

## Flavonoids and sport

In the seventies, when I first encountered with flavons during my research in sports physiology, I did not think that this subject – the importance of use of dietary supplements – will ever become a central issue in sports medicine; through surprisingly direct connections, the desired unity of research and practice becomes reality.

At that time, Chinoin Pharmaceuticals made flavon products and did research on their efficacy to broaden the palette of vitamins, adding vitamin-like compounds to the pipeline.

The flavon compounds are uniquely belong to this group.

The University of Szeged had been the center of research with vitamins since the mid-thirties – Rusznyak and the Noble-prize winner Szentgyorgyi – carried out research with flavonoids. The above-mentioned research at Chinoin was also based on their work. At that time the task was the scope of efficacy of the products, not the well-known, full-spectrum flavonoids.

We came to the picture at this stage. It is well known, that lack of vitamins results in hypo-avitaminosis, and in case of fat-soluble vitamins, the overdose causes hyper-avitaminosis. In our field, the issue is hypo-avitaminosis, its role in both the disease susceptibility and the lower performance in sports. Specific types of avitaminosis, - the well-defined diseases: scurvy, beri-beri, rickets, etc. - are very rarely seen.

Similarly to vitamins, in general, flavonoids and vitamin-like substances effect metabolic processes. Typically, they effect the enzymes that regulate metabolic processes, making certain pathways more effective. These substances are not called vitamins, because we can't prove that any kind of disease occurs in case of their total absence in the human body. Probably, they are ultimately present in our foods. In case of their absence, similarly to vitamins, the result is lower performance and increased disease susceptibility.

Focusing on our research, obviously, it is easier and more plausible to prove the effect of one missing component during stress tests. Our stress tests in performance-research attracted more and more attention. Another important question is, whether the results of animal testing can be applied to human testing. Studying isolated components on animals is not easy, and in humans it is even more difficult. Animals can be kept in totally controlled environment and on controlled food supply. In humans, there are a large number of components to take in consideration; it is difficult to follow the role of one component precisely.

We used the swimming stress test on rats and we measured the effects of flavon products on their performance and also on the details of adaptation to stress that is the function of the hypophysis-adrenal system.

The addition of flavon products to the diet facilitated the adaptation processes and enhanced the performance of the animals. We presented these results at a number of pharmacology conferences at that time.

This subject appeared to be on the main path of interest at that time, because the use of performance-enhancing substances was already an issue in sports. It became obvious that offering a variety of dietary supplements added to normal diet is one of the most important elements in the battle against forbidden substances. The athletes being on an ever-increasing training plan had a demand for this kind of dietary support.

Flavonoids, found mostly in fruits, generally in plants, considering their metabolic effects are important components of human nutrition.

The widely proven opinion of our profession is, that the athletes' in competitive sports require a higher then average intake of vitamin-like substances, including flavonoids. It is a simple fact. Well known that athletes, – relative to the specifics of their sport, and the frequency and intensity of trainings – evidently, require

higher caloric-intake and in relation of these factors, evidently, require more of the non- energy-providing nutrients such as vitamins, vitaminoids and minerals. The increased demand for energy intake, or simply put, the increased burning of calories, oxygen use and use of enzymes demand increased intake of enzyme-activating vitamins and minerals.

In the last couple of decades scientific research has proved - this studies started on the need of vitamins and substances of antioxidant nature at the time of our mentioned research with flavonoids - that in certain pathological conditions, and also, in relation with exhaustive, strenuous exercise produces so-called free radicals, that, in excess, can lead to pathological occurrences. Antioxidants eliminate free radicals, protect health and increase performance.

The most important feature of the age of dietary supplements in sport medicine is the antioxidant effect. Naturally, in sports, the most prominent issue is the increase of performance, but we would also like to protect the athletes' health. It is important to mention, that flavonoids inhibit lipid-peroxydation through their free radical scavenger effects. It results in decreased level of LDL (low density lipoproteins), therefore, lower risk of arteriosclerosis, the hardening of the walls of the arteries. Also, they inhibit the formation of blood cloths; promote the durability of the wall of the arteries. It is well known, that sports have a positive effect on the cardio-vascular system, and the effects of flavonoids are synergetic.

Of course, the other, above described health-protective effects of flavonoids are also important for athletes, too. Namely, they are anti-carcinogenic, decrease the late complications of diabetes, antiviral, antibacterial and anti-allergenic.

The question is whether regularly consumed flavonoids increase performance, or simply protect athletes' health come up quite often. In my opinion, we should not divide these two effects, both are equally important.

Our vision is, that athletes need healthy nutrition on the first place. Sport nutrition means healthy nutrition. It is advisable to everyone, but for athletes, it is mandatory. Why would they put up with all the training, if their lifestyle counteracts with the positive effects of their training?

What is considered healthy nutrition nowadays? Among other things, consciousness with caloric intake, the use of minerals, vitamins, vitaminoids and proper fluid intake. There is a demand for flavonoids, too. Vitamin-like substances – through their antioxidant effects – are necessary components of nutrition.

Fortunately, there is a product that appears to be an adequate source to satisfy the athletes' demand for flavonoids. From the medical point of view we would like to think that our foods provide all the vitamins and minerals we need. Our experience is, that the guaranteed, sufficient intake is possible only if we use dietary supplements. It has been proven with flavonoids, too. We can expect real performance enhancement, not only the prevention of decrease of performance.

It is a very important fact, that Flavin7® has been examined and it does not contain any forbidden substances.

In 1993 in Zurich, I participated on a medical advisory panel organized by FIFA (Fédération Internationale de Football Association) focusing on aspects of soccer players' nutrition. The physician of the famous Italian club, AC Milan emphasized, that dietary supplements are very important, not only for nutrition but also for psychological reasons. We rightfully dislike the way how the harmful performance enhancers have changed the face of sports and sport medicine, but we all should acknowledge that the dietary supplements are the only medically, physiologically agreeable tools in the battle against forbidden substances. At least they are in compliance with the principle of “do no harm”, and the use of flavonoids takes it even further, it provides real nutritional support to athletes.

We derived the above detailed experience from our studies in the seventies. I am glad to see the re-emergence of this issue. The new product, Flavin7® makes it possible to continue the wide range of studies on human subjects. I hope, that our previous studies were only the beginning of a more solid body of research.

We are planning to conduct studies with flavonoids on athletes of different kind – strength, stamina, team-sports – in both sexes and different age-groups. We are planning to follow a large number of athletes taking flavonoids on a regular basis and stress tests, spirono-ergometric studies on a smaller number of athletes.

We predict the following results:

- Athletes will like the product
- No unwanted effects will be identified
- They are going to list a number of subjective positive experience
- Some parameters are going to show improvement

Researchers know that the new ideas come during the planning and conduct of studies, giving us new perspectives and insight. We trust these ideas to come.

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