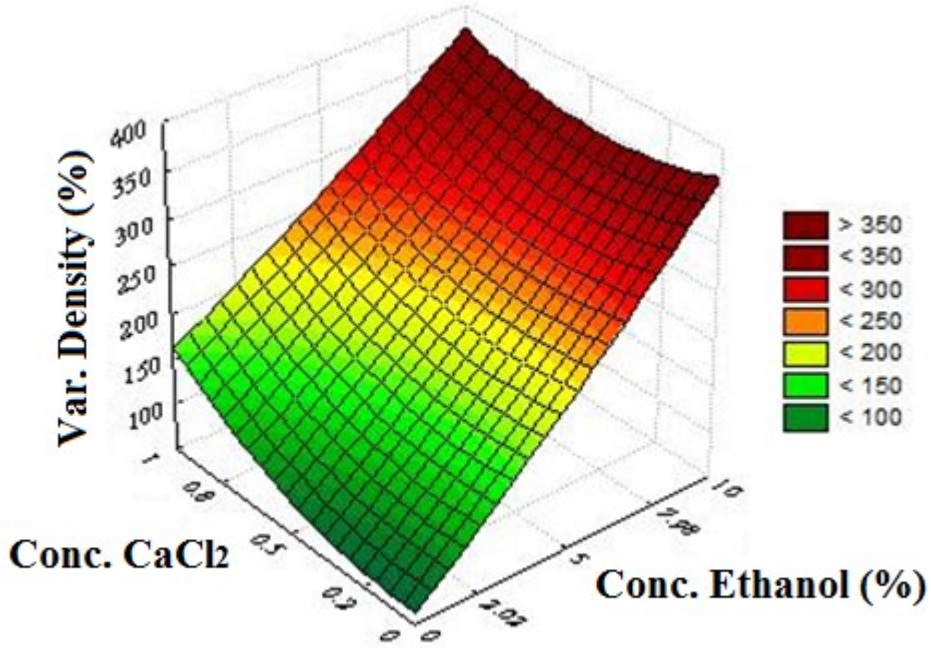
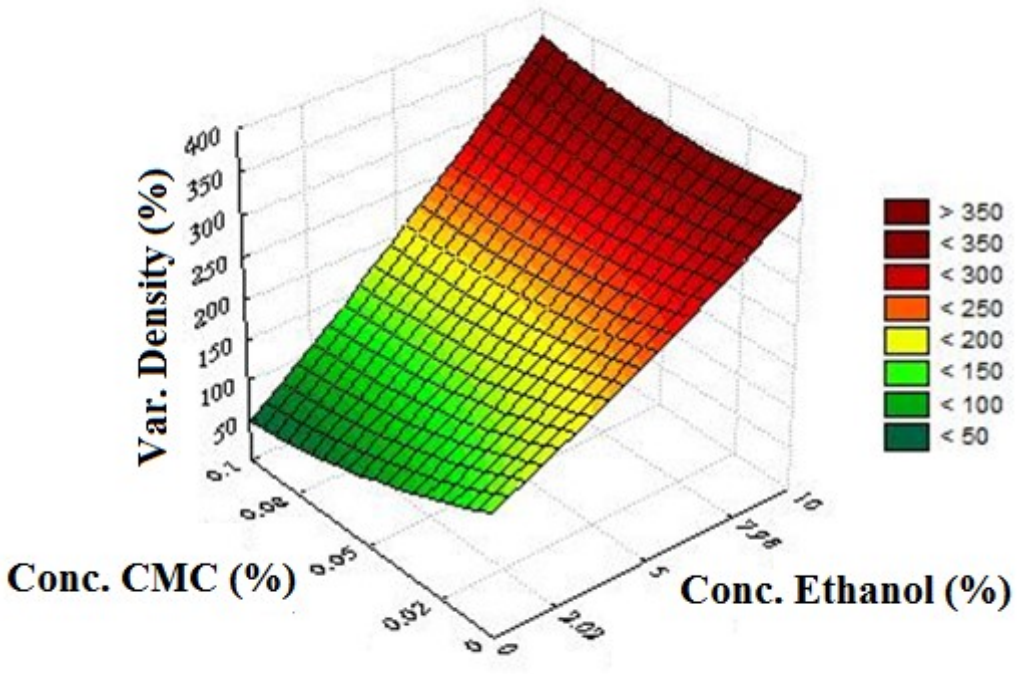
Electronic Supplementary Material (ESI) for Sustainable Food Technology.

SUPPLEMENTARY MATERIAL

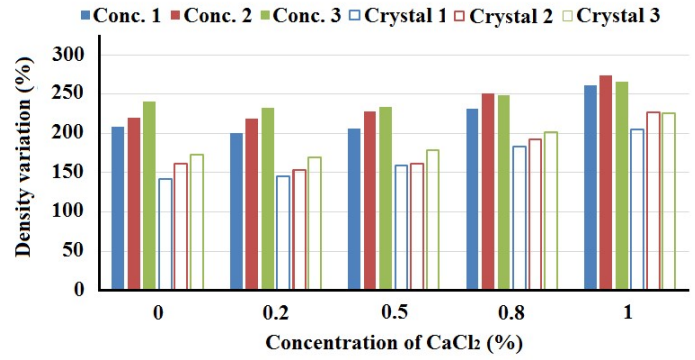


(a)

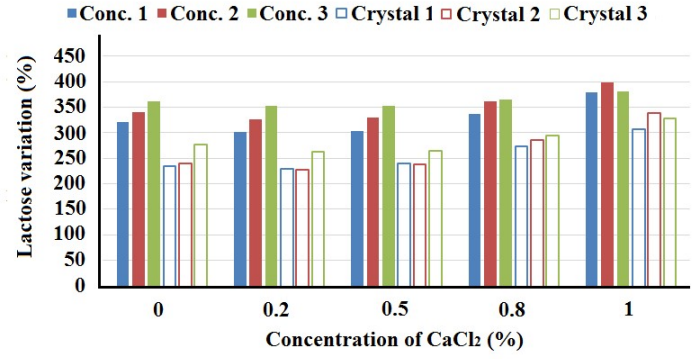


(b)

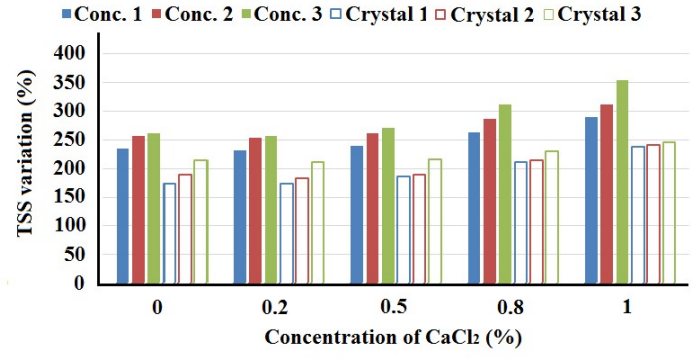
Figure 1S - Response surface for the variation in the density of concentrate 1 (a) as a function of the concentration of ethanol and $CaCl_2$ and, (b) as a function of the concentration of ethanol, and CMC.



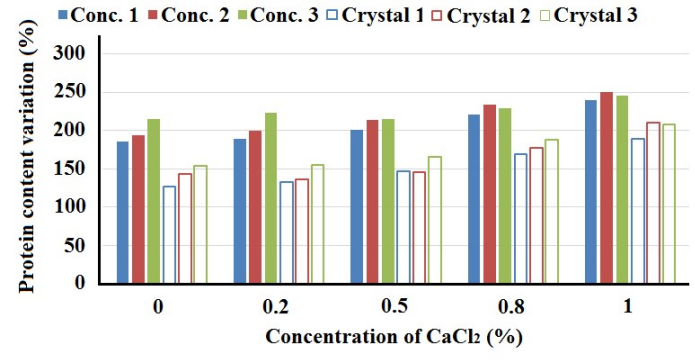
(a)



(b)



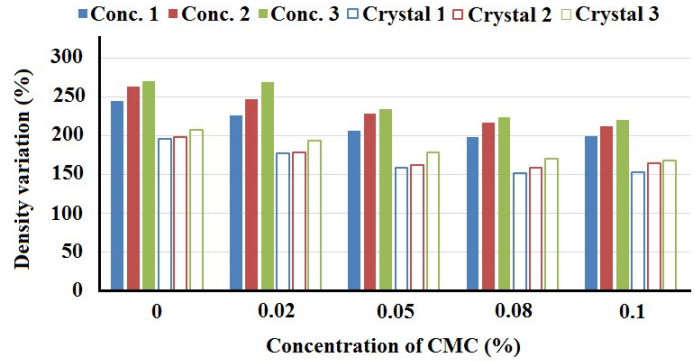
(c)



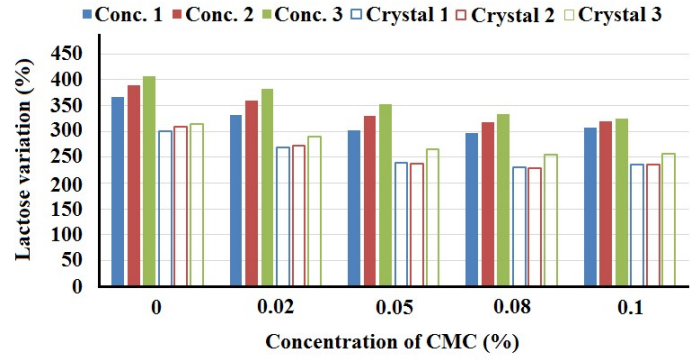
(d)

Figure 2S - Behavior of response variables (a) density, (b) lactose content, (c) soluble solids content and (d) protein content as a function of the concentration of $CaCl_2$, 5 % of ethanol

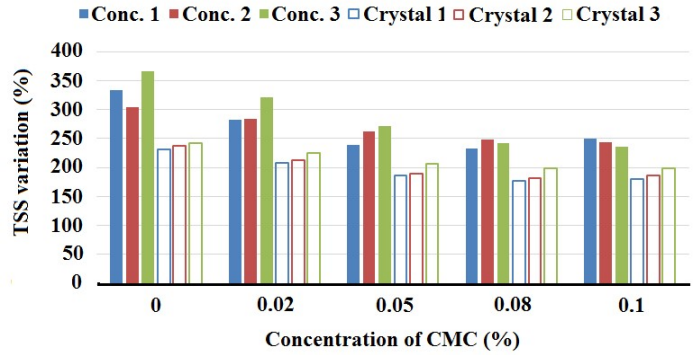
and 0.05% CMC in Concentrates and Ice Crystals separated in Stages 1, 2 and 3 of the freezing concentration process.



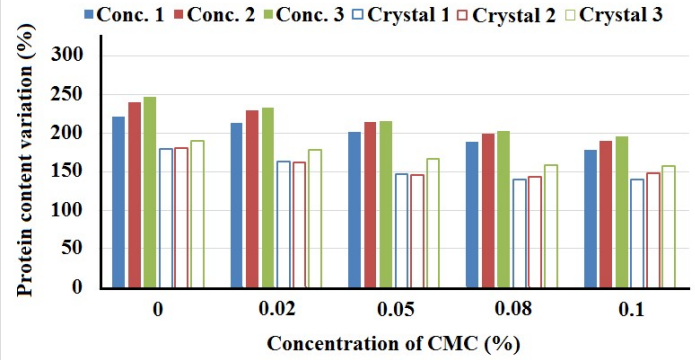
(a)



(b)



(c)



(d)

Figure 3S - Behavior of response variables (a) density, (b) lactose content, (c) soluble solids content and (d) protein content as a function of CMC concentration, 5% ethanol and 0.5%

$CaCl_2$ in the Concentrates and Ice Crystals separated in Stages 1, 2 and 3 of the freezing concentration process.

Table 1S - Regression results of the rotational central composite design (RCCD) for protein partition coefficient in the stage 1 and stage 2 of the BMW freeze-concentration.

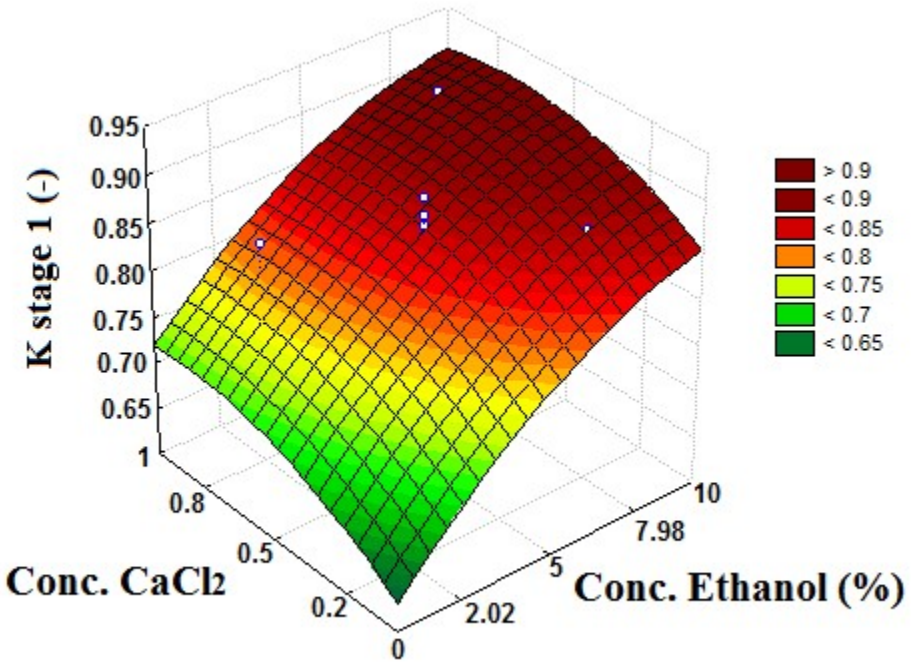
Protein partition coefficient – K (-)				
	Stage 1		Stage 2	
	Regression coefficient	p	Regression coefficient	P
β0	0,843167	0,000000*	0,782233	0,000000*
β1	0,060382	0,000286*	0,072853	0,000054*
β11	-0,012795	0,240102	-0,004834	0,616912
β2	0,021510	0,049228*	0,024676	0,021715*
β22	-0,010705	0,318438	0,024326	0,033754*
β3	-0,002378	0,800449	0,005285	0,548906
β33	0,007695	0,465376	0,019117	0,077295
β12	-0,003139	0,798421	-0,018057	0,143636
β13	0,012201	0,336789	0,006793	0,555248
β23	-0,009315	0,456941	-0,011915	0,313263
R^2	0.8890		0.934	
F	6,2310		1.,1508	

* Significant at the level of 5% probability ($p<0.05$).
Legend: β_0 = is a constant term; β_1 = Ethanol (%); β_{11}= (Ethanol (%))^2 ; β_2 = $CaCl_2$ (%); β_{22} = ($CaCl_2$ (%))^2; β_3 = CMC (%); β_{33} = (CMC (%))^2; β12 = Ethanol (%) × $CaCl_2$ (%); β_{13} = Ethanol (%) × CMC (%); β_{23} $CaCl_2$ (%) × CMC (%).

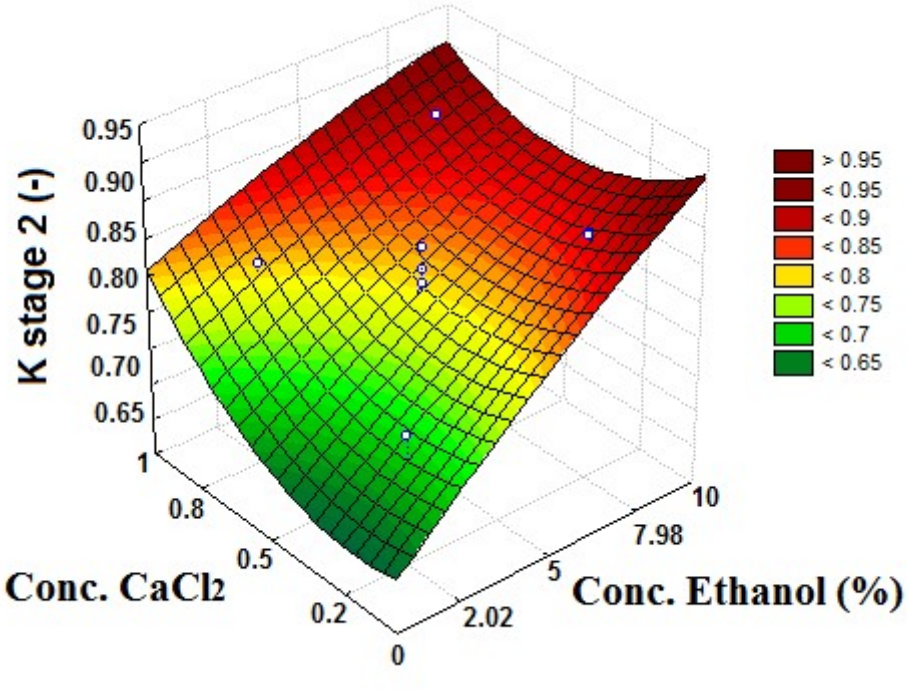
Table 2S - ANOVA results of the rotational central composite design (RCCD) for protein partition coefficient in the stage 3 of the BMW freeze-concentration.

ANOVA - Protein partition coefficient – K (-), stage 3					
	SS	**df**	**MS**	**F**	**p**
β0	0,033760	1	0,033760	9,528442	0,017646
β1	0,001117	1	0,001117	0,315125	0,592061
β11	0,010757	1	0,010757	3,036121	0,124962
β2	0,000322	1	0,000322	0,090953	0,771731
β22	0,002973	1	0,002973	0,839058	0,390131
β3	0,000391	1	0,000391	0,110438	0,749376
β33	0,011953	1	0,011953	3,373553	0,108867
β12	0,002245	1	0,002245	0,633620	0,452175
β13	0,005115	1	0,005115	1,443736	0,268606
Error	0,024801	7	0,003543		
Total SS	0,092867	16			
R^2 = 0.73294					
	SS	**df**	**MS**	**F**	**p**
Regression	0,068066	9	0,0076	2,1346	0,1649
Error	0,024801	7	0,003543		
Total SS	0,092867	16			

Legend: β_0 = is a constant term; β_1 = Ethanol (%); β_{11}= (Ethanol (%))^2 ; β_2 = $CaCl_2$ (%); β_{22} = ($CaCl_2$ (%))^2; β_3 = CMC (%); β_{33} = (CMC (%))^2; β12 = Ethanol (%) × $CaCl_2$ (%); β_{13} = Ethanol (%) × CMC (%); β_{23} $CaCl_2$ (%) × CMC (%).

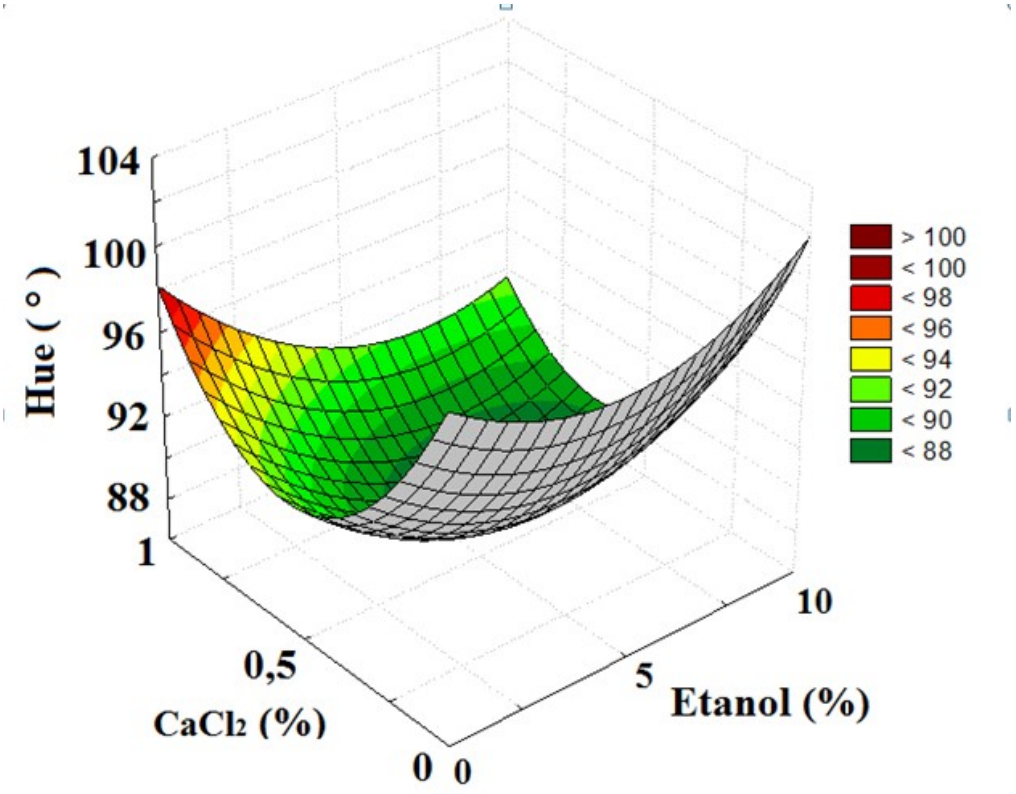


(a)

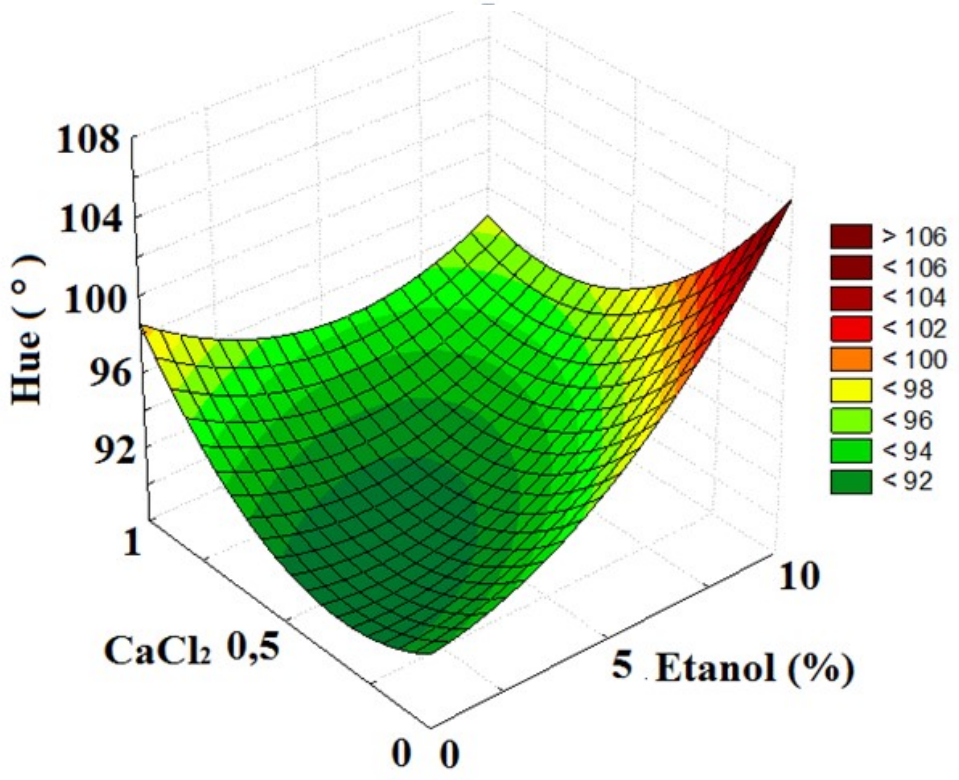


(b)

Figure 4S - Response surfaces of the protein partition coefficients (K) for (a) stage 1 and (b) stage 2.



(a)



(b)

Figure 5S - Response surfaces of the Hue angle variable for (a) concentrate 2 and (b) ice crystal 3.