



Serpa PDO cheese: towards identification of chemical markers involved in organoleptic attributes

Helena Araújo-Rodrigues, Freni K. Tavaría, Maria Teresa P.G. dos Santos, Nuno Alvarenga, Manuela M. Pintado
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Serpa PDO cheese

- Raw ovine milk
- No starter cultures
- Cynara cardunculus* L.

High microbial biodiversity

- strong and exquisite flavor
- semi-soft and creamy texture

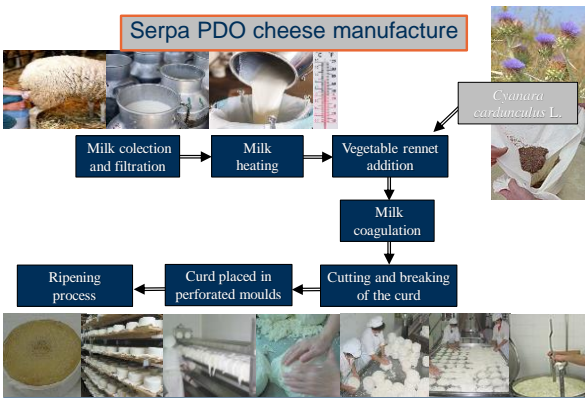
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Background
Aims
Materials and methods
Results and discussion
Conclusions and future perspectives

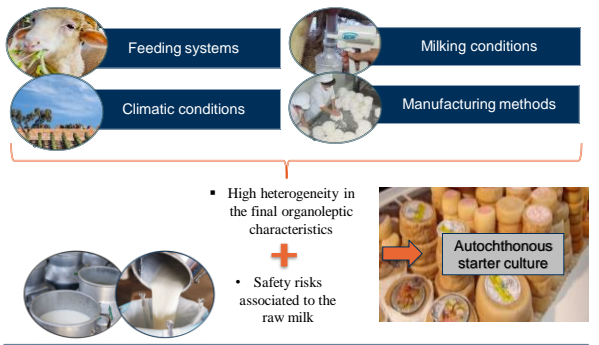
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Serpa PDO cheese manufacture



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Traditional cheeses issues




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Serpa PDO cheese

Screening of flavor and texture related compounds:

- Free amino acids (FAAs)
 - Organic acids
 - Volatile compounds

Towards the identification of chemical markers involved in the specificity of Serpa cheese





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4 PDO certified industries

Core of 30 days-old cheeses


Organic acid profile

Free amino acid profile

Volatile compounds screening

HPLC analysis

SPME GC-MS analysis



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Organic acid profile

Concentration of organic acids (mg/100g) in Serpa cheeses (n=4)

	Lactic	Acetic	Propionic	Butyric
M	1881.26±60.35 ^a	170.66±8.71 ^a	5.87±2.05 ^a	4.37±4.38 ^a
A	992.72±471.86 ^b	212.76±30.04 ^{a,b}	22.58±7.81 ^b	21.95±6.28 ^b
O	1668.12±724.20 ^{a,b}	198.72±50.40 ^{a,b}	7.09±1.73 ^a	2.65±2.97 ^a
N	1268.02±97.92 ^b	120.92±12.50 ^b	9.74±1.81 ^a	21.03±2.19 ^b
T				
H				
D				
M	946.09±6.25 ^a	318.62±19.26 ^{a,b}	6.96±2.05 ^a	5.40±1.26 ^a
A	645.03±160.41 ^a	359.44±82.31 ^b	77.01±16.83 ^b	41.82±29.40 ^b
O	1700±348.81 ^b	238.27±41.03 ^a	5.87±1.07 ^a	BDT
N	1185.88±507.73 ^{a,b}	265.05±29.86 ^{a,b}	10.76±3.74 ^a	19.93±10.52 ^{a,b}
T				
H				
D				

*BDL- Below the detection threshold.
Means in the same column and corresponding to the same month of production with different superscript letters differ significantly (p<0.05).




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Free amino acid profile

Concentration of FAAs (mg/100g) in Serpa cheeses (n=4)

F A	February				March			
	A	B	C	D	A	B	C	D
Asp	8.6±1.4 ^a	5.9±1.3 ^a	8.6±4.8 ^a	7.8±3.1 ^a	5.4±2.5 ^a	7.7±2.4 ^a	11.2±3.0 ^b	9.3±2.9 ^a
Glu	64.4±9.5 ^a	43.9±10.7 ^a	47.8±27.1 ^a	51.3±6.6 ^a	54.1±10.98 ^a	22.7±6.4 ^a	53.8±6.4 ^a	55.7±12.4 ^a
Cys	0.1±0.1 ^a	0.05±0.01 ^a	0.05±0.04 ^a	0.05±0.04 ^a	0.9±1.4 ^a	0.2±0.1 ^a	0.1±0.1 ^a	0.2±0.1 ^a
Asn	0.6±0.2 ^a	0.4±0.2 ^a	0.8±0.5 ^a	0.3±0.04 ^a	4.5±4.8 ^a	0.6±0.1 ^a	0.3±0.07 ^a	0.4±0.4 ^a
Ser	0.5±0.1 ^a	1.0±0.6 ^a	2.2±1.4 ^a	1.8±1.2 ^a	5.8±6.4 ^a	0.6±0.2 ^a	1.5±0.2 ^a	0.5±0.2 ^a
His	0.4±0.5 ^a	1.7±0.4 ^a	4.9±4.8 ^a	3.8±3.6 ^a	4.7±4.6 ^a	4.2±1.5 ^a	4.5±0.8 ^a	7.8±1.1 ^a
Gln	1.5±0.3 ^a	1.3±0.4 ^a	1.7±1.1 ^a	2.2±1.1 ^a	1.8±1.3 ^a	2.1±0.7 ^a	3.8±0.4 ^a	3.4±1.8 ^a
Thr	4.5±0.6 ^a	4.1±1.1 ^a	7.1±4.2 ^a	4.4±1.4 ^a	5.6±0.8 ^a	2.8±0.6 ^a	12.2±2.2 ^a	4.3±1.5 ^{a,b}
Arg	3.2±0.5 ^a	6.4±4.9 ^a	9.9±8.5 ^a	10.5±9.3 ^a	6.2±8.8 ^a	1.8±0.8 ^a	1.2±0.4 ^a	3.3±1.7 ^a
Ala	13.1±1.1 ^a	14.2±8.4 ^a	14.4±8.5 ^a	20.9±3.3 ^a	21.8±1.8 ^a	14.3±4.1 ^a	13.9±2.6 ^a	14.8±2.2 ^b
Tyr	0.4±0.03 ^a	5.4±3.9 ^a	2.5±1.6 ^a	5.7±3.9 ^a	3.3±2.8 ^a	1.6±1.6 ^a	1.0±0.2 ^a	0.8±0.9 ^a
Phe	26.4±5.3 ^a	34.8±13.3 ^a	46.3±25.6 ^a	46.6±9.9 ^a	42.9±6.8 ^a	65.0±23.5 ^a	55.6±8.9 ^a	82.4±19.2 ^a
Met	2.0±0.2 ^a	4.6±3.1 ^{a,b}	6.0±4.1 ^{a,b}	7.9±2.4 ^a	11.6±3.2 ^a	5.7±2.0 ^a	3.8±0.9 ^a	13.3±5.2 ^a
Trp	0.6±0.01 ^a	1.3±0.7 ^a	1.3±0.2 ^a	1.8±1.0 ^a	1.5±0.02 ^a	B D T	B D T	0.1±0.2 ^a
Trp	14.3±0.9 ^a	21.8±5.0 ^{a,b}	31.0±17.1 ^a	27.1±7.5 ^{a,b}	22.3±5.1 ^a	22.9±5.9 ^a	25.9±6.3 ^a	22.8±3.6 ^a
Ile	2.5±0.2 ^a	9.3±6.0 ^{a,b}	12.4±10.1 ^{a,b}	16.0±4.7 ^a	10.2±0.9 ^{a,b}	9.6±5.6 ^{a,b}	6.6±1.2 ^a	15.2±2.6 ^b
Leu	41.3±1.8 ^a	54.8±13.6 ^{a,b}	72.6±36.1 ^a	71.1±13.6 ^a	56.0±7.6 ^a	67.1±5.9 ^{a,b}	83.5±17.8 ^a	81.0±9.5 ^a



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Free amino acid profile

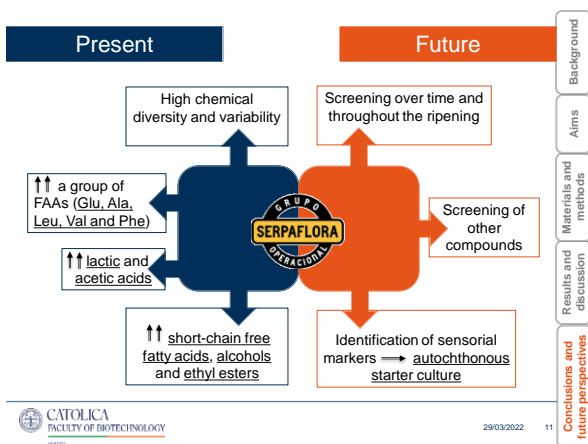
Concentration of FAAs (mg/100g) in Serpa cheeses (n=4)

February				
FAA	A	B	C	D
Glu	64.4±9.5 ^a	43.9±10.7 ^a	47.8±27.1 ^a	51.3±6.6 ^a
Ala	13.1±1.1 ^a	14.2±8.4 ^a	14.4±8.5 ^a	20.9±3.3 ^a
Val	26.4±5.3 ^a	34.8±13.3 ^a	46.3±25.6 ^a	46.6±9.9 ^a
Phe	14.3±0.9 ^a	21.8±5.0 ^{a,b}	31.0±17.1 ^b	27.1±7.5 ^{a,b}
Leu	41.3±1.8 ^a	54.8±13.6 ^{a,b}	72.6±36.1 ^b	71.1±13.6 ^b
March				
FAA	A	B	C	D
Glu	54.1±10.98 ^a	22.7±6.4 ^b	53.8±6.4 ^a	55.7±12.4 ^a
Ala	21.8±1.8 ^a	14.3±4.1 ^b	13.9±2.6 ^b	14.8±2.2 ^b
Val	42.9±6.8 ^a	65.0±23.5 ^a	55.6±8.9 ^a	82.4±19.2 ^b
Phe	22.3±5.1 ^a	22.9±5.9 ^a	25.9±6.3 ^a	22.8±3.6 ^a
Leu	56.0±7.6 ^a	67.1±5.9 ^{a,b}	83.5±17.8 ^a	81.0±9.5 ^a

Means in the same line with different superscript letters differ significantly (p<0.05).

Volatile compounds screening

More incident groups	Volatile compound	Other groups	Volatile compound
Short-chain free fatty acids	Acetic acid	Ketones	2-Octanone
	Butyric acid		2-Butanone
	Valeric acid	Medium-chain free fatty acids	Hexanoic acid
	Propionic acid		Octanoic acid
Alcohols	Ethanol	Terpenes	Limonene
	1-Propanol		3-Carene
	1-Butanol	Aromatic compound	Benzene methanol
1-Octanol	Phenol		
Ethyl esters	Ethyl hexanoate	Sulfur compounds	Dimethyl sulphide
	Ethyl octanoate		
	Ethyl decanoate		



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**THANK YOU
FOR
YOUR
ATTENTION!**

hrodrigues@porto.ucp.pt