Note

Carotenoids in Human Blood Plasma after Ingesting Paprika Juice

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We investigated the presence of different carotenoids in male human subject after the ingestion of paprika juice, and identified capsanthin, capsanthone, cucurbitaxanthin A, 11-cis-capsanthin, lutein and zeaxanthin in the human plasma. These results suggest that capsanthone and 11-cis-capsanthin might be as important as capsanthin for human health.

Key words: carotenoid; capsanthin; capsanthone; cucurbitaxanthin A; 11-cis-capsanthin

Dietary carotenoids play an important role in the prevention of cancer. Epidemiological studies have revealed a correlation between the risk of cancer, the dietary intake of carotenoids and their concentration in blood plasma. Different carotenoids present in common foods are accumulated in tissues and blood plasma. Khachik has identified about 20 carotenoids in human plasma. Many previous studies have suggested that β-carotene plays an important role in the chemoprevention of cancer. However, some recent studies have indicated that some other carotenoids possess equivalent or superior anti-tumour activity compared with that of β-carotene. To clarify the bioavailability of carotenoids other than β-carotene, Oshima et al. have studied the accumulation and clearance of capsanthin, a major carotenoid of Capsicum (about 35% of total carotenoids) in blood plasma after the ingestion of paprika juice by human male. These studies have revealed that dietary capsanthin was absorbed into the body and distributed to plasma lipoproteins. The concentration of other carotenoids present in paprika juice such as zeaxanthin, lutein, cryptoxanthin and β-carotene was also increased in the blood plasma. These studies also showed that capsanthin disappeared from the plasma at a faster rate than lycopene. However, some of the compounds present in blood plasma after the ingestion of paprika juice were not identified. The objective of this study is to identify those hitherto unidentified carotenoids.

Diets. Paprika was purchased from local distribu-

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blood for a longer period. After a single ingestion of paprika juice (diet 2), the decrease in the amount of capsanthin was accompanied by a simultaneous increase in the amount of capsanthone. As shown in Fig. 3, the concentration of capsanthin started decreasing after 7 hours and reached zero after 10 hours, while capsanthone, which was not observed within the first 7 hours, started increasing after 7 hours and reached its maximum level after 10 hours. These results indicate that all of capsanthin was metabolized within 10 hours after ingestion. In view of these findings, it is suggested that not only capsanthin, but also its metabolites such as capsanthone and its geometrical isomers such as 11-cis-capsanthin may be equally important in preventing human diseases. We propose that these compounds should be subjects of further biological studies.

The oxidation of capsanthin is important to understand these results. Philip and Francis have reported that capsanthin was converted into capsanthone by Oppenauer oxidation. It has been assumed that lycopene and capsanthin were oxidized by an oxygenase or active oxygen in human plasma. Further studies on the metabolism of capsanthin in plasma are in progress.

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**References**


