

Effects of a long-term dietary supplementation with anthocyanins and xanthophylls on serum metabolomic profile and macular pigment optical density in postmenopausal women.

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Introduction and objectives

Anthocyanins and xanthophylls are natural pigments widely consumed as part of a healthy diet. They have shown a range of biological effect related to cardiovascular and ocular health. Although, anthocyanins and xanthophylls are commercialized as food supplements to improve ocular health, human trials designed to specific poblational groups are still needed to better understand their metabolism and bioactivity.

The objective of this work was the assessment of the effect of the xanthophylls and anthocyanins dietary supplementation on lutein (L) and zeaxanthin (Z) status [serum concentrations and macular pigment optical density (MPOD) and its relation with the serum metabolomics profile in postmenopausal women.

Subjects and methods

75 women were randomized into a parallel study of 8 months duration. Inclusion criteria: age (50-70 years), amenorrhea (> 2y), BMI (25-33 kg/m²). Participants were randomized in three groups: Group A) anthocyanins (60 mg/day); Group X) xanthophylls (6 mg lutein + 2 mg zeaxanthin/d); Group A+X) anthocyanines (60 mg/d) + xanthophylls (6 mg lutein + 2 mg zeaxanthin/d). Blood samples were collected at the start (time 0), 4 and 8 months. Metabolomics was performed using HPLC-Q-TOF LCMS (G6530A). MassHunter Profinder software (B.06.00) was used for recursive molecular feature extraction and Mass Profiler Professional Software (B.13.01) for Multivariate statistical analysis.

Table 1: Characteristics at baseline (n =74)

	Mean ± SD
Lutein (µg/dL)	19.1 ± 10.1
Zeaxanthine (µg/dL)	5.8 ± 2.9
L+Z/Chol+TG	0.09 ± 0.05
MPOD	0.32 ± 0.13
Cholesterol (mg/dL)	216 ± 25
HDL (mg/dL)	67 ± 25
TG (mg/dL)	86 ± 31

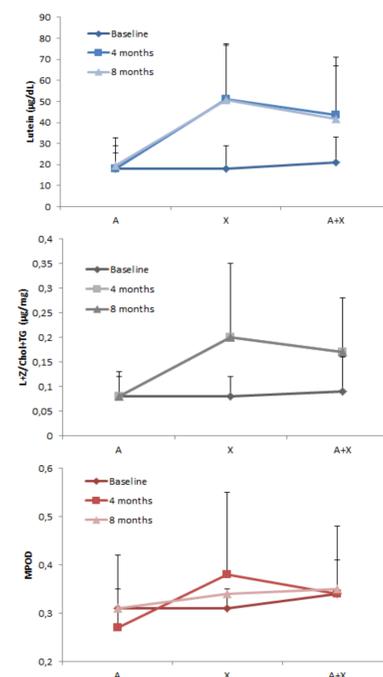


Figure 1: Lutein, L+Z/Chol+TG and MPOD values at baseline, t4months and t8months for all groups

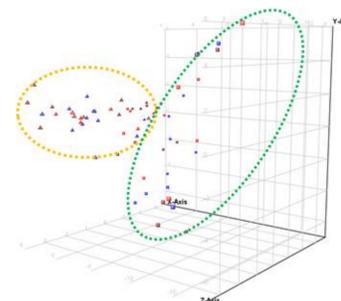


Figure 2: 3D PCA scores plot obtained from MS data of serum at baseline and after 8 months intervention.

Results

Supplementation with L and Z resulted in 2 to 2.8 fold and 1.4 to 1.6 fold increases in the serum levels of L and Z, respectively. These increments occurred in groups X and A+X, being slightly higher but not statistically significant in group X. The levels of L and Z concentrations, and L+Z/cholesterol+TG in serum reached at 4 months were maintained throughout the intervention period (8 months) in the (X) and (A+X) groups (Figure 1). There were no variations in the L and Z serum levels in the group (A) and neither were in the concentrations of cholesterol, HDL-, LDL- and TG in any of the three groups. Serum metabolome profile was changed in all groups at 8 months when compared with time 0 samples (Figure 2). Metabolomic results are still under analysis. MPOD value was not modified in any of the groups at the end of the study. Only an increase was observed in the MPOD after 4 months in the group X (Figure 1).

Conclusions

Supplementation with L and Z at dietary levels provokes an increase in their concentrations in serum that is not modified by the simultaneous supplementation with anthocyanins. The L and Z supplied was insufficient to get an increase in the MPOD during the period studied. A change in serum metabolome of all group participants before and after 8 months supplementation was observed.

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