Influence of environmental conditions in the ripening of traditional ewe's cheese

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CFD4 CHEESE

Objectives

The objective of this work was to evaluate the influence of atmospheric conditions on cheese properties during ripening and to identify the conditions that allow the best quality of the final product. .

Introduction

Artisanal sheep cheeses are part of the cultural heritage of the Alentejo, being a legacy passed from generation to generation. In recent decades there has been a shift from traditional ripening rooms to modern chambers with controlled temperature and humidity, however the ripening is not homogeneous inside.

Methodology

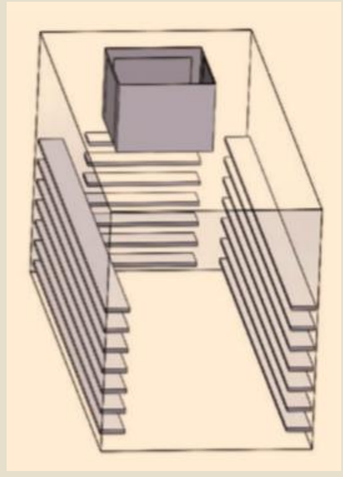
The environmental parameters (air velocity, temperature, humidity, gases and weight) were measured and recorded by a data acquisition system consisting of 10 dataloggers placed at different locations within the chamber. This system, based on IoT (Internet of Things), was chosen due to the simplicity of remote control and data transfer. The architecture was built on a Raspberry Pi hub connected to the local sensor system using WiPy microcontrollers. Data from the datalogger pool was recorded locally but was also transmitted in real time to a remote NodeRed server using a Message Queuing Telemetry Transport (MQTT) broker. The NodeRed tool was used for web based graphical data visualization. Over time, cheese was sampled at 10 different locations in the chamber at different ripening dates (0, 15 and 35 days) in order to perform the physicochemical and rheological characterization.

Conclusion

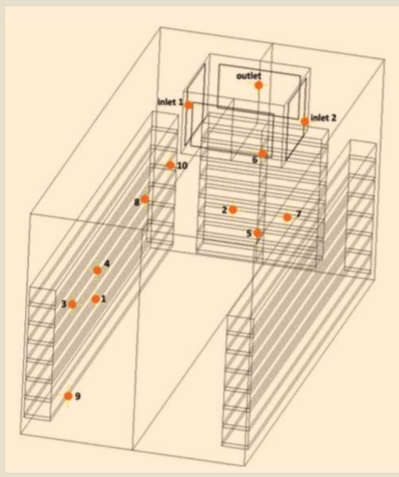
The results allowed us to conclude that the location affects the cheese properties throughout the ripening, especially the rheological component.

Methodology

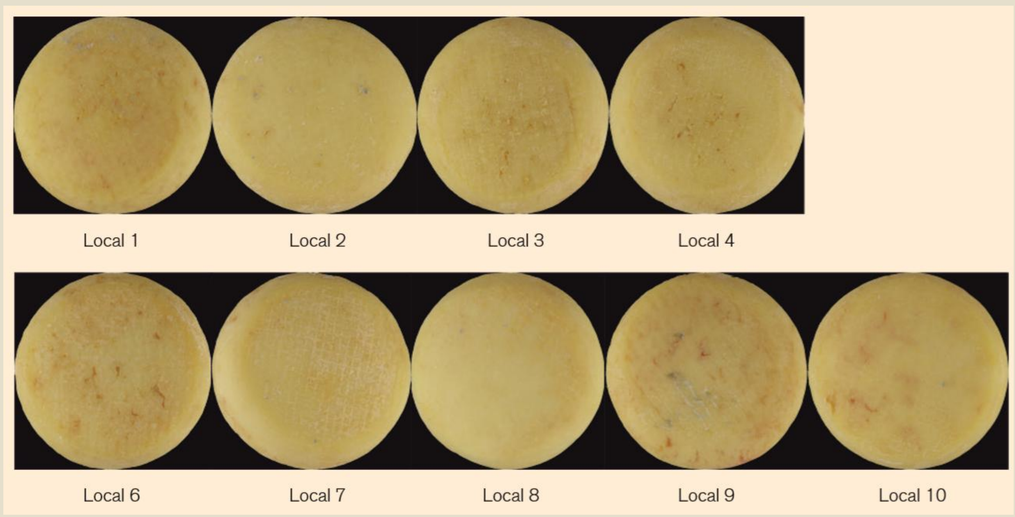
Data acquisition module



Model of ripening room



Sampling local



Cheese image from different ripening locals

Results

		At 0 d ripening	At 35d ripening, in tested locals							
			1	2	3	4	6	7	8	9
Environmental parameters	Air velocity (m/s)	–	0,18	0,05	0,16	0,11	0,18	0,05	0,20	0,09
	T (ºC)	–	8,9	8,5	9,8	8,7	8,7	9,1	8,7	9,9
	RH (%)	–	95,4	70,3	95,9	62,2	69,3	57,9	98,2	99,9
Physical chemical and microbiological parameters	Moisture % (m/m)	54,7	51,2	51,1	49,8	50,9	53,3	50,8	50,4	51,2
	ΔE	–	24,47	24,15	25,50	26,88	26,35	23,40	22,82	24,52
	Adhesiveness (-N.s)	2,02	12,5	13,1	11,5	13,3	12,8	11,9	11,9	10,33
	Mesophiles in the rind (ufc / cm^2)	7,23E+03	2,02E+05	2,18E+04	3,23E+04	4,73E+04	5,95E+04	3,00E+04	4,77E+04	5,50E+05
	Lactic bacteria (ufc/g)	2,88E+06	2.65E+08	4.15E+08	2.75E+08	2.43E+08	4.10E+08	1,99E+08	2.50E+08	3,70E+08
	Enterobacteria (ufc/g)	7,50E+04	2.68E+06	6.09E+06	2.32E+06	2.86E+06	5.68E+06	1,32E+06	1.68E+06	1,50E+06

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