

Supplementary Material

Water-in-oil-in-water double emulsions as protective carriers for *Sambucus nigra* L. coloring systems

Liandra G. Teixeira ¹, Stephany Rezende ¹, Ângela Fernandes ¹, Isabel P. Fernandes ¹, Lillian Barros ¹, João C.M. Barreira ^{1,*}, Fernanda V. Leimann ², Isabel C.F.R. Ferreira ¹ and Maria-Filomena Barreiro ^{1,*}

*Correspondence: jbarreira@ipb.pt (J.B.); barreiro@ipb.pt (F.B.)

Table S1. Fatty acids composition of the studied base food matrices and respective colored products (with the extract or double emulsion) (mean \pm SD, $n = 9$).

Fatty acids (%)	Yogurt	Yogurt with extract	Yogurt with double emulsion
C6:0	3.0 \pm 0.1	3.09 \pm 0.01	0.120 \pm 0.004
C8:0	1.29 \pm 0.05	1.32 \pm 0.04	0.059 \pm 0.004
C10:0	2.9 \pm 0.1	2.46 \pm 0.08	0.087 \pm 0.001
C12:0	3.0 \pm 0.2	3.16 \pm 0.05	0.095 \pm 0.004
C14:0	10 \pm 1	9.7 \pm 0.4	0.313 \pm 0.009
C15:0	1.02 \pm 0.08	1.12 \pm 0.03	0.040 \pm 0.003
C16:0	33 \pm 1	33.0 \pm 0.2	11.7 \pm 0.2
C16:1	0.96 \pm 0.09	0.935 \pm 0.008	0.149 \pm 0.002
C17:0	0.74 \pm 0.01	0.649 \pm 0.006	0.087 \pm 0.001
C18:0	13.9 \pm 0.2	14.14 \pm 0.02	2.63 \pm 0.08
C18:1n9c	19.8 \pm 0.6	20.4 \pm 0.2	32.9 \pm 0.5
C18:2n6c	4.0 \pm 0.2	4.07 \pm 0.09	49.9 \pm 0.2
C18:3n3	0.97 \pm 0.04	0.60 \pm 0.02	0.766 \pm 0.001
C20:0	0.600 \pm 0.006	0.59 \pm 0.02	0.433 \pm 0.008
C20:1	0.515 \pm 0.007	0.44 \pm 0.03	0.218 \pm 0.006
C22:0	2.04 \pm 0.05	1.95 \pm 0.05	0.297 \pm 0.008
C23:0	1.54 \pm 0.03	1.4 \pm 0.1	0.040 \pm 0.003
C24:0	1.04 \pm 0.02	0.96 \pm 0.07	0.18 \pm 0.01
SFA	73.7 \pm 0.9a	73.6 \pm 0.2a	16.1 \pm 0.3b
MUFA	21.3 \pm 0.7a	21.7 \pm 0.1a	33.3 \pm 0.5b
PUFA	5.0 \pm 0.2b	4.7 \pm 0.1b	50.6 \pm 0.2a

Fatty acids (%)	Rice drink	Rice drink with extract	Rice drink with double emulsion
C6:0	0.24 \pm 0.01	nd	0.068 \pm 0.003
C8:0	0.088 \pm 0.002	nd	0.026 \pm 0.002
C10:0	0.279 \pm 0.006	nd	0.039 \pm 0.003
C12:0	0.088 \pm 0.008	nd	0.039 \pm 0.001
C14:0	0.350 \pm 0.009	0.20 \pm 0.01	0.127 \pm 0.001
C16:0	10.3 \pm 0.4	8.9 \pm 0.1	11.0 \pm 0.1
C16:1	0.16 \pm 0.02	0.19 \pm 0.01	0.146 \pm 0.001

Table S1. (continuation). Fatty acids composition of the studied food matrices (mean \pm SD, $n = 9$).

Fatty acids (%)	Rice drink	Rice drink with extract	Rice drink with double emulsion
C18:0	4.10 \pm 0.08	3.51 \pm 0.02	2.65 \pm 0.01
C18:1n9c	71.2 \pm 0.2	72.0 \pm 0.1	36.5 \pm 0.5
C18:2n6c	9.61 \pm 0.01	12.4 \pm 0.1	46.9 \pm 0.6
C18:3n3	0.372 \pm 0.003	0.35 \pm 0.03	0.84 \pm 0.01
C20:0	0.83 \pm 0.02	0.38 \pm 0.02	0.456 \pm 0.001
C20:1	0.360 \pm 0.007	0.272 \pm 0.007	0.233 \pm 0.002
C20:2	0.23 \pm 0.01	0.490 \pm 0.006	0.26 \pm 0.02
C22:0	1.24 \pm 0.05	0.83 \pm 0.01	0.36 \pm 0.02
C24:0	0.55 \pm 0.06	0.52 \pm 0.03	0.35 \pm 0.01
SFA	18.1 \pm 0.2a	14.3 \pm 0.1c	15.10 \pm 0.01b
MUFA	71.7 \pm 0.2a	72.4 \pm 0.1a	36.9 \pm 0.5b
PUFA	10.2 \pm 0.1c	13.24 \pm 0.02b	48.0 \pm 0.5a

Fatty acids (%)	Milk	Milk with extract	Milk with double emulsion
C6:0	4.24 \pm 0.04	4.4 \pm 0.2	0.71 \pm 0.03
C8:0	1.84 \pm 0.08	2.11 \pm 0.02	0.409 \pm 0.002
C10:0	4.3 \pm 0.1	4.05 \pm 0.01	0.74 \pm 0.02
C12:0	4.6 \pm 0.3	4.30 \pm 0.04	0.72 \pm 0.03
C14:0	11.8 \pm 0.7	12.3 \pm 0.2	1.66 \pm 0.03
C14:1	1.13 \pm 0.02	0.918 \pm 0.004	0.110 \pm 0.001
C15:0	1.44 \pm 0.01	1.22 \pm 0.01	0.136 \pm 0.005
C16:0	34.1 \pm 0.2	33.3 \pm 0.1	14.1 \pm 0.02
C16:1	1.26 \pm 0.05	1.50 \pm 0.06	0.293 \pm 0.003
C17:0	0.601 \pm 0.008	0.577 \pm 0.008	0.134 \pm 0.002
C18:0	11.7 \pm 0.6	11.3 \pm 0.1	3.9 \pm 0.2
C18:1n9c	19.9 \pm 0.2	21.07 \pm 0.03	31.6 \pm 0.4
C18:2n6c	2.2 \pm 0.1	2.1 \pm 0.1	43.8 \pm 0.7
C18:3n3	0.92 \pm 0.06	0.57 \pm 0.02	0.67 \pm 0.02
C20:0	nd	0.23 \pm 0.01	0.412 \pm 0.004
C20:1	nd	nd	0.164 \pm 0.006
C20:2	nd	nd	0.242 \pm 0.003
C22:0	nd	nd	0.23 \pm 0.01
SFA	74.6 \pm 0.2a	73.8 \pm 0.1a	23.1 \pm 0.3b
MUFA	22.3 \pm 0.3c	23.49 \pm 0.04b	32.2 \pm 0.4a
PUFA	3.08 \pm 0.06b	2.7 \pm 0.1b	44.7 \pm 0.7a

Fatty acids (%)	Soy drink	Soy drink with extract	Soy drink with double emulsion
C10:0	0.107 \pm 0.008	nd	nd
C12:0	0.11 \pm 0.01	nd	nd
C14:0	0.218 \pm 0.004	0.150 \pm 0.003	0.100 \pm 0.001
C16:0	12.4 \pm 0.3	12.5 \pm 0.2	11.35 \pm 0.4
C17:0	0.133 \pm 0.001	0.124 \pm 0.002	0.088 \pm 0.001
C18:0	6.3 \pm 0.2	6.4 \pm 0.1	3.05 \pm 0.07
C18:1n9c	20.6 \pm 0.4	20.26 \pm 0.09	31.2 \pm 0.3
C18:2n6c	51 \pm 1	52.10 \pm 0.07	50.8 \pm 0.7

Table S1. (continuation). Fatty acids composition of the studied food matrices (mean \pm SD, $n=9$).

Fatty acids (%)	Soy drink	Soy drink with extract	Soy drink with double emulsion
C18:3n3	6.3 \pm 0.2	6.6 \pm 0.1	1.7 \pm 0.1
C20:0	0.41 \pm 0.02	0.36 \pm 0.01	0.48 \pm 0.02
C20:1	nd	0.215 \pm 0.001	0.222 \pm 0.001
C20:2	1.17 \pm 0.01	0.443 \pm 0.003	0.442 \pm 0.001
C22:0	0.66 \pm 0.04	0.519 \pm 0.004	0.383 \pm 0.003
C24:0	0.35 \pm 0.02	0.24 \pm 0.01	0.25 \pm 0.01
SFA	20.8 \pm 0.5a	20.33 \pm 0.07a	15.7 \pm 0.5b
MUFA	20.6 \pm 0.4b	20.48 \pm 0.09b	31.4 \pm 0.3a
PUFA	58.6 \pm 0.9a	59.15 \pm 0.02a	52.9 \pm 0.8b

Results are presented as mean \pm standard deviation. Different letters correspond to significant differences ($p < 0.05$).

Fatty acids are expressed as relative percentage of each fatty acid. C6:0 – caproic acid; C8:0 – caprylic acid; C10:0 – Capric acid; C12:0 – lauric acid; C14:0 – myristic acid; C14:1 – myristoleic acid; C15:0 – pentadecanoic acid; C16:0 – palmitic acid; C16:1 – palmitoleic acid; C17:0 – heptadecanoic acid; C18:0 – stearic acid; C18:1n9 – oleic acid; C18:2n6c – linoleic acid; C18:3n3 – linolenic acid; C20:0 – arachidic acid; C20:1 – gadoleic acid; C20:2 – eicosadienoic acid; C22:0 – behenic acid ; C23:0 – tricosylic acid; C24:0 – lignoceric acid. SFA - Saturated fatty acids; MUFA - Monounsaturated fatty acids; PUFA - Polyunsaturated fatty acids; nd - not detected.