High-performance extraction process of anthocyanins from Jussara (*Euterpe edulis*) using deep eutectic solvents

- Supporting information -

Nicholas Vannuchi[a], Anna Rafaela Cavalcante Braga[b],

and Veridiana Vera de Rosso[c*]

[a]Programa de Pós-Graduação Interdisciplinar em Ciências da Saúde - Universidade Federal de São Paulo (UNIFESP), Rua Silva Jardim 136 CEP 11015-02, Santos, São Paulo, Brazil.

[b]Department of Chemical Engineering, Universidade Federal de São Paulo (UNIFESP), Campus Diadema, Rua São Nicolau 201 CEP 09972-270, Diadema, São Paulo, Brazil.

[c]Nutrition and Food Service Research Center, Universidade Federal de São Paulo (UNIFESP), Rua Silva Jardim 136 CEP 11015-02, Santos, São Paulo, Brazil.

*__Corresponding author__: Veridiana Vera de Rosso - Federal University of São Paulo (UNIFESP), Silva Jardim Street, 136, Vila Mathias, 11015-020, Santos, SP, Brazil. +55-11-99658-3459 – veridiana.rosso@unifesp.br

Table S1. A) Real and coded values used in the fractional experimental design with three central composites (2^{5-1}). **B)** Real and coded values used in the Central Composite Rotatable Design (CCRD) 2^2.

Coded variable level	DES proportion	$R_{(S/L)}$	Time (min)	Repetitions	$R_{(CoSolv\%)}$
A. Fractional fatorial design with three central points (2^{5-1})					
-1	DES1	1:15	2	1	20
0	DES1/DES2	1:20	4	3	30
+1	DES2	1:25	6	5	40
B. Central Composite Rotatable Design (CCRD) 2^2					
-1.41				1	10.3
-1				2	16
0	DES1	1:15	2	4	30
1				6	44
1.41				7	49.7

Table S2. Real values and experimental values and relative deviation (%) among experimental and predictive values for (A) ABTS and (B) ORAC antioxidant activity for jussara pulp extracted by CH-Xyl in the CCRD assays.

	A – ABTS				B - ORAC			
Assay	**CoSolv(%)**	**Repetitions**	**(mmol Trolox 100 g-1 dwb)**	**Relative deviation (%)**	**CoSolv(%)**	**Repetitions**	**(mmol Trolox 100 g-1 dwb)**	**Relative deviation (%)**
	X1	**X2**	**Y1**	**Y1**	**X1**	**X2**	**Y1**	**Y1**
1	16	2	132.022	17.05	16	2	73.746	15.84
2	44	2	69.922	-1.50	44	2	63.090	1.63
3	16	6	152.698	-7.36	16	6	102.711	-34.35
4	44	6	167.677	-20.75	44	6	110.749	-24.60
5	10.3	4	118.767	1.52	10.3	4	114.734	15.41
6	49.7	4	127.517	8.28	49.7	4	104.408	7.04
7	30	1	72.844	-25.71	30	1	36.027	-39.27
8	30	7	253.733	12.25	30	7	196.436	19.96
9	30	4	187.800	-1.03	30	4	161.554	1.38
10	30	4	198.933	4.63	30	4	161.089	1.10
11	30	4	182.311	-4.07	30	4	155.030	-2.77

Table S3. Kinetic parameters obtained by fitting the experimental data for degradation of anthocyanins during thermal treatment of the extracts obtained with MeOH and DES.

Temperature (°C)	Parameters	Extraction method	
		MeOH	DES
60	y_0	0.84 ± 0.01	0.80 ± 0.00
	y_∞	1.20 ± 0.51	1.18 ± 0.10
	A_1	-0.09 ± 0.03	-0.12 ± 0.03
	γ_1	5.88 ± 4.95	114.22 ± 74.55
	A_2	-1.11 ± 0.51	-1.04 ± 0.08
	γ_2	4442.4 ± 2666.8	7101.65 ± 1380.19
90	y_0	0.71 ± 0.03	0.81 ± 0.01
	y_∞	0.40 ± 0.02	5.88 ± 5.90
	A_1	-0.30 ± 0.03	1.42 ± 0.31
	γ_1	0.52 ± 0.10	-0.10 ± 0.00
	A_2	-0.21 ± 0.02	-5.79 ± 5.89
	γ_2	37.57 ± 10.0	2447.38 ± 2619.60

Table S4. Determination of halo diameter and susceptibility for extract for strains of S. enterica and S. aureus. S – sensible.

	Saline Solution	CHCL	Positive control	Extract	Extract Susceptibly
S. enterica	-	-	32.6	8.6	S
S. aureus	-	-	18.3	7.6	S

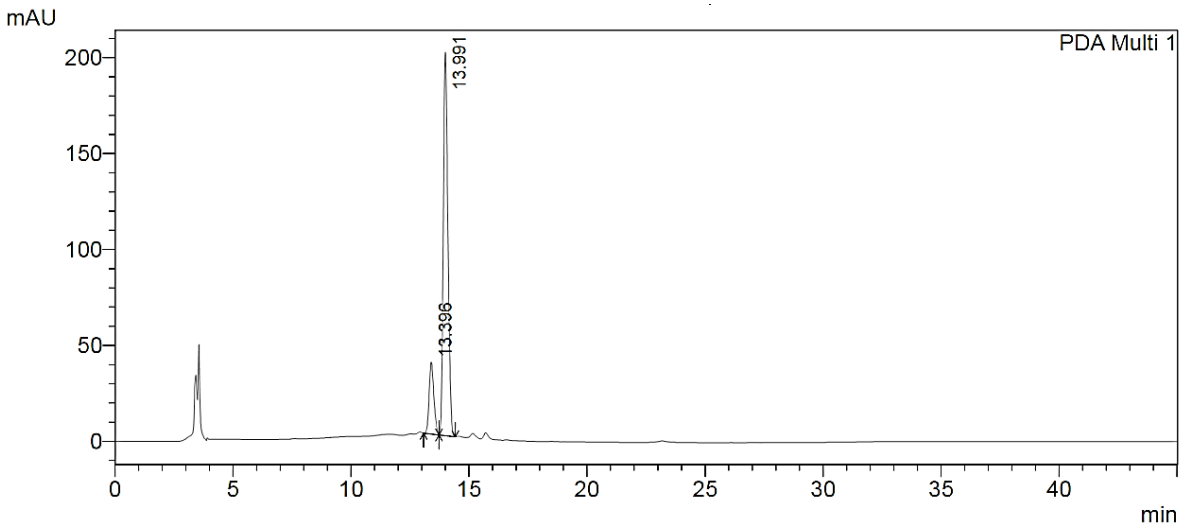

Figure S1 - Chromatogram obtained by HPLC-PDA-MS/MS of the jussara methanolic extract from jussara pulp. Cyanidin 3-glucoside, retention time: 13.396 min; cyanidin 3-rutinoside, retention time: 13.991.

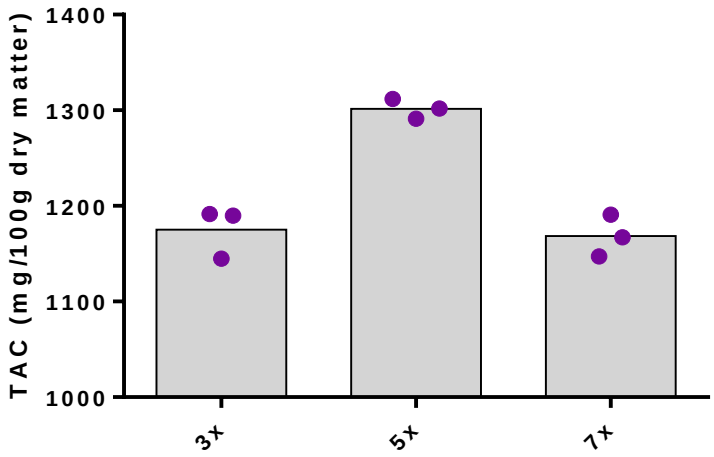

Figure S2. TAC of Ch-Xyl extracts by repetition. Purple dots represent individual experiments. Extracts with seven repetitions show significantly (ANOVA) less yield of anthocyanins than extracts with five repetitions. They are not statistically different of extracts with three repetitions.