

## **Sports And Performance Nutrition**

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**Week-03**

### **Lecture-14: Antioxidants**

What are antioxidants? What is its role in supporting an athlete's health? What are the other food sources of antioxidants and should an athlete take antioxidant supplements? Those individuals who are into fitness or athletes from novice to the elite who train for several hours a day can produce a lot of free radicals. Free radicals are those molecules that have lost an electron. So obviously they are unstable and when they are unstable they try and steal the electrons of the immediate cell. So this way free radicals set out a chain reaction and this chain reaction can damage cells with genetic material as DNA, protein and this can impact a muscle tissue. This is also the same process that fastens aging and also initiates certain diseases. Also athletes with their prolonged training sessions have a higher need to quench these free radicals and that increases the oxidative stress in the body.

This exercise induced inflammation can make an athlete very fatigued. That's where antioxidants come into the picture. Like the old saying goes, let food be thy medicine. Food can be very powerful and have several compounds that can protect the body from this free radical damage.

So the way the antioxidants from our food can neutralize these free radicals is what we call oxidative stress. The fine balance between antioxidants and the pro-oxidants or these free radicals. It's something like the job of a class teacher or a mother or two students fight. You need to intervene and if they're fighting for one same common pen then you become magnanimous by offering your own pen thus neutralizing their fight. That is what antioxidants do.

So antioxidants donate their own electron to these unstable free radicals thereby stabilizing them and cutting off the chain reaction of the process of taking on electrons from the neighboring cells. So how can athletes prioritize to get antioxidants? For all those of you who don't enjoy eating your vegetables I hope this can be a reminder. Eating dark colored fruits vegetables offers beta carotenoids or vitamin A. In the previous chapters we've already touched upon a bit of a vitamin C. Similarly vitamin E is a very powerful antioxidant and we commonly refer to this as ace vitamins.

We are anyway going to be spending another lecture in understanding vitamins in detail. All yellow colored red and dark green leafy vegetables give you vitamin A. Vitamin E is found in almonds and citrus fruits such as oranges are rich in vitamin C. These vitamins not only help manage they also blunt the long term stress hormone cortisol. Athletes with strenuous exercise and long hours of physical activity can have elevated cholesterol.

If you recollect our first chapter on carbohydrates on how we talked of manipulating the carbohydrate to keep the maximum absorption of the fast digesting carbohydrates before and immediately after training either to fuel a workout or to refuel it. So the recovery of glycogen

can get slowed if we add a lot of protein fats and fiber. So you may ask when should athletes eat vegetables and the dietician says you should eat four to five servings of vegetables a day and that can roughly be a half to one katori hundred grams of cooked vegetables and of course if it's salad change and of course if it's salad it can be a larger volume. Certain vegetables as dark green leafy vegetables have higher fiber content in them. So if an athlete needs to consume vegetables in a meal which is just immediately after training is there a way to make this better? Yes instead of choosing high fiber variety of vegetables like the dark green leafy ones or maybe an enormous salad you can enhance the absorption of carbohydrates by cooking the vegetable.

The cooking process softens the fibers and makes it easy to digest particularly if you are looking to incorporate vegetables in a meal immediately after your workout and the starchy ones such as what is shown in this photograph as carrots, beetroot, potatoes can also offer carbohydrates as they are starchy vegetables. Well if it is salad now you lost me. If I have trained a midday session and I jump into lunch directly now when should I incorporate raw vegetables? You can plan to enjoy your salad away from training time so that way you are not going to thwart the absorption of carbohydrates which can be essential for recovery. Salads can also be enjoyed on rest days where you don't have any training. We recently discussed the importance of these antioxidant minerals, selenium and zinc that can be great antioxidants other than the yellow, red vegetables and fruits, dark green leafy vegetables, the deep colored fruits like what is shown in this picture of the Jamun fruit contain plant pigments which are polyphenols, the anthocyanins and these berries are power packed with nutrients such as antioxidants.

Another simple way of ensuring your antioxidant intake is to make sure you consume a cup of tea and I am referring to not the chai but the black tea, the green tea, lemon tea, oolong tea. Green tea contains a very powerful antioxidant, the catechins, epigallocatechin gallates are best absorbed also when you add a bit of lemon juice that can enhance the absorption of these catechins. Similarly a black or a lemon tea offers thea-flavin and if you enjoy that variety please do check it out. Indian spices are versatile and popular world over. Curcumin came to the fore through the pandemic.

The ones who had covid also were given a large dose of curcumin extract of even 1000 mg. You keep in mind doling a whole lot of turmeric may not help you meet the high demands of curcumin. If you are under the weather or looking to maximize your curcumin intake a teaspoon of turmeric may roughly give you only 200 mg of curcumin and as a reminder you may already know how astringent or strong flavor turmeric is who are under high training load and have poor recovery challenges can look at consuming a curcumin extract between 500 to 1000 mg. In our regular cooking there was a reason turmeric was added into the seasoning where the oil enhanced the absorption of the curcumin from turmeric. Also adding some pepper in the dishes that contain turmeric can also support the absorption of curcumin and for all those dark chocolate lovers like me please do enjoy a few cubes of dark chocolate they contain very powerful antioxidants called flavonoids.

Also to clarify dark chocolate also contains added sugar may be the proportion can vary so the recommendation is to choose at least 70% dark chocolate or if you can handle the bitterness. I have already emphasized whenever you consume your vegetables try and choose darker colors definitely seasonal you don't need anything imported. Local veggies that are more fresh and can offer more nutrients is beneficial, in fact frozen vegetables can hold more nutrition

than a vegetable that has been left in your refrigerator for over a week. I'm also often asked should we go organic or just choose the regular grown produce? I know that organic vegetables and fruits come at a very high cost and there are some mixed reviews to support that organic vegetables not only can be devoid of pesticides but can offer some more nutrients. Another question that typically comes up in my consultation is should I eat fruit by itself on empty stomach should I eat fruit with food fruit can be a great snacking option either before a workout in between a workout and of course even as an evening snack if you're not training. However due to constraints of your training schedule and there are many athletes who rise very early hours so I know athletes who do an early morning session and sometimes they'd like to take a midday nap. If it is not possible to fit in a fruit conveniently it's better to eat a fruit with food than not eat at all and I hope you agree with that also delayed onset muscle soreness kills the joy out of athletic training. One of the biggest symptoms I hear in several consultations is being sore from training and poor recovery after intense sessions or resistance exercise so consuming certain vegetables and fruits which are not only deep coloured they can help the recovery process. Pineapples contain an enzyme called bromelain the tart cherries which are available in ample in peak summer and the Indian version of the pomegranate and the beetroot which also can help reduce soreness and the nitrates from the beetroot they're going to spend substantial time learning about it in another chapter. Take antioxidant supplements let's see what the research data is suggesting resistance exercise and training and training can change muscle composition consuming antioxidants can actually prevent those training adaptations these training adaptations or transformation can actually work in your favor by improving your muscle force so a wee bit of that free radical that can be found due to the training can be beneficial for you but unnecessary consumption of an antioxidant supplement can blunt this training response in you. So you may ask me when and why should an athlete take an antioxidant supplement if there is a challenge to consume fruits and vegetables for a decent time duration or if the athlete is in an intense phase of a training cycle like a peak competition season and is under the weather and not recovering and falling sick often maybe that validates the use of an antioxidant supplement periodized to that cycle so ensuring the antioxidant supplement is given for only that short duration of time that will support you to recuperate and avoid further injury for those who don't fit this bill an antioxidant supplement is an unnecessary cost because a human body is magnificent a human body is magnificent and has some very delicate antioxidant-based enzyme defense system be it the superoxide dismutase or the glutathione peroxidase. So to summarize athletes ensure that you consume at least two to three fresh fruits daily and four to five servings of vegetables which are local and seasonal using Indian spices such as turmeric to enjoying the cup of green tea can be great antioxidant addition only if you're unwell and in the peak cycle you may want to consume an antioxidant supplement after discussing with the sports dietitian. I hope this lecture has helped you with some new insights thank you for listening.

Hi my name is Aher Chassi I am a swimmer who was born in India grew up in Kenya also swam in both countries swimming is a very straightforward sport you jump into the water and swim any of the four strokes. I specialize in backstroke. Which is a stroke that is swam on your back where you pull your arms, consecutively I specialize normally in the 200 and 100 backstroke so for backstroke we classify that as a short distance to middle distance in between but sometimes. I do participate in 50 meter backstroke also which is a sprint event 200 backstroke is the maximum the maximum distance you can go in backstroke and requires the most endurance and as an athlete endurance is key especially in sport like swimming we all

know that or we can all tell that swimming is a very tough and tiring sport it requires a lot of training to go into it not only in the pool but also out of the pool dry land sessions in in terms of gym so I currently study in the UK right now and I swim around eight sessions a week and on top of that I have dry land sessions in the gym around three times a week so fatigue is a kind of a daily occurrence in our week-to-week lives so high intensive training in the pool and both out of the pool increases oxidative stress and also lowers your immunity and the fact that .We have a lot of endurance training sessions are coupled up with a lot of gym sessions can increase inflammation in our body which creates these which creates the stress and fatigue that we go through and one thing that helps with me through my dietitian and nutritionist is taking omega-3 as a supplement omega-3 I mean obviously omega-3 is found and can be taken in normal everyday meals that includes eating different types of fish like salmon mackerel and like sardines but mostly for people who don't eat fish or don't eat enough of fish or any other omega-3 or any other foods that have omega-3 tend to take supplements or concentrated omega-3 supplements including me so taking omega-3 or fish oil supplements increases the antioxidant intake also other options could mean eating dark colored fruits or vegetables or green tea and omega-3 is a very important supplement to take in order to maintain a healthy life.