

**Table S1.** Degradation rate constants (*k*) for  $\alpha$ -linolenic acid (C18:3),  $\alpha$ -tocopherol, and hydroxytyrosol, tyrosol and its derivatives at the experimental temperatures studied.

		25 °C		40 °C		50 °C		60 °C	
	<i>Sample</i>	<i>k</i> /10 <sup>-3</sup>	*R <sup>2</sup>	<i>k</i> /10 <sup>-3</sup>	*R <sup>2</sup>	<i>k</i> /10 <sup>-3</sup>	*R <sup>2</sup>	<i>k</i> /10 <sup>-3</sup>	*R <sup>2</sup>
<b>C18:3</b> <sup>1</sup> <i>k</i> / % weeks <sup>-1</sup>	<i>I</i>	-0.76	0.853	-3.05	0.916	-6.38	0.985	-12.69	0.986
	<i>II</i>	-0.42	0.787	-2.04	0.892	-4.74	0.955	-8.85	0.989
	<i>III</i>	-0.75	0.896	-3.11	0.909	-6.52	0.957	-12.4	0.983
	<i>IV</i>	-0.69	0.858	-2.59	0.913	-4.81	0.893	-10.71	0.990
	<i>V</i>	-0.64	0.842	-2.24	0.881	-4.34	0.954	-10.13	0.977
	<i>VI</i>	-0.60	0.876	-1.79	0.859	-3.84	0.921	-7.98	0.970
	<i>VII</i>	-0.54	0.696	-2.10	0.931	-4.65	0.980	-8.64	0.971
<b><math>\alpha</math>-tocopherol</b> <sup>2</sup> <i>k</i> /weeks <sup>-1</sup>		<i>k</i> /10 <sup>-2</sup>	*R <sup>2</sup>	<i>k</i> /10 <sup>-2</sup>	*R <sup>2</sup>	<i>k</i> /10 <sup>-2</sup>	*R <sup>2</sup>	<i>k</i> /10 <sup>-2</sup>	*R <sup>2</sup>
	<i>I</i>	-0.30	0.849	-2.20	0.968	-9.12	0.884	-18.65	0.971
	<i>II</i>	-0.19	0.703	-0.95	0.918	-5.41	0.637	-12.57	0.973
	<i>III</i>	-0.26	0.798	-1.42	0.919	-5.16	0.803	-20.17	0.968
	<i>IV</i>	-0.27	0.714	-2.02	0.954	-13.34	0.973	-30.59	0.955
	<i>V</i>	-0.21	0.776	-1.46	0.958	-8.76	0.971	-28.51	0.944
	<i>VI</i>	-0.35	0.850	-1.21	0.932	-9.25	0.949	-26.62	0.960
	<i>VII</i>	-0.25	0.776	-1.14	0.970	-7.81	0.906	-25.76	0.949
<b>Htyr, tyr and derivatives</b> <sup>2</sup> <i>k</i> /weeks <sup>-1</sup>		<i>k</i> /10 <sup>-2</sup>	*R <sup>2</sup>	<i>k</i> /10 <sup>-2</sup>	*R <sup>2</sup>	<i>k</i> /10 <sup>-2</sup>	*R <sup>2</sup>	<i>k</i> /10 <sup>-2</sup>	*R <sup>2</sup>
	<i>I</i>	-0.846	0.866	-1.88	0.840	-4.17	0.964	-10.95	0.980
	<i>II</i>	-0.974	0.845	-1.49	0.844	-4.29	0.974	-8.80	0.972
	<i>III</i>	-1.39	0.909	-2.89	0.772	-5.37	0.911	-14.85	0.933
	<i>IV</i>	-1.05	0.804	-2.23	0.789	-4.02	0.825	-13.05	0.958
	<i>V</i>	-1.15	0.838	-2.33	0.896	-4.25	0.926	-11.20	0.994
	<i>VI</i>	-0.656	0.852	-2.08	0.893	-4.53	0.995	-10.17	0.990
	<i>VII</i>	-0.587	0.738	-2.05	0.849	-4.76	0.940	-10.94	0.985

<sup>1</sup> Pseudo zero-order kinetics:  $C = C_0 + kt$

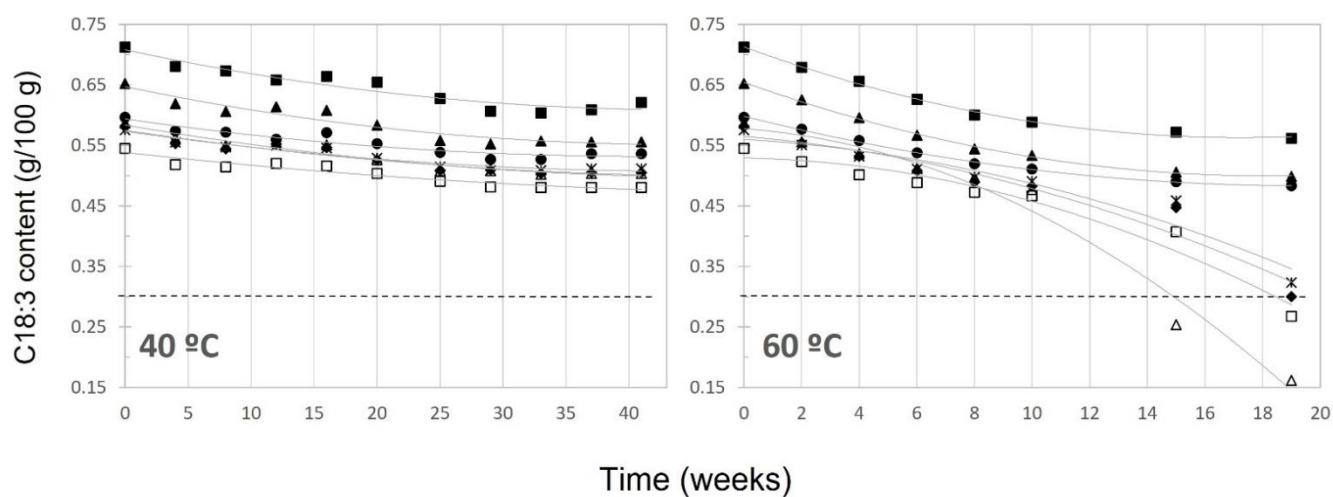
\*P<0.05

<sup>2</sup> Pseudo first-order kinetics:  $\ln C = \ln C_0 + kt$

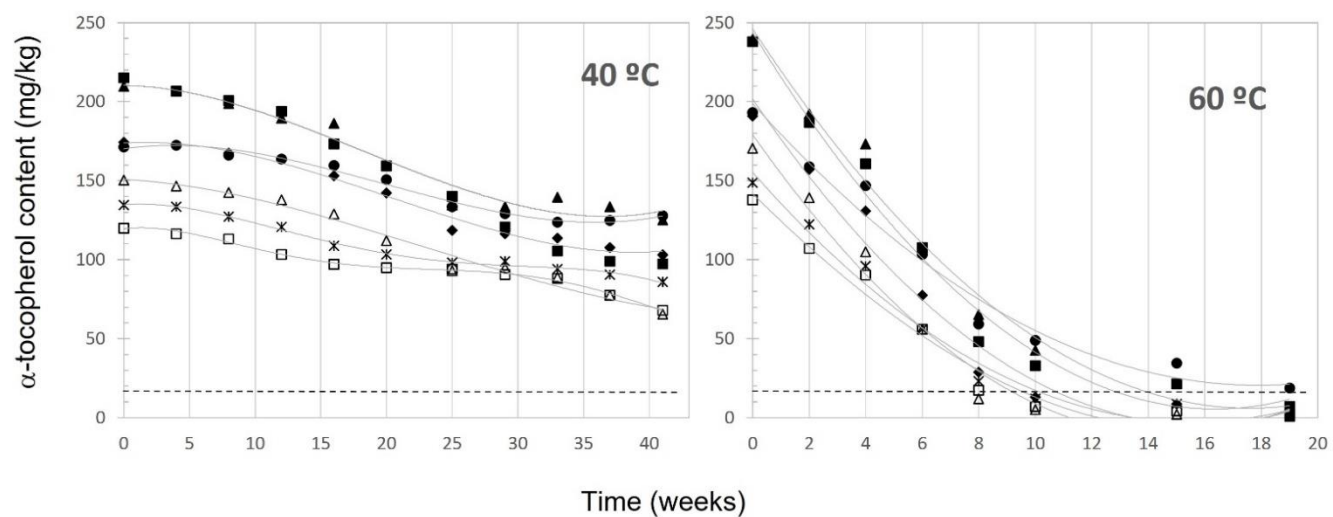
**Table S2.** Calculated Time (weeks) required to reach the limits for Declining the Health Claims (TLHC, weeks) for  $\alpha$ -linolenic acid (C18:3),  $\alpha$ -tocopherol, and hydroxytyrosol, tyrosol and its derivatives as compared with the experimental ones

	<i>Sample</i>	25 °C		40 °C		50 °C		60 °C	
		TLH C	Exp	TLH C	Exp	TLH C	Exp	TLH C	Exp
<b>C18:3</b> = 0.30 g/100 g	<i>I</i>	543.2	nr	135.4	nr	64.7	nr	32.5	nr
	<i>II</i>	706.5	nr	145.5	nr	62.6	nr	33.5	nr
	<i>III</i>	469.9	nr	113.3	nr	54.0	nr	28.4	nr
	<i>IV</i>	415.9	nr	110.8	nr	59.7	nr	26.8	12.
	<i>V</i>	438.1	nr	125.2	nr	64.6	nr	27.7	5
	<i>VI</i>	408.7	nr	137.0	nr	63.9	nr	30.7	19.
	<i>VII</i>	510.2	nr	131.2	nr	59.3	nr	31.9	0
<b><math>\alpha</math>-tocopherol</b> = 18 mg/kg	<i>I</i>	859.4	nr	112.8	nr	27.4	24	13.8	17.
	<i>II</i>	1234.	nr				27		5
	<i>III</i>	4	nr	237.2	nr	42.9		18.9	
	<i>IV</i>	976.3	nr	172.9	nr	49.7	nr	12.8	16
	<i>V</i>	822.3	nr	105.1	nr	16.6	16	7.3	7
	<i>VI</i>	1132.	nr				26		9
	<i>VII</i>	5	nr	155.5	nr	27.0		8.3	
<b>Htyr, tyr and derivatives</b> = 250 mg/kg	<i>I</i>	588.4	nr	156.8	nr	22.0	16	7.7	8.5
	<i>II</i>	861.1	nr	176.5	nr	26.2	23	8.2	9
	<i>III</i>								
	<i>IV</i>								
	<i>V</i>								
	<i>VI</i>								
	<i>VII</i>								

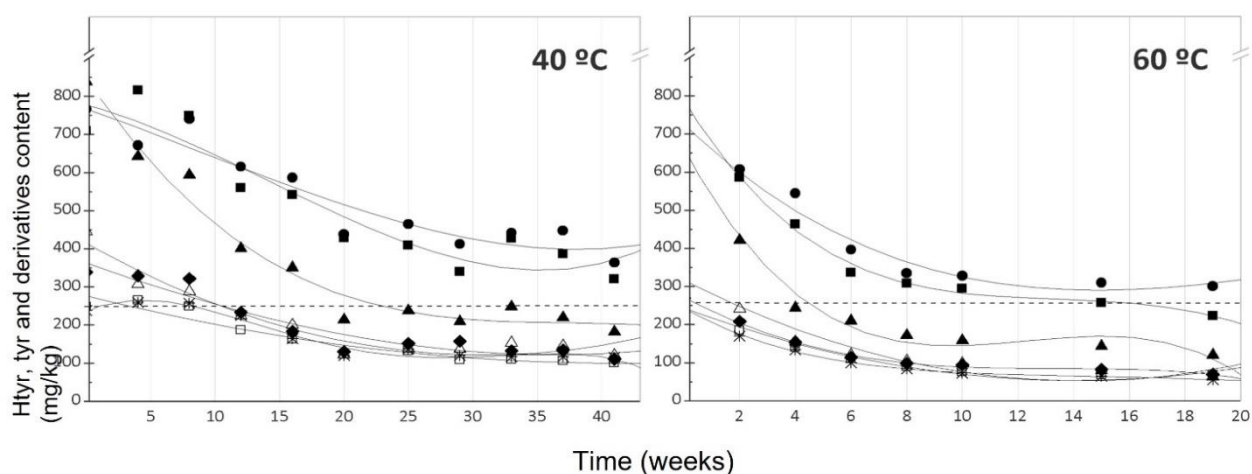
nr =the limit value was not reached during the experimental period; Exp = approximate experimental weeks



**Figure S1.** Content of  $\alpha$ -linolenic acid (C18:3) along the storage period at 40 and 60 °C  
 Samples: ■, I; ●, II; ▲, III; △, IV; ◆, V; □, VI; \*, VII

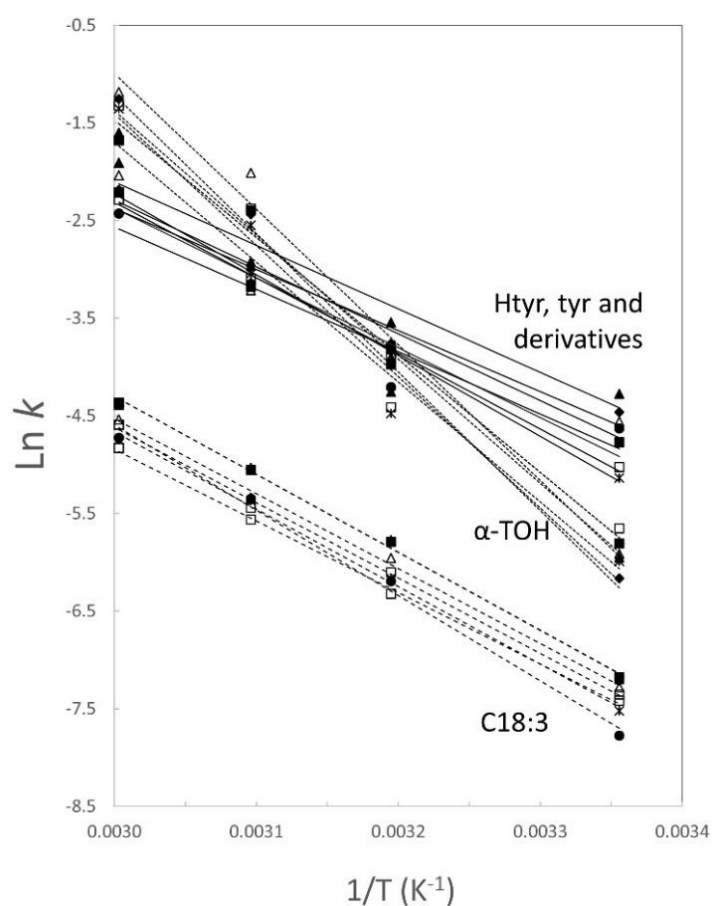


**Figure S2.** Content of  $\alpha$ -tocopherol along the storage period at 40 and 60 °C  
 Samples: ■, I; ●, II; ▲, III; △, IV; ◆, V; □, VI; \*, VII



**Figure S3.** Content of hydroxytyrosol, tyrosol and derivatives along the storage period at 40 and 60 °C

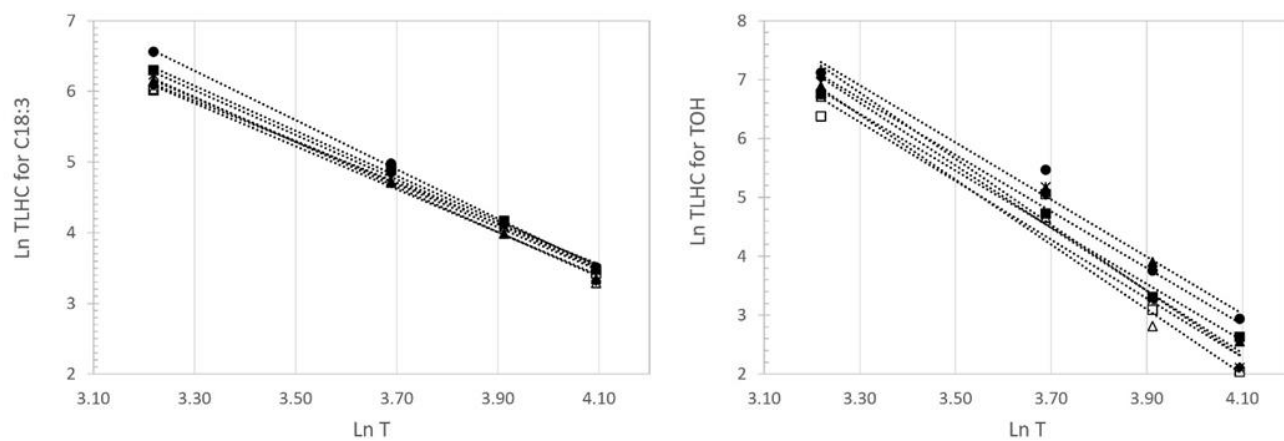
Samples: ■, I; ●, II; ▲, III; △, IV; ◆, V; □, VI; \*, VII



**Figure S4.** Arrhenius plot: Effect of temperature (T) on oxidation rate constants ( $k$ )  

$$\ln k = \ln A - \frac{E_a}{RT}$$

Samples: ■, I; ●, II; ▲, III; △, IV; ◆, V; □, VI; \*, VII



**Figure S5.** Correlation between TLHC for  $\alpha$ -linolenic acid (C18:3) and  $\alpha$ -tocopherol (TOH) and temperature (T)

TDHC =  $aT^b$

Samples: ■, I; ●, II; ▲, III; △, IV; ◆, V; □, VI; \*, VII