged arteries, say free radicals because of free radicals. Then autoimmune and the inflammatory disorder such as the rheumatoid arthritis and cancers, that is due to the formation of free radicals. And, cataracts and the age related vision declines.

Age related change in appearance, such as loss of skins elasticity, wrinkles, graying hairs, hair loss and change in hair texture, diabetes then genetic degenerative disease such as the Huntington's disease or the Parkinson disease. So, these are the some of the disease that is there many other regions also there and free radicals formation also one of the reasons for this for this disease we cannot ruled out this free radicals. So, these are the diseases either the aging, cancer, heart attack, atherosclerosis, trauma, hypersia, stroke, cataractogenesis, retinal damage, liver injury, sexual disfunction, periodontis, vasospasm, dermatitis, asthma, arthritis.

So, these are the some of the disease that is due to the free radicals because having the formation of free radicals in human body. So, the sum of the disease can occur in the human body, if there is a regular formation of free radicals and if those free radicals are

not neutralized means our body we have the defense mechanism. So, this antioxidant the enzymes are secretin body, but they may not be quite enough to fight the free radicals. So, need the external sources and external sources that natural sources of free radicals should be supplemented daily to fight against the free radicals.

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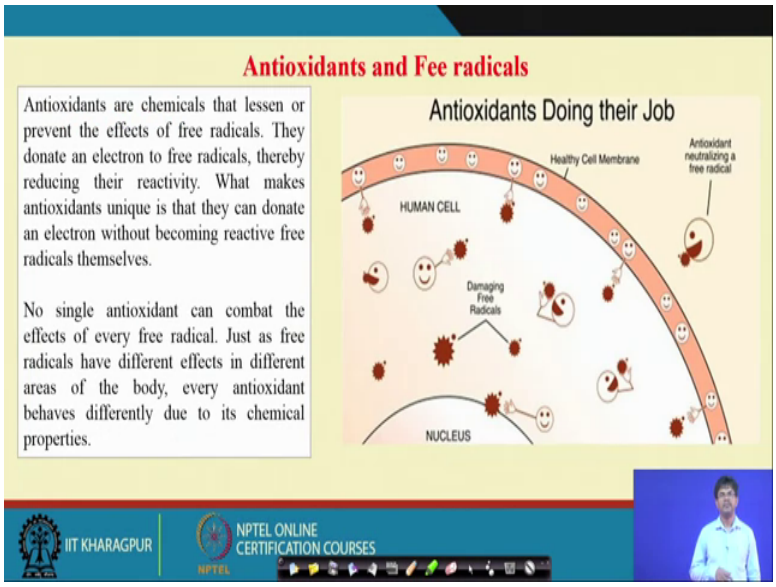

So, what antioxidant free radicals that they do the means the antioxidants are the chemicals that lessens or prevent the effect of free radicals. So, they donate an electron as you discuss the previous lectures. They donate an electrons to the free radicals, thereby reducing their act their reactivity. What makes antioxidants unique is that they can donate an electron without becoming reactive free radicals themselves. So, these free radicals after donating electron they do not become reactive. So, that is a beauty of the antioxidant. So, they do not free radicals.

They neutralize the free radicals and they do not make because the same time they do not become also reacting, they become reactive free. So, no single antioxidants can combat the effect of every free radicals. Just as free radicals have different effects in different areas of the body, every antioxidants behaves differently due to its chemical properties. So, the so as you see the antioxidant is a healthy cells and antioxidants they do neutralize these are the free radicals. So, the free radicals are damaging free radicals. So, the they make damage nucleus. So, having anti regular intake of the antioxidants, they can neutralize the free radicals and they protect the human cell from the damage.

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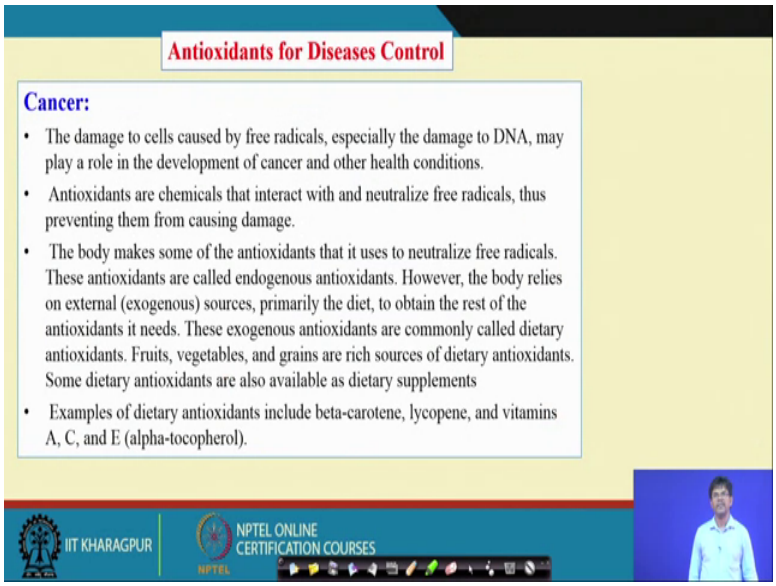

And there the we will discuss some of the antioxidants and for the disease control. So, what are the antioxidants can be can be antioxidants can be used for controlling some diseases. So, cancer is you know a very deadly disease. Now, you can see the cancer patients the populations that increasing day by day. Even if the earlier we had the diagnose of cancer only from the cities, you say there is a pollutions no quality of the airs and the food. Now, we can say cancer person also growing in a village areas, in village everywhere many families we are seeing the cancer patient as it is growing. So, because cancer the damage where the cancer damage the cell called by the free radicals, especially the damage to DNA, may play role in the development of cancer and the other health related conditions.

Antioxidants are chemicals that interact with and neutralizing free radicals does prevent from causing damage. So, regular intake antioxidants not that after the detection of the cancer it may very difficult after control but, to avoid to have such disease we should have a regular intake from the usually from the childhood, from the young age we should take regular intake of the antioxidants in your daily diet. So, that you can neutralize body can neutralize the free radicals; so our such disease. The body makes some of the antioxidants that it uses to neutralize free radicals. Of course, this is the natural defense mechanism within the body. So, these antioxidants are called the endogenous antioxidants those are secreted from the body.

However, the body relies on external or the exogenous sources primarily the diet to obtain the rest of the antioxidant it needs. So, these exogenous antioxidants are commonly called dietary antioxidants. So, the as you see that body has own defense mechanisms. So, there is a secretion of the glutathione peroxides, many antioxidants are there, but they are not enough to fight against these free radicals. So, you need the external supply. So, external supply best shows the natural sources, we can take the daily intake of the fruit and vegetable they can supply the natural antioxidants.

So, that is a fruits, vegetables and grains are rich source of dietary antioxidants. So, some dietary antioxidants are also available as a dietary supplements. So, those can be taken regularly to fight against the deadly at the free radicals and to protect the human being from different disease like cancer. So, examples of dietary and antioxidants are include the beta carotene, lycopene and vitamin A, C and E that is a tocopherols. So, these are the secondary metabolites that can be taken from different sources. We have discussed already the sources of this the secondary metabolites. So, you can the regular diets this can be included so, that they can fight the formation of the free radicals.

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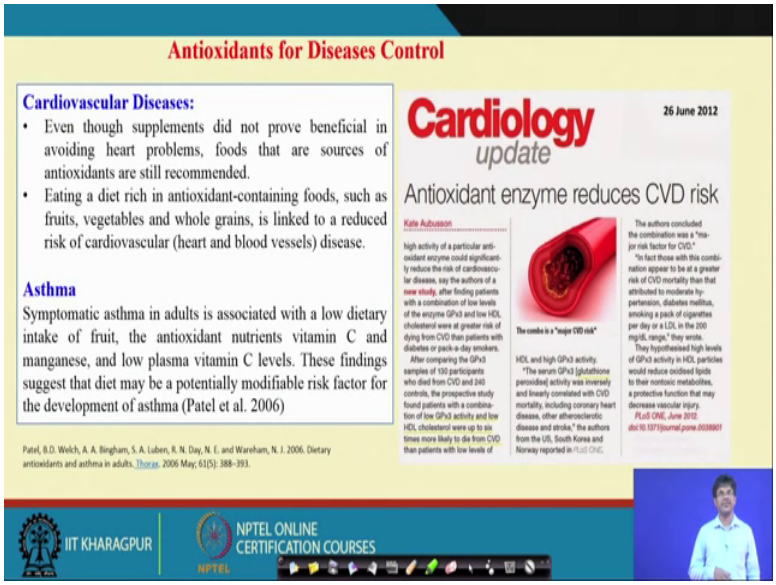

So, another disease that say the cardiovascular disease. So, this cardiovascular disease heart disease you can say. So, this is the even though supplements did not prove beneficial in avoiding heart problem, foods that are sources of antioxidants are still the recommended; have the regular intake of the fruits. Natural sources of antioxidants to

fight the free radicals and to avoid these cardiovascular disease. Eating a diet rich in antioxidants containing foods such as fruits, vegetables and whole grains is linked to a reduced risk of the cardiovascular the heart and the blood vessel disease.

So, this is one of the study that indicates that the body that say the enzyme, that say if the body has low enzyme there is a glutathione peroxides and the low HDL cholesterol. If you have the low enzyme glutathione peroxides and low LDL cholesterol and the human being is a greater risk of the dying from cardiovascular disease. So, SDL high density lipoprotein cholesterol that is a good cholesterol for the human being. LDL is a bad cholesterol that is say low density lipoprotein. But, the HDL the high density lipoprotein that is a good cholesterols. If there is a low amount and also the glutathione peroxides is a low amount so, those the human being are highly prone to the cardiovascular disease.

So, this study also says that combination of the low glutathione peroxides and the low HDL cholesterol were up to six times more likely to die from cardiovascular disease than patient with low levels of HDL and high levels of GP 3 activity. So, that means, having the low levels of glutathione peroxides enzyme so, that causes this more risk for the patients says six times the more risk to die from the cardiovascular disease as compared to the high levels of glutathione peroxides; that means, this enzymes. So, those the glutathione peroxides enzyme activity so, those things as a as a antioxidants they come from this the natural sources having the natural the natural antioxidants.

So, foods and the say foods or the fruits vegetables and whole grains are discussed you can take regular intake. So, they can fight the free radicals. So, they can protect from such type of disease and asthma the that is say the symptomatic asthma that in adults is associated with the low dietary intake of fruits, the antioxidant nutrients vitamin C and manganese and low plasma vitamin C levels. So, this finding suggest that diet may be a potentially modifiable risk for the fact of development of asthma. So, we can so, having the diets; that means, the whatever disease you see so, most of them are they regulated by the daily food intake what type food you are taking.

So, food is very important whatever food you are taking and more over also the fresh foods and the processed foods and the junk foods know. If so, daily intake daily if the now the obesity also is the great problem. In many developed country they want to come down the obesity by having the by reducing the junk foods and have been taking fresh

foods. So, fresh food in organic farming also the food processing also we do not prefer to have the processed food. Fresh fruits are the better they have the high antioxidants as compared to the processed foods. And, also the foods from the organical produced crops have the less residue of pesticides and that is the good for health as compared the foods from the conventional or the chemically produced pesticides.

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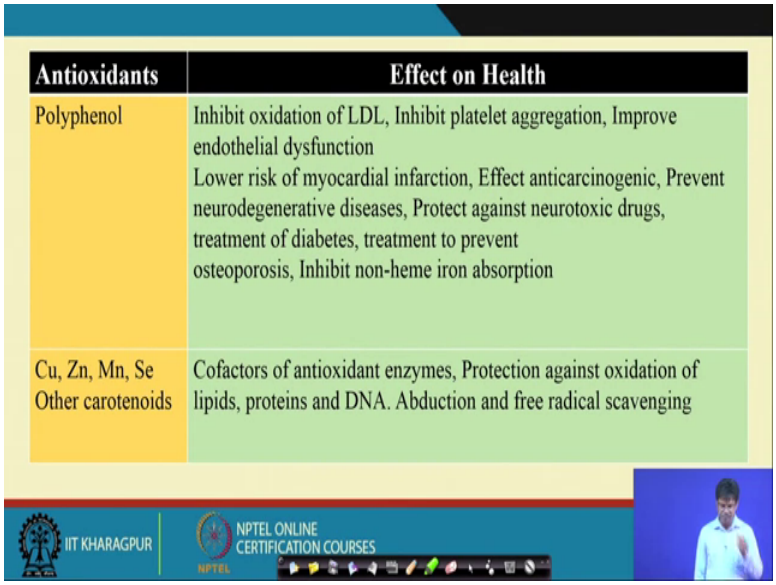

So, we will discuss the antioxidants and the effect on the human health. So, like the polyphenols so, that inhibit the oxidation of LDL there is a low density lipoproteins and inhibit the platelet aggregations, improve the endothelial dysfunctions, also the lower risk of the myocardial infractions, then effect on the anticarcinogenic that can avoid the cancers and prevent the neurodegenerative diseases, protected against the neurotoxic drugs.

Also, treatment for the diabetes and treatment to prevent the osteoporosis and inhibited the non-heme the iron absorption. So, this is the function of polyphenols. So, by having the polyphenols the from natural sources we can avoid the you can take care of this health problems. Also, these are the copper, zinc, manganese, selenium other carotenoids. So, that the cofactor of antioxidant enzymes. So, protection against the oxidation of the lipids proteins and DNA and abductions and the free radicals scavenging activity.

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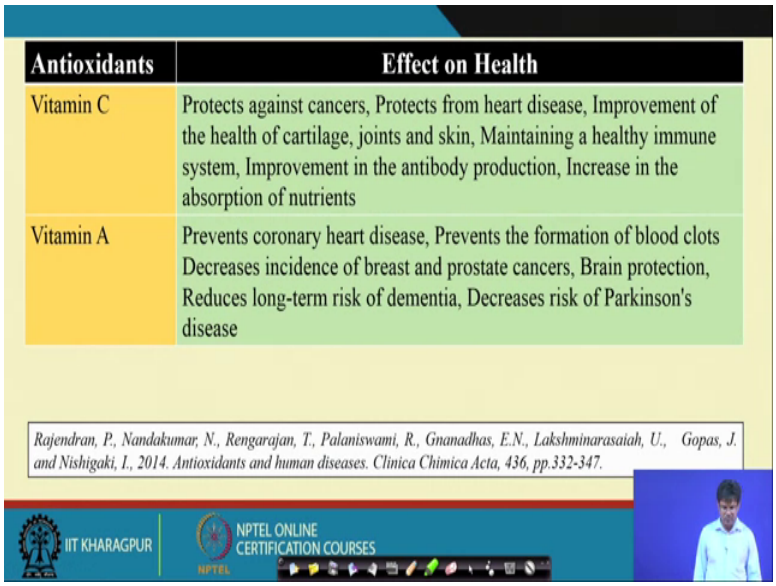

So, other antioxidants like the vitamin C that is say protect against the cancers and also protect from the heart disease, improvement of the health of the cartilage joints and skins. And, maintaining a healthy immune systems, improvement in the antibody productions and increase in the absorption of nutrients having the vitamin C. Similarly, the vitamin A that prevents the coronary heart disease, prevent the formation of blood clots, decrease the incidence of breast and the prostate cancers, brain protections, reduce long term risk of dementia, decrease risk of Parkinson's disease.

So, these are the secondary metabolites or the polyphenols or the vitamins or the coenzymes. So, those are required in the daily intake of the foods regular intake of the foods required. So, to protect or to have a healthier because now, healthy bodies and to keep the body for the better work and the feed the body make healthy body. So, that needs the diet control so, diet should have the fruits and vegetables and mostly the fruits and vegetables should be free from the pesticide residues.

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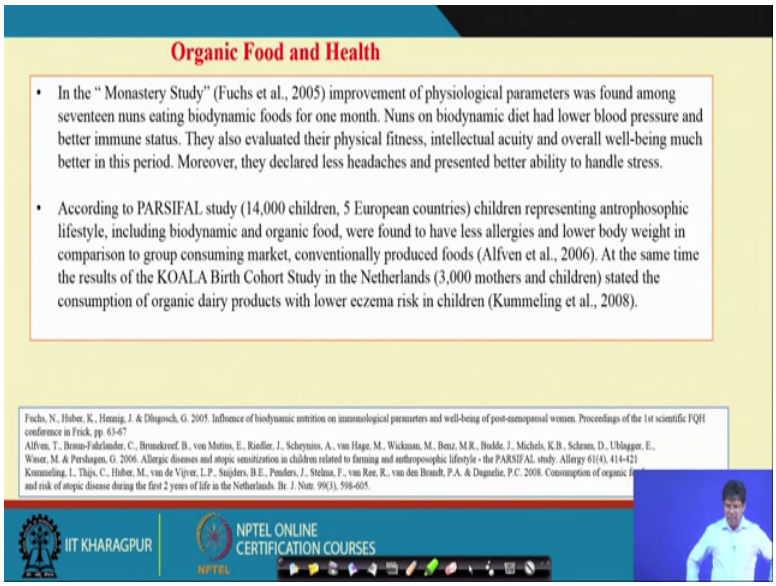

And how the organic foods we have some reports why the organic foods are the healthy foods and they have the better health benefits as compared to conventional foods. So, we will discuss some of the study this is in the in the Monastery studies that is a from this reference you can see the a Fuchs et al., 2005 improvement of physiological parameters was found among seventeen nuns they eating bio dynamic foods for one months. That means, so from the one month of study found the so, bio dynamic it is a organic the components of the organic farming having the bio dynamic foods, they have the improvement in the physiological parameters that is nuns on biodynamic diet had lower blood pressure and better immune systems.

So, they also evaluated they are the physical fitness, intellectual activity and the overall well being a much better in these periods having the biodynamic food. Moreover, they declared the less headache and presented better ability to handle stress; having the organic or the bio dynamic food as when compared to the nuns from the conventionally produced. They are consuming the conventionally produced foods. The another study according to PARSIFAL study 14,000 children's in 5 European countries they found children representing antrophosophic the lifestyle; that means, the spiritual lifestyle including the biodynamic and the organic foods were found to have less allergies. And the lower body weight in comparison to group of the children they are consuming the from the market as a conventionally produced foods.

And, also at the same time the results of the another study the KOALA Birth Cohort Study in Netherlands they also reported that consumption of organic dairy products with that has the lower eczema risk in children. So; that means, so these are the some of the study the reported reference also given. So, you can go through these references and this indicates that organic foods have the better health benefits as compared to the conventional foods and also, another study the pesticide residue.

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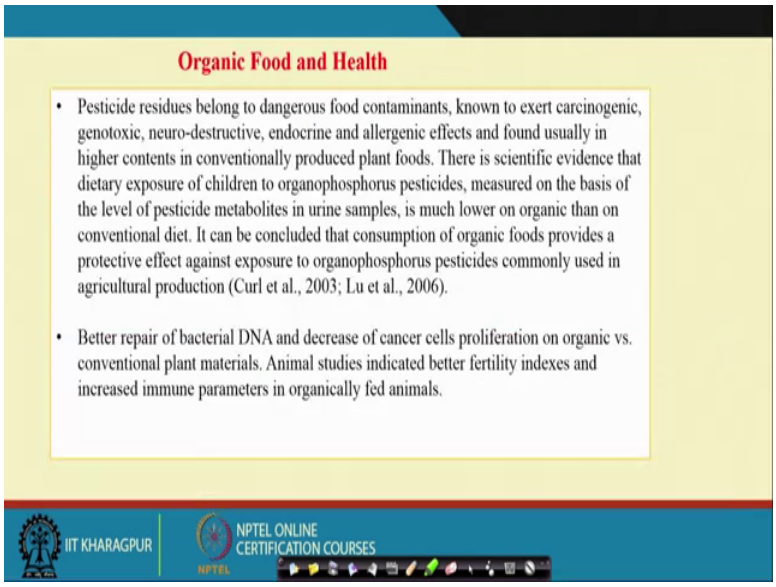

The pesticide residue belong to the that the dangerous food contaminants. Now, they can have the they exert the carcinogenic, genotoxic, neuro destructive, endocrine and allergenic effects and found usually in higher continent in conventionally produced plant foods. So, these are the pesticide effects. So, those are the most of the pesticide residue are higher in conventionally produced food as compared to the organic food.

So, there is a scientific evidence that dietary exposure of children to organophosphorus pesticides, measured on the basis of the label of pesticide metabolites in the urine samples, is much lower in organics than on conventional diet. So, these compounds are found that say organic the people are taking organic diets had the most lower content of the in the urine samples are analyzed, organophosphorus pesticides as compared to the people from the conventional diet. It can be concluded that consumption of organic foods provides a prototype effect against the exposure to organ phosphorus pesticide commonly used in agricultural productions.

And, for also another study better repair of a bacterial DNA and the disease of cancer cells proliferations on organic versus the conventional plant materials. Animal studies indicated that better fertility index and increased immune parameters in organically fed animals. So that means, that indicates the organic produced food. So, they have the less pesticide residue and the low pesticide residue. So, that can cause a better health benefits and that can minimize many of the chronic diseases.

The adverse effect of the pesticide residue reduce because conventional foods have the pesticide residue the above the maximum MRL maximum residue limit levels. So, those causes several the chronic health problems. So, having the regular organic foods; that means, you can see organic foods are free from pesticides. So, that we can we can avoid many of the health related issues. So, will give some examples of the pesticide residue in the food (Refer Time: 19:42) in the human body.

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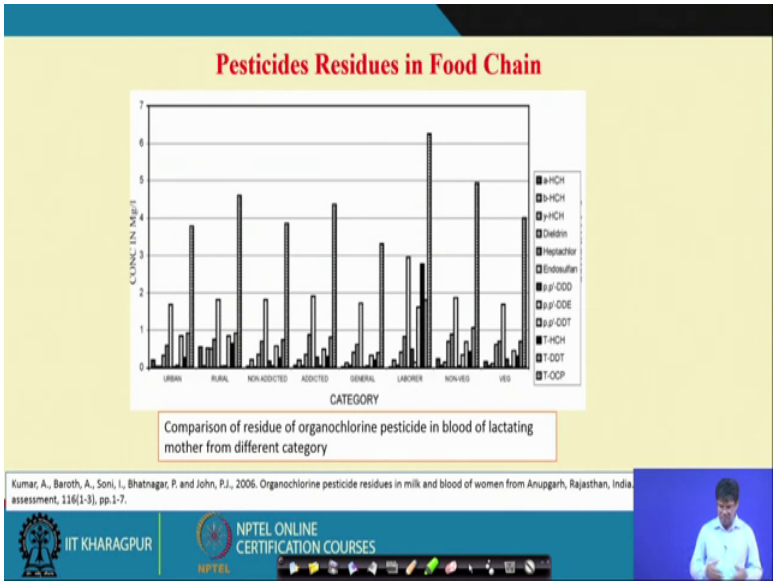

As you see one of the study here you can see the comparison of the residue of organochlorine pesticides in blood of lactating mother from different category. You see the organochlorine pesticide means the DDT or the dichlorodiphenyltrichloroethane or the DD group of pesticides those are these are the organochlorine pesticides. And, this is a resistance will be used in India and also all over the world they are used. And, if you see the if the comparison of the residue of the in this organochlorine pesticides in the

lactating mothers in the blood of the lactating mothers, you can find that different categories of the mother you can find the from the urban and the rural populations.

So, this residue has a higher in the women in the rural populations as compared urban population thoroughly, they are the more exposed to the pesticides in rural areas in agricultural applications. So, the woman in rural area there they are the highly vulnerable. So, detected are the more pesticides in the rural woman and the other cases non addicted and addicted means either the tobacco or the brittle lips. So, in that cases also so, those who are the women's are addicted to this they have the higher level of the pesticide residue in their blood as compared to the non addicted woman's.

And, also if you compare it from the general category to labor category the labor categories of extensive sufficiently higher than the significantly higher pesticide residue in their blood as compared to the general category. Especially the labor category means, they are exposed to the farm fields and exposed to the pesticide applications and the spray in the air and also in their activity that the. So, that say they have the higher content of the pesticide residue in the blood of the laborer has compared general category and if see the vegetarian non vegetarian. So, non vegetarians have the higher content of the pesticide residue as compared to the vegetarians.

So, as go on these food sense from one stage to another stage; so, as they consume on the suppose the either the poultry or the cattle. So, they do consume the pesticide residue from the residue also this is in same that also transfers to the human body have being vegetarians and non vegetarians of the more pesticide residue as compared to vegetarian. So, these are the some of the example we can say that the woman's, they are exposed and the lactating mothers. So that means, the milk also contaminated that as the blood is contaminated milk is also contaminated with the pesticides and also there goes to the young one baby.

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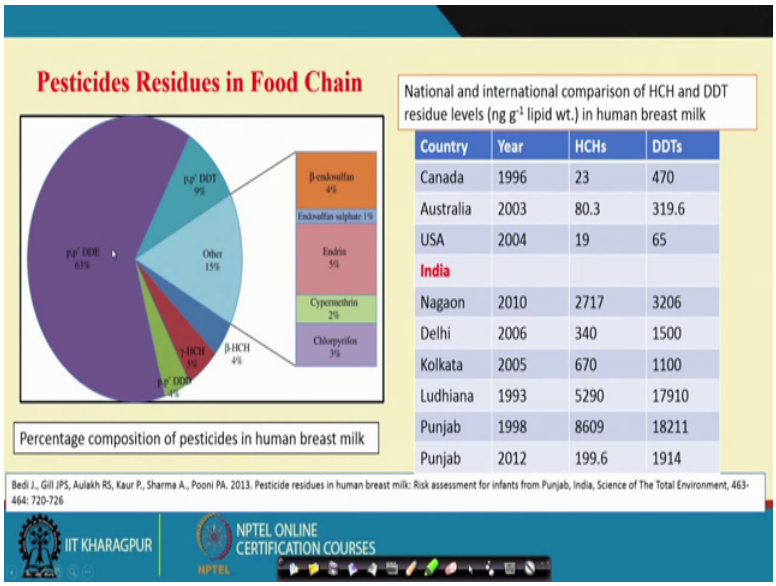

So, this example also you can say in another study if you see how the pesticides are very harmful and that caused the human health problems. The study in the pesticide residue in food chain in India; if you see the percentage composition of the pesticide in human breast milk, you can see here that around this is a the Indian study you can see in the. So, here around 63 percent of the DDE that is a the organochlorine pesticides groups that is a higher around 60 percent in the human breast milk. There is dry chloro diphenyl ethane so, this is around 63 percent.

So, there are others HCH and HCH and also hexachloro hypochloro hexane compound or the DDT the 9 percent and others means the endosulfans, endosulfan sulfate, endrine, cypermethrin chlorpyrifos this is around 15 percent's and this DDD. So, these that means, the organochlorines pesticide the DDE that is a maximum amount 63 percentage is found in the human breast milk. Also, that see compare the national and international comparison of HCH and DDT the hexane group and the organochlorine group residue levels as nano gram per gram of lipid weight in human breast milk. You can see different countries see Canada, Australia, US.

And this year of study in 1996, 2003 in Australia, 2004 in US, see the hexane groups you can see the Canada it is 23 and DDT around 470 nano gram per gram of lipid weight in the human milk. And, in case of Australia this is around 80.3 and 319.6 of DDT and USA HCH is around 19 and DDT around 65. But, come to Indian figure if you see as

compared to the abroad as you see are all developed country Canada, Australia and US. So, their figure of the action group and the organochlorine pesticide groups, if you come to Indian figure the Nagaon Nagaon just say this located in the northeast part probably some parts Assam.

In that case you can 2010 study shows HCH amount 2717 nanogram per gram of the lipid and in case of the DDT 3206 nano gram per gram of. So, it is very high as compared to the developed country, in India what are the pesticide that is found in the human milk much has significantly higher as compared to the developed country. Similarly, you can (Refer Time: 25:04) the Delhi it is around 340, in case of HCH and 1500 in case of the DDT. And, in Kolkata this around 670 in case of HCH and DDT it is around 1100. Ludhiana where there is a rampant of the excessive use of pesticide as Punjab and Ludhiana, their figures are highly alarming. You can see here Ludhiana it is around 5290 in case of the be HCH and 17910 in case of the for the DDT.

Punjab interestingly confined, Punjab in case of the 1998 its DDT was 8609 and it came down to one 199 in 2012. Because so, there is a control measures, after that they have taken control measure applications from 8609 nano gram per gram of the lipid weight it came down to 199 points or 1 and two 200 nano gram per gram of lipid weight. Similarly, the you can find the DDT that the chlorinator the organ chlorine pesticides, it was in 1998 18211. And, came down to 1914 in 2012, though it has it has come down still it is very higher as compared to the figure we have seen from the developed world its very higher in India.

So, this gives a highly alarming because, this type of pesticides in the human milk that goes that in the portion that goes to young baby also, this study that is reported by the Bedi et al in the Science of the Total Environment in 2013. They have also reported because, of the human milk that goes transmitted, because they are feeding of the baby as a breast feeded baby. What I mean this pesticide goes to the children newborn baby. And, if see the provisional daily intake of the pesticide in case of the children, if you if you take in front of the 5 kg weight. And, he can take the 700 gram of the milk per day.

If you calculate the concentration of the this pesticides the either the hexane group or the chlorinated hydrocarbon chlorine group pesticide, the estimated daily intake of the pesticide in the in the baby. And, the provisional the tolerable daily intake, if you

compare that one the specially for the DDT the in daily intake in the here the young baby is around 12 times higher than the provisional daily intake. So, those this report also they have reported say around 3 to 12 times higher than the threshold level, you can say or the provisional daily intake of this baby whatever the recommend or the minimum the maximum level. And, it is around 12 times higher DDT into in this Indian regions.

Similarly, the hexane group also, but that is very this around 1.2 or maximum 2 times higher as compared to the provisional total daily intake. So, this indicates that the newborn baby; so, they are also taking they are also carrying these pesticides from the mother. And, that has a because now having the pesticide in the food chain because of the chemical farming because, of chemical farming if. As you discussed earlier 82 percent, the produced of the chemical farming they are contaminated and the residue is the above maximum residue limit. So, having the chemical produced in the daily the your dining tables or the on the tables; that means, you are taking the presence and also the pregnant woman.

So, they are also consuming that one and those transmit the newborn baby and you can find now cancer disease or many disease from the young age also; children because who has only seen the earth may be 4 months, 5 months they are also diagnosed or detected as cancer because of the food chain. So, this gives a signal or this indication that we need to very careful our food habit or the daily food habit daily food intake; we should be as much careful very careful because of food habit. So, that they can take a good food, fresh food and healthy foods and mostly the foods free from pesticide residue. And, that can be possible it can go for the organic foods. Daily intake of organic foods we can remain free from pesticides and for a better health and for a better environment for a healthy child's. With this I thank you all.

Thank you.