





Consequences of Changes in the Dietary Reference Intakes for Nutrient Databases

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USDA National Nutrient Database for Standard Reference (SR)

- 6,661 food items in SR16.1
- More than 2,600 used in the USDA Food and Nutrient Database for Dietary Studies (FNDDS)
 - Complete nutrient profiles for 61 food components (nutrients)
 - If analytical data are not available for any of these nutrients, NDL imputes a value

Folate

-  g Total folate
-  g Food folate
-  g Folic acid
-  g Dietary Folate Equivalents (DFE)

$$\text{DFE} = (\text{img alt="laptop icon" data-bbox="271 708 304 746"/> g \text{ Folic acid} * 1.67) + \text{img alt="laptop icon" data-bbox="676 708 709 746"/> g \text{ Food folate}$$

Folate Methods

- Microbiological
 - Measures total folate
- HPLC
 - Folic acid
 - 5 methyltetrahydrofolate
 - 5 formyltetrahydrofolate
 - 10 formylfolic acid
 - 10 formyldihydrofolate

Calculation of DFEs for Cooked Rice

Total folate 58 μg

Food folate 3 μg * 1 = 3

Folic Acid 55 μg * 1.7 = 94





97 μg DFE

Determination of Food Folate by Microbiological Assay

Total Folate – Folic acid = Food Folate

$(1.7 \times \mu\text{g folic acid}) + \mu\text{g food folate} = \mu\text{g DFE}$

Folates reported in SR

-  g Total folate
-  g Food folate
-  g Folic acid
-  g Dietary Folate Equivalents (DFE)





Folate DRI

EAR for adults 320 g/day DFE

RDA for adults 400 g/day DFE

UL for adults 1,000 g/day from fortified
foods or supplements

Vitamin A Activity

	International Units	Retinol Equivalents	Retinol Activity Equivalents
	IU	RE	RAE
Retinol  g	.3	1	1
 -carotene  g	.6	6	12
Other active carotenoids  g	1.2	12	24

 g

Vitamin A Conversions

Spinach 9,377 IU/20 =
469 RAE

938 RE/2 =

Chicken 137 IU/3.33 =

41 RAE

41 RE/1 =

Calculating Vitamin A in μg RAE for Cheddar Cheese

vitamin A 278 RE

carotene - 20 RE/2 = 10 RAE

retinol 258 RE/1 = 258 RAE

268 RAE

Carotenoids in Database

Vitamin A active carotenoids

- β -carotene
- α -carotene
- β -cryptoxanthin
- Lycopene
- Lutein+zeaxanthin

Vitamin A DRI

EAR Men 625  g RAE/day

Women 500  g RAE/day

RDA Men 900  g RAE/day

Women 700  g RAE/day

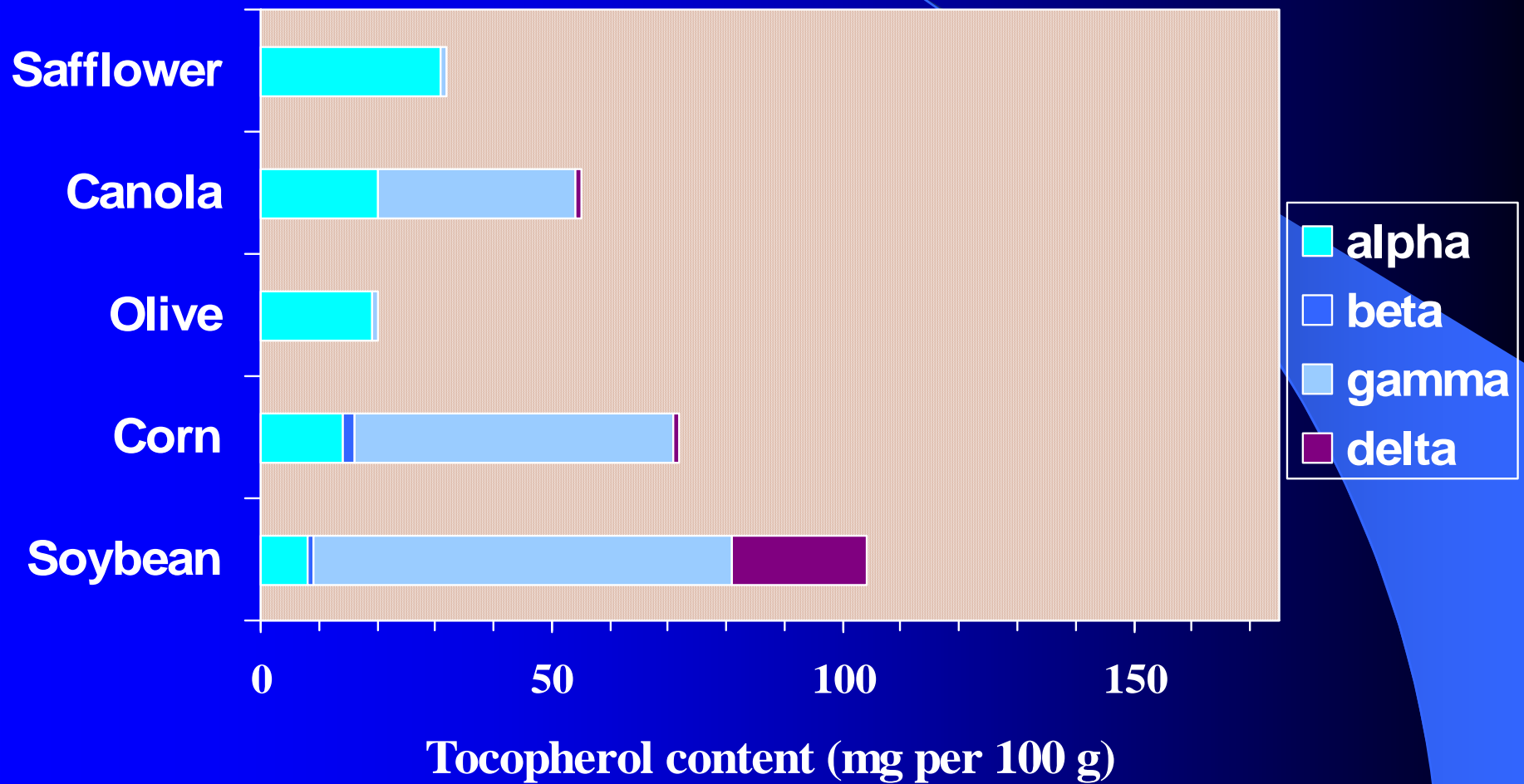
UL Adults 3,000  g/day of
preformed

vitamin A

Vitamin E

- α -tocopherol equivalents
 - α -tocopherol
 - β -tocopherol
 - γ -tocopherol
 - δ -tocopherol
 - tocotrienol
- mg α -tocopherol

Vitamin E isomers in various vegetable oils



Soybean oil example

(values per 100g)

8 mg	α -tocopherol	x 1	=	8
1 mg	β -tocopherol	x 0.5	=	0.5
72 mg	γ -tocopherol	x 0.1	=	7.2
23 mg	δ -tocopherol	x 0.03	=	<u>0.69</u>
Vitamin E, ATE				16.39

Added Vitamin E

- *All rac- α -tocopherol (Historically and incorrectly labeled *dl*- α -tocopherol)*
 - IU * 0.45
- *RRR- α -tocopherol (Historically and incorrectly labeled *d*- α -tocopherol)*
 - IU * 0.67

Identification of Added Vitamin E on Ingredient Labels

Breakfast cereals, infant formulas, peanut
butter, breakfast powder:

- Vitamin E acetate
- Alpha-tocopherol acetate
- Tocopheryl acetate

Identification of Added Vitamin E on Ingredient Labels

Energy/protein bars:

- 6 no vitamin E added
- 7 vitamin E acetate
- 5 alpha tocopherol acetate
- 6 dl-alpha-tocopheryl acetate
- 1 d-alpha-tocopheryl acetate
- 1 natural vitamin E acetate
- 1 d-alpha tocopheryl acetate &
dl-alpha tocopheryl acetate

Vitamin E DRI

EAR for adults 12 mg/day of α -tocopherol

RDA for adults 15 mg/day of α -tocopherol

UL for adults 1,000 mg/day of any form of supplementary α -tocopherol

Conversions for Added Vitamin E

- Synthetic vitamin E also called *All rac* or *DL* α -tocopherol
 - Comparison to RDA or EAR
 - $\text{IU} * 0.45$
 - Comparison to UL
 - $\text{IU} * 0.90$
- Natural vitamin E also called *RRR* or *D* α -tocopherol
 - Comparison to UL same as RDA and EAR
 - $\text{IU} *.67$

Vitamin B-12 DRI

EAR for adults* 2  g /day

RDA for adults* 2.4  g /day

UL for adults none established

*For adults ages 51 years and older it is recommended that B-12 fortified foods or supplements be used to meet the requirements.

DRI for Niacin







EAR Men 12 mg/day niacin equivalents
Women 11 mg/day niacin equivalents

RDA Men 16 mg/day niacin equivalents
Women 14 mg/day niacin equivalents

UL Adults 35 mg/day of niacin*

* Intake of niacin as a supplement or food fortificant

Units for RDAs

	<u>Folate</u>	<u>Vit. A</u>	<u>Vit. E</u>	<u>Vit. B12</u>	<u>Niacin</u>
1968	mg	IU	IU	 g	mg NE
1974	 g	RE	IU	 g	mg
1980	 g	RE	α-TE	 g	mg NE
1998 - 2001	DFE	RAE	mg	 g	mg NE

SR Nutrients

Before New DRI

Folate, total

Vitamin A, IU

Vitamin A, RE

Vitamin E, α -TE

After New DRI

Folate, total

Food folate

Folic acid

Folate, total DFE

Vitamin A, IU

Vitamin A, RAE

Retinol

α -carotene

β -carotene




β -cryptoxanthin

Vitamin E, α -tocopherol

*When did
you say they
are going to
start the next
revision of
the DRIs?!!*



Differences in Units for Reporting Nutrients

Nutrient	Current DV	Proposed DV*
Folate	400  g	314 DFE
Vitamin A	5,000 IU	529 RAE
Vitamin E	30 IU	12 mg
Vitamin B-12	6  g	2  g

*DRI Guiding Principles for Nutrition Labeling and Fortification