Assessment of tocotrienols intake in adults; a pilot study

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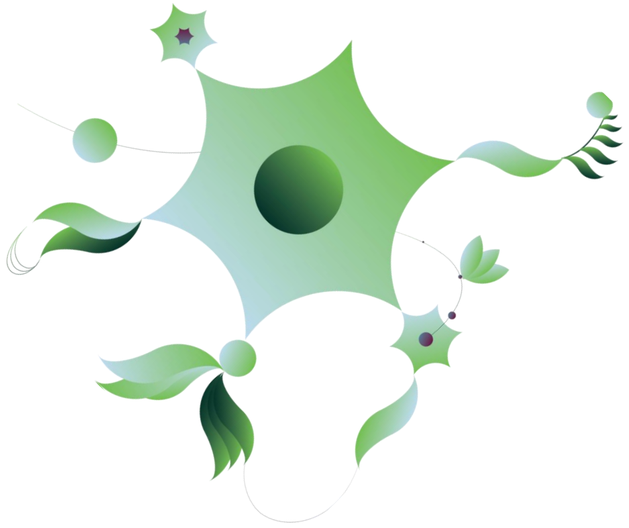

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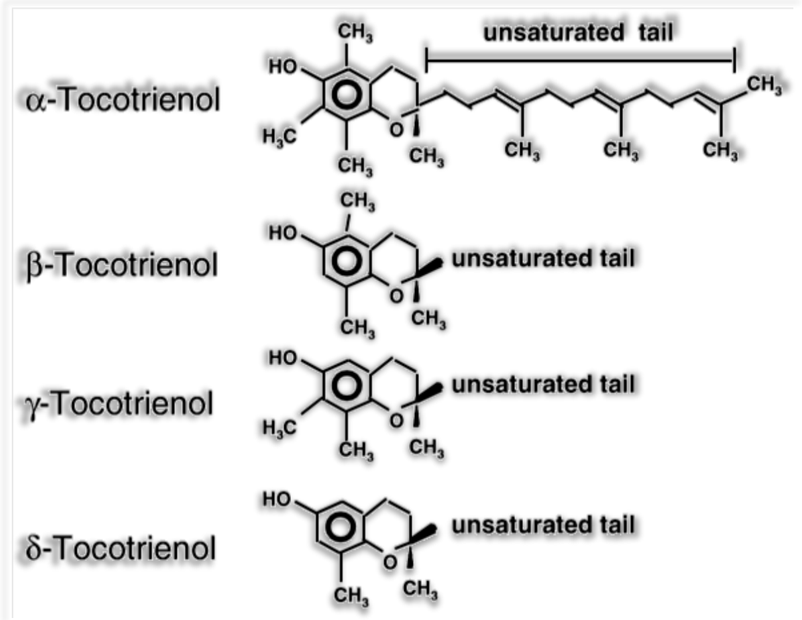
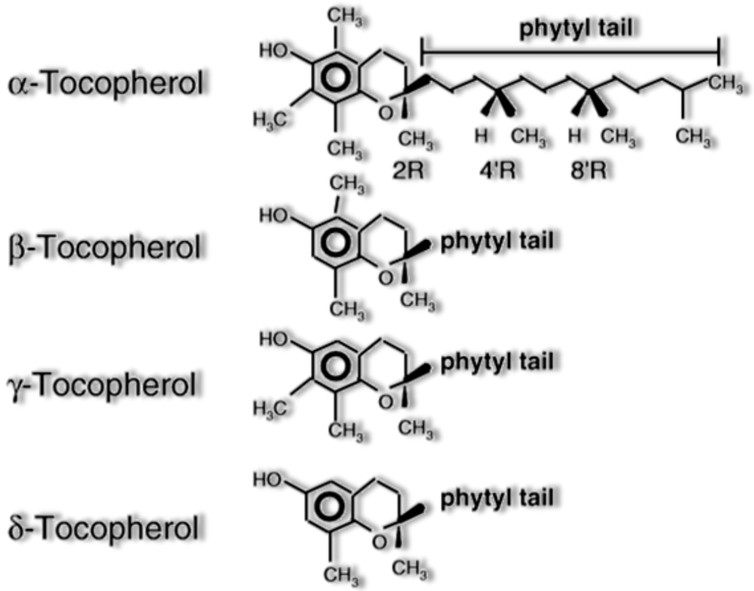
Introduction
Tocotrienols

- natural antioxidant
- with tocopherols formed a group of compounds known as vitamin E
- synthesized by autotrophic organisms through photosynthesis





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Tocotrienols

UNIQUE BIOLOGICAL ACTIVITIES AND PROPERTIES:

- protection against reactive oxygen forms (antioxidant)
- analgesic, anti-inflammatory / bacterial / pyretic / coagulant / cancer
- cardio-, hepato- and neuro-protective
- inhibition of hormonal changes, and the activity of the enzyme 3-hydroxy-3-methylglutaryl coenzyme A (HMG-CoA) reductase
- treatment of chronic diseases

FOOD SOURCES (for instance):

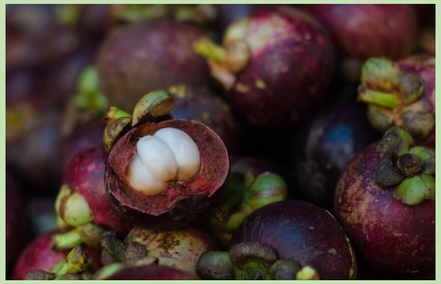
- vegetable oils (palm oil and soy oil)

- rice

- wheat
- barley

- Achiote (Bixa orellana L.)

- Mangosteen (Garcinia mangostana)



Source: www.flaticon.com; www.freepik.com

The aim: to develop a food frequency questionnaire (FFQ) for the evaluation of tocotrienols (T3s) intake and comparison with data obtained from a 24-hour dietary record in a group of adult.

FFQ

- included 41 questions about the frequency of consumption of vitamin E-rich 15 food categories foods (e.g., fruits, vegetables, oils, nuts and seeds, fish, eggs, beverages, sweets and salty snacks) in the three months preceding the study

24-h recall

- included questions about the consumption of the same products in the 24 hours preceding the study

T3s

- USDA database to calculate the average intake of individual isomers and the sum of tocotrienols

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Methods

- a cross-sectional online survey
- using the FFQ method and a single 24-hour dietary record
- survey was open to all Poland residents aged 18 -65 years from May to September 2021
- the final data set included data from 202 participants from 18 to 40 years (people over 40 years of age were not taken into account, 10 responses were rejected due to unreliable information)

Statistical analysis - IBM SPSS Statistics:

- Chi-square test
- U Mann–Whitney test
- The Bland-Altman plot
- for all tests, the significance level $p \leq 0.05$ was considered as significant

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Results

Characteristics of participants

- N=202 ;73% of and 27% of
- 77% of subjects aged 18-25
- 67 % of subjects lived in town > 100,000 inhibitiants
- 51% during studies
- 38% with higher educational level (university)
- 68% of total subjects with normal weight, 28% with overweight and obesity
- 42% of subjects with modarate physical acivity, 36% with low
- 43% of subjects supplemented the diet

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Results
- Intake of individual isomers and sum of tocotrienols

	FFQ Mean (SD); mg/day				
	α-T3	β-T3	γ-T3	δ-T3	Sum of T3s
Total	0,418 (0,377)	1,343 (1,341)	0,419 (0,41)	0,055 (0,05)	2,236 (2,157)
Women	0,418 (0,377)	1,336 (1,354)	0,436 (0,422)	0,056 (0,058)	2,246 (2,199)
Men	0,403 (0,379)	1,314 (1,318)	0,375 (0,375)	0,051 (0,063)	2,144 (2,059)
p	0,890	0,794	0,297	0,253	0,886
	24-h Mean (SD); mg/day				
	α-T3	β-T3	γ-T3	δ-T3	Sum of T3s
Total	0,418 (0,378)	1,207 (1,205)	0,455 (0,459)	0,084 (0,089)	2,165 (2,160)
Women	0,376 (0,335)	1,098 (1,123)	0,412 (0,408)	0,068 (0,058)	1,955 (1,953)
Men	0,540 (0,461)	1,505 (1,488)	0,584 (0,585)	0,131 (0,134)	2,761 (2,516)
p	0,018	0,064	0,057	0,005	0,020

FFQ – Food Frequency Questionnaire; SD - standard deviation; T3 – tocotrienol;
24-h – 24-hour dietary record

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Results

Comparison of the mean intake of sum of tocotrienols and individual isomers obtained with the two methods

	FFQ	24-h	p
	Mean (SD); mg/day		
	Sum of T3s		
Total	2,236 (2,157)	2,165 (2,160)	0,545
Women	2,246 (2,199)	1,955 (1,953)	0,126
Men	2,144 (2,059)	2,761 (2,516)	0,022
	α-T3		
Total	0,418 (0,377)	0,418 (0,378)	0,645
Women	0,418 (0,377)	0,376 (0,335)	0,956
Men	0,403 (0,379)	0,540 (0,461)	0,002
	β-T3		
Total	1,343 (1,341)	1,207 (1,205)	0,054
Women	1,336 (1,354)	1,098 (1,123)	0,024
Men	1,314 (1,318)	1,506 (1,488)	0,390
	γ-T3		
Total	0,419 (0,410)	0,455 (0,459)	0,247
Women	0,436 (0,422)	0,412 (0,408)	0,810
Men	0,375 (0,375)	0,584 (0,585)	<0,001
	δ-T3		
Total	0,055 (0,050)	0,084 (0,089)	<0,001
Women	0,056 (0,058)	0,068 (0,058)	0,006
Men	0,051 (0,063)	0,131 (0,134)	<0,001

FFQ – Food Frequency Questionnaire; SD - standard deviation; T3 – tocotrienol; 24-h – 24-hour dietary record

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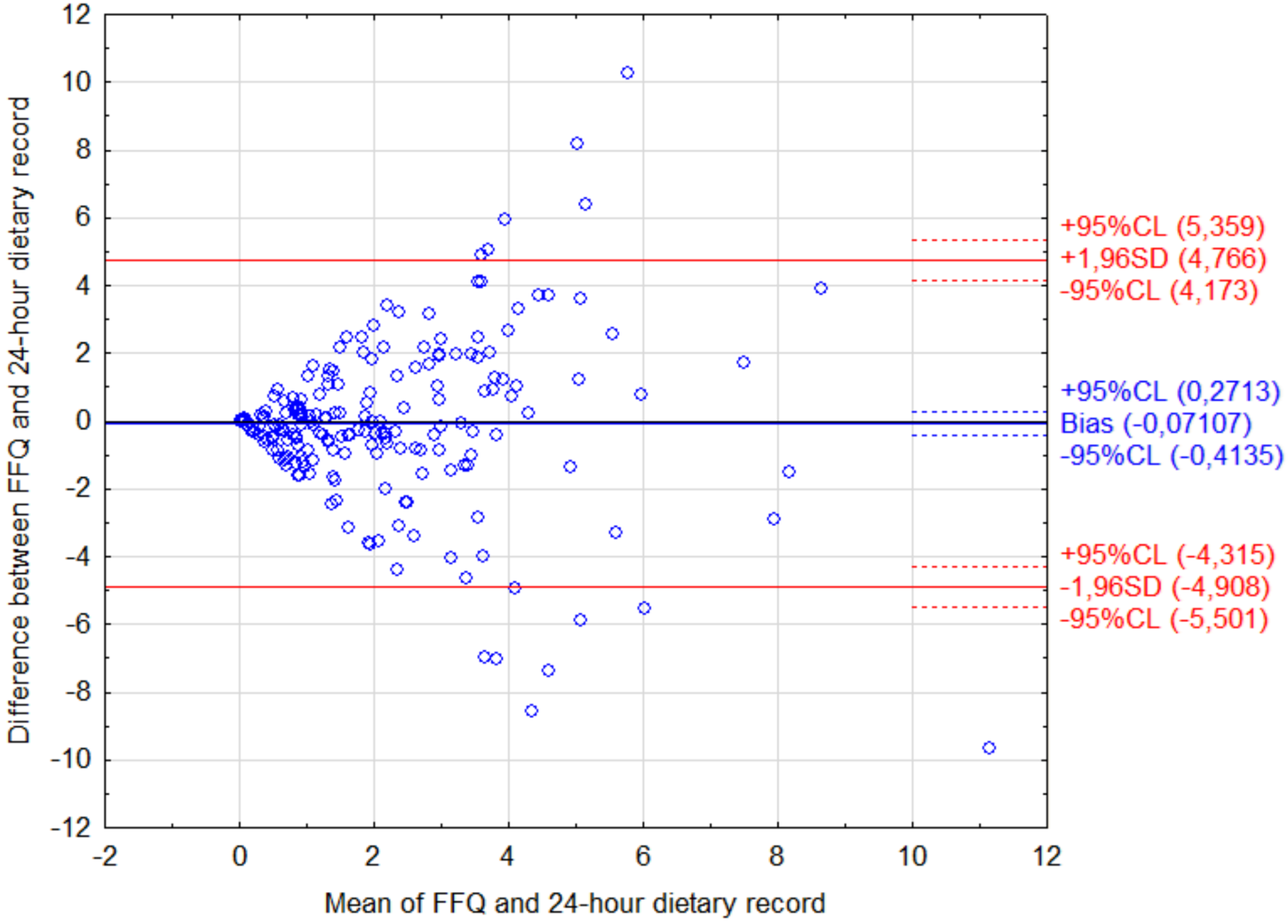
Results
Bland-Altman plot comparing FFQ with 24-hour dietary record for sum of tocotrienols



1. 0.071 - the mean absolute difference of the sum of tocotrienols intake

2. The number of individuals observed to be beyond the LOA value was 189 out of 202, corresponding to the Bland-Altman index of 6,4%.

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Findings

- Total sum of tocotrienol intake was 2.16 - 2.24 mg/day; similar results were found in Japan population: 1.9-2.1 mg tocotrienols/day.

- Among all forms of tocotrienols, the highest content was β-tocotrienol, and γ-tocotrienol.

- δ-tocotrienol was characterized by the lowest consumption among all isomers.

- The developed FFQ questionnaire obtained lower total tocotrienol intake results, by an average of 0.071 mg tocotrienols than the 24-hour dietary record.

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Conclusion

- The results of the tocotrienols intake obtained with both methods were similar, but the questionnaire developed in this pilot study requires further refinement in order to correctly assess the intake of these compounds.

- Due to the low proportion of tocotrienols in the diet, it seems beneficial to popularize the knowledge about their influence on health and food sources.

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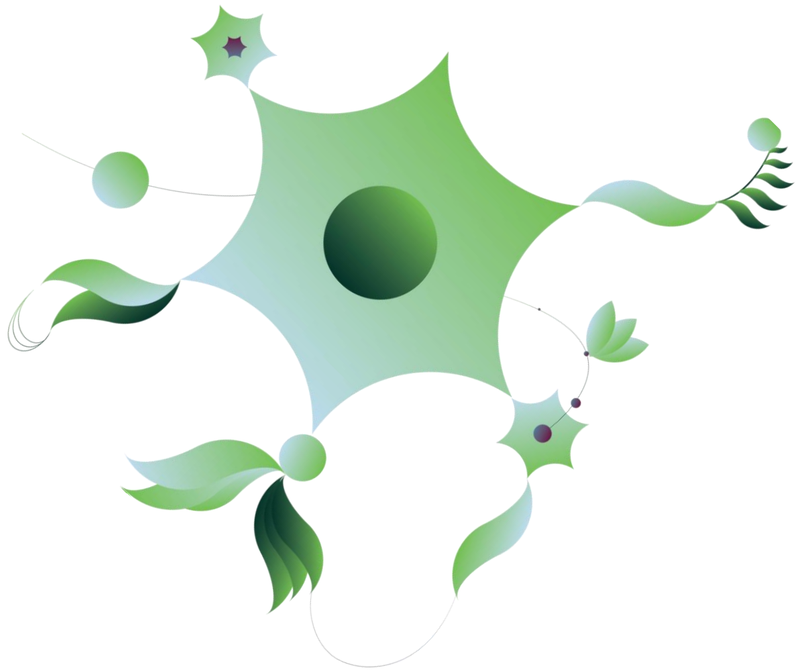

Thank you for your attention

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