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ORIGINAL RESEARCH

Quality and yield of Ricotta cheese as affected by milk fat content and coagulant type

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Milk processing conditions can exert a large influence on the quality of acid-coagulated cheeses. Herein, we evaluated the influence of milk fat content and coagulant type on Ricotta yield and physical, chemical and sensory properties. Fat-free Ricotta was hard and whiter than reduced-fat or full-fat Ricotta. Ricotta produced from low-fat and whole milk showed no differences in acceptability, indicating that fat content could be substantially reduced without impairing quality. Milk coagulation by citric acid decreased Ricotta moisture, firmness and yield, whereas calcium chloride produced a white Ricotta with desired firmness and high consumer acceptability.

Keywords Cheese, Ricotta, Fat, Coagulant, Quality, Storage.

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INTRODUCTION

Ricotta is an Italian high-moisture cheese obtained by direct acidification of milk or whey (Hough *et al.* 1999). With several uses including direct consumption (Monsalve and González 2005) or incorporation in pasta filling (Gianuzzi 1998) and confectionery products, Ricotta has become very popular worldwide (Pizillo *et al.* 2005).

In the last decade, there has been great interest in the production of low-fat cheeses (Di Cagno *et al.* 2014), to provide consumers with alternative ways to control their calorie intake (Olson and Johnson 1990; Mistry 2001; Ohlsson 2010). Although Ricotta is a high-moisture cheese, its energy density and fat content (up to 15–20%) are still high compared to several foods discouraged for weight control diets. Many research groups have attempted to produce low-fat cheeses (Banks *et al.* 1989; Bryant *et al.* 1995). Decreasing fat content has been reported to exert negative effects on texture, flavour and acceptability in most common cheese types (Banks 2004; Abd El-Gawad Mona *et al.* 2007). Strikingly, no studies have evaluated the effect of reducing fat content on milk Ricotta cheese to date.

The type of coagulant is also one of the most relevant processing factors in Ricotta cheese production. Most studies conducted to date have evaluated Ricotta cheeses obtained with a single coagulating agent (Carminati *et al.* 2002; Prudêncio *et al.* 2014), and the few studies comparing different coagulants have given variable results. Pintado *et al.* (2001) and Abdel-Razig and AlGamry (2009) reported that the use of acetic acid (ACE) as a coagulant resulted in a high-quality Ricotta, compared to that made with citric acid (CIT). Conversely, Weatherup (1986) found that CIT produced better Ricotta than ACE. No comparative evaluation of the effects caused by other coagulants such as lactic acid (LAC) and calcium chloride (CLC) has been conducted. In this work, we evaluated the effect of milk fat content (<0.1, 1.5 and 3.0%) and coagulant type (ACE, LAC, CIT and CLC) on the yield, composition and physical, chemical and sensory properties of stored Ricotta cheese.

MATERIALS AND METHODS

Effect of milk fat content on the yield, composition and quality of refrigerated Ricotta cheese

Whole milk (12.5% total solids, pH 6.7, mesophilic aerobic count 4×10^4 cfu/mL) was centrifuged and standardised to <0.1% fat (fat-free, density 1.034 g/mL), 1.5% (reduced-fat, density 1.032 g/mL) and 3.0% (full-fat, density 1.031 g/mL).

Cheese production was performed on a pilot scale steam-heated jacketed stainless steel cheese vat containing 50 L of milk. Milk was subsequently heated (8 °C per min) to 75 °C, and ACE 25% w/v was added until coagulation and whey separation. The temperature was rapidly increased after coagulation and held for 3 min at 90 °C. The curd was filtered through cheesecloth, cooled (8 °C per min), held at 10 °C for 10 min to allow whey draining and weighed. Samples were subsequently packed in 300-g polypropylene (PP) trays, covered and stored at 4 °C for 0, 3, 7 and 10 days. At day 0, samples were taken for compositional analyses (yield, protein, fat, ash, pH) and sensory evaluations. Changes in moisture content, hardness (force, *N*), colour (b^*) and lightness during storage were evaluated. All assays were carried out in triplicate.

Effect of the type of coagulant on Ricotta yield and physical, chemical and sensory properties

Whole milk (11.71% total solids, pH 6.8, mesophilic aerobic count 2.5×10^4 cfu/mL) was used to prepare Ricotta cheese in a pilot scale steam-heated jacketed stainless steel cheese vat. Batches of 50 L of milk were heated (8 °C per min) to 75 °C, and coagulation was conducted with 25% w/v ACE, 25% w/v LAC, 25% w/v CIT and 25% w/v CLC. After coagulation and whey separation, the temperature was rapidly increased to 90 °C and hold for 3 min. Further steps for Ricotta production and packaging were conducted as described in section entitled' Effect of milk fat content on the yield, composition and quality of refrigerated Ricotta cheese'. The samples were stored at 4 °C for 0, 3, 7 and 10 days. Prior to storage, compositional (yield, protein, fat, ash and pH) and sensory analysis (consumer acceptability test) were conducted. During storage, the changes in moisture content, hardness (force, *N*), colour (b^*) and lightness were evaluated. All assays were carried out in triplicate.

Yield

Milk volume, density and Ricotta weight were determined for each milk batch. Yield was calculated as follows: 100 × Ricotta weight (kg)/[Milk volume (L) × density (kg/L)]. Three measurements were carried out for each treatment.

Protein

Protein content was determined by the Kjeldahl method (IDF 1964). Briefly, samples (1 g) were digested with 25 mL 980 g/kg H_2SO_4, 2.7 g $ZnSO_4$ and 0.3 g $CuSO_4$. After digestion, the beaker was connected to the distillation apparatus and 6 mol/L NaOH was added until pH 8.2. The distillate was collected in 50 mL of 0.1 mol/L HCl containing four drops of Mortimer, indicator. The samples were titrated with NaOH 0.1 mol/L, and protein content was calculated using the factor 6.38. Results were expressed in g per 100 g of fresh Ricotta. Measurements were carried out in triplicate.

Fat

Fat content was determined by the Gerber method for cheese. Samples (2.5 g) were weighed in a cheese butyrometer with 15 mL of sulphuric acid (δ 1.525). The butyrometer was gently mixed, and 1 mL of amyl alcohol was added. Samples were incubated in a water bath at 65 °C for 5 min and were centrifuged for 5 min. After a final incubation at 65 °C, the fat content was read. Results were expressed as grams of fat per 100 g of fresh Ricotta. Measurements were carried out in triplicate.

Ash

Ten grams of Ricotta were weighed in a crucible and incinerated. Samples were then taken to a furnace at 550 °C for 3 h. The crucibles were cooled and weighed, and the ash content was calculated. Results were expressed in g per 100 g of fresh Ricotta. Measurements were carried out in triplicate.

Moisture

Approximately five grams of Ricotta were weighed in a metal container having dry sand and a glass rod. Cheese samples and sand were homogenised and dried at 102 °C until constant weight (IDF 1982). Results were expressed in percentage (w/w). Measurements were carried out in triplicate.

Hardness

Ricotta hardness (force, *N*) was evaluated by compression tests in a texture analyser (TAX2 Stable Microsystems, Godalming, UK) equipped with a flat probe (3 mm diameter). The samples were compressed 5 mm at a speed of 0.5 mm/s. The maximum force was recorded, and results were expressed in Newton. Ten measurements were conducted for each treatment.

Colour

Colour was determined using a chroma meter (Minolta CR 400, Osaka, Japan). The a^*, b^* and L^* (lightness) values were recorded. Ten measurements were conducted for each treatment.

pH

Ricotta pH was determined with a solid-phase electrode (TPA III; Altronix, FL, USA). For each experiment, measurements were carried out in triplicate. Measurements were carried out in triplicate.

Sensory evaluation

A consumer acceptability test was conducted to evaluate the Ricotta cheese. Cheeses were scored from 1 (lowest) to 9 (highest) for texture, colour, taste and overall acceptability. Cheese samples were randomly coded and served at 18–20 °C in portions of 20 g together with unsalted table biscuits and still water. Ninety nontrained consumers were used for each evaluation with equal distribution of men and women ranging in age between 23 and 28 years.

Statistical analysis

Experiments were designed based on a factorial design being the factors the type of coagulant, milk fat content and storage at 4 °C time. Data were analysed by ANOVA, and means were compared based on a Fisher test at a level of significance of $P < 0.05$.

RESULTS AND DISCUSSION

Effect of milk fat content on the yield, composition and quality of refrigerated Ricotta cheese

Several studies have determined the effect of fat content on the quality of most renetted cheeses (Bryant *et al.* 1995; Amelia *et al.* 2013). In contrast, the information available in acid-coagulated cheeses is very limited. In the present work, the influence of milk fat content 3.0, 1.5 and 0.1% w/v on the yield and compositional, physical, chemical and sensory properties of stored highly popular Italian Ricotta cheese was evaluated. As expected, cheese yield (*ca.* 12%, 9 and 8% for full-fat, reduced-fat and fat-free Ricotta, respectively) was highly variable depending on milk fat content (Table 1). The increased yield of full-fat Ricotta was due to both more elevated level of total solids in the raw milk and a higher recovery of milk solids. High fat to protein balance has been also reported to improve the yield of renetted cheeses (Guinee *et al.* 2007). The fat contents were 16.6, 2.0 and 0.1 for full-fat, reduced-fat and fat-free Ricotta, respectively (Table 1). Ash content showed no significant differences among treatments (Table 1).

As has been shown in other cheese types (Nelson and Barbano 2004), fat-free Ricotta was harder (1.5-fold) than full-fat Ricotta (Table 2). Interestingly, no differences were

Table 1 Yield, protein, fat and ash content of full-fat, reduced-fat and fat-free Ricotta cheese.

	% w/w			
Treatment	*Yield*	*Protein*	*Fat*	*Ash*
Full-fat	12.0 ± 0.1 c	32.8 ± 0.7 c	16.4 ± 1.2 c	2.1 ± 0.0 a
Reduced-fat	9.4 ± 0.8 b	36.6 ± 0.8 b	1.6 ± 2.1 b	2.2 ± 0.1 a
Fat-free	7.8 ± 0.3 a	48.5 ± 0.9 a	0.0 ± 0.0 a	2.4 ± 0.5 a

Different letters indicate differences based on a Fisher test at a level of significance of $P < 0.05$.

Table 2 Moisture, hardness (force), colour parameters (*a*, b*, L**) and pH of full-fat, reduced-fat and fat-free Ricotta cheese during storage at 4 °C for 0, 3, 7 and 10 days.

		Time at 4 °C (day)			
	Treatment	*0*	*3*	*7*	*10*
Moisture (% w/w)	Full-fat	52 ± 6 abc	51 ± 2 ab	53 ± 2 abc	50 ± 3 a
	Reduced-fat	53 ± bc	54 ± 2 bcd	55 ± .4 cd	55 ± 1 cd
	Fat-free	57 ± 3 cd	58 ± 3 e	58 ± 3.7 e	58 ± 3 e
Force (*N*)	Full-fat	1.7 ± 0.1 a	2.2 ± 0.1 b	2.6 ± 0.6 c	2.6 ± 0.8 c
	Reduced-fat	2.2 ± 1.3 b	3.3 ± 0.8 d	3.9 ± 1.0 d	4.1 ± 1.2 de
	Fat-free	5.2 ± 2.6 f	5.9 ± 2.6 h	5.7 ± 1.8 gh	5.4 ± 3.4 fg
*a**	Full-fat	−3.5 ± 0.2 cd	−3.5 ± 0.2 cd	−3.6 ± 0.2 d	−3.7 ± 0.1 d
	Reduced-fat	−3.3 ± 0.1 abcd	−3.0 ± 1.5 a	−3.5 ± 0.1 bcd	−3.1 ± 1.5 abc
	Fat-free	−3.0 ± 0.2 a	−3.0 ± 0.1 a	−3.1 ± 0.1 a	−3.1 ± 0.1 ab
*b**	Full-fat	19.3 ± 0.7 c	19.5 ± 1.0 c	20.4 ± 0.7 c	20.0 ± 0.8 c
	Reduced-fat	17.1 ± 0.6 b	16.6 ± 0.6 b	17.4 ± 0.5 b	16.9 ± 0.4 b
	Fat-free	12.3 ± 0.9 a	11.9 ± 0.5 a	12.3 ± 0.9 a	11.8 ± 0.6 a
*L**	Full-fat	89 ± 2 cd	90 ± 2 ef	90 ± 1 ef	91 ± 2 ef
	Reduced-fat	90 ± 1 de	89 ± 2 cdef	89 ± 1 cd	90 ± 1 cdef
	Fat-free	88 ± 4 bc	87 ± 2 ab	87 ± 1 a	87 ± 2 a
pH	Full-fat	5.8 ± 0.1 bcd	5.7 ± 0.1 abc	6.1 ± 0.1 d	5.9 ± 0.0 cd
	Reduced-fat	5.7 ± 0.1 abc	5.5 ± 0.2 ab	5.9 ± 0.3 cd	5.8 ± 0.1 bcd
	Fat-free	5.6 ± 0.2 abc	5.4 ± 0.4 a	5.9 ± 0.4 cd	5.7 ± 0.1 abcd

Different letters indicate differences based on a Fisher test at a level of significance of $P < 0.05$.

found between full-fat and reduced-fat Ricotta. Regardless of the fat content, Ricotta hardness increased during the first week at 4 °C, although fat-free Ricotta softened at longer storage periods. Texture improvement of low-fat cheeses during storage has been reported (Tunick *et al.* 1993; Wadhwani *et al.* 2014). Milk fat content had a marked influence on Ricotta colour. Full-fat Ricotta had a^* and b^* values (Table 2) implying a yellow hue, whereas fat-free Ricotta was whiter, probably due to the lower level of β-carotene as well as to the higher water content, which would affect light scattering (Kosikowski and Mistry 1997). All the Ricottas showed pH values *ca.* 5.5–5.9 and showed only minor changes during refrigeration (Table 2).

As has been found in other full-fat cheeses (Banks *et al.* 1989; Bryant *et al.* 1995), whole-milk Ricotta showed higher sensory scores than the fat-free Ricotta (Table 3). This was observed for texture, flavour, colour and overall acceptability to the full-fat cheese. Decreasing the fat content in cheeses has over time been surrounded by many flavour and texture problems, which have been successfully overcome in some varieties but not in others (Ardö 1997). In this work, reduced-fat Ricotta showed similar acceptability than full-fat cheese. Mangino (1984) demonstrated that increasing protein concentrations favour the formation of polypeptide cross-linkages during heating, resulting in a more compact protein gel (Figure 1) having higher water-holding capacity. Consequently, the good sensory performance of reduced-fat Ricotta may have been associated with the higher whey retention partially mimicking the function of fat (Mistry 2001).

Overall, the results show that the use of skim milk (1.5% v/v) does not compromises Ricotta sensory quality. This differs from what has been reported for other acid-coagulated cheeses such as South Asian Paneer, in which the use of

Table 3 Sensory scores for colour, flavour, texture and acceptability of full-fat, reduced-fat and fat-free Ricotta cheese.

	Sensory score			
Treatment	*Colour*	*Flavour*	*Texture*	*Acceptability*
Full-fat	6.6 ± 0.6 b	6.2 ± 0.3 b	6.2 ± 0.3 b	6.6 ± 0.3 b
Reduced-fat	6.8 ± 0.9 b	5.9 ± 0.5 b	5.9 ± 0.1 b	6.0 ± 0.3 b
Fat-free	5.3 ± 0.9 a	3.9 ± 0.6 a	3.4 ± 0.6 a	4.0 ± 0.7 a

Different letters indicate differences based on a Fisher test at a level of significance of $P < 0.05$.

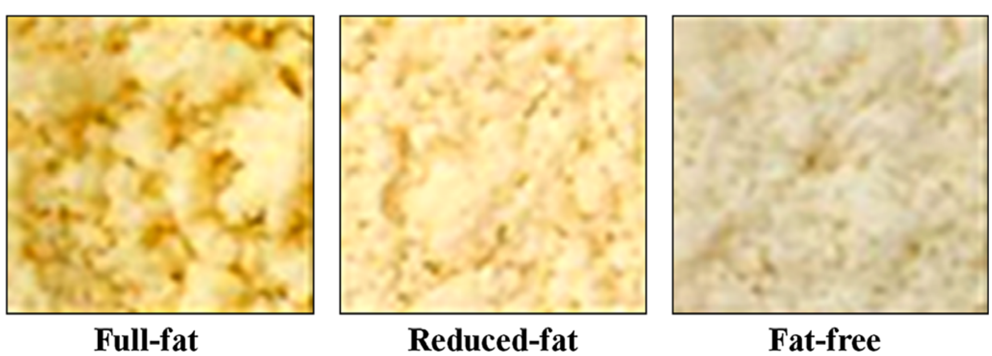

Figure 1 Appearance of full-fat, reduced-fat and fat-free Ricotta cheeses. [Colour figure can be viewed at wileyonlinelibrary.com]

Table 4 Yield, protein, fat and ash content of milk Ricotta cheese produced with acetic acid (ACE), lactic acid (LAC), citric acid (CIT) or calcium chloride (CLC) as coagulants.

	% w/w			
Treatment	*Yield*	*Protein*	*Fat*	*Ash*
ACE	15.1 ± 1.6 b	25.9 ± 1.3 a	17.3 ± 1.0 ab	2.2 ± 0.6 ab
LAC	14.6 ± 1.0 b	26.9 ± 2.1 a	15.9 ± 1.4 ab	1.7 ± 0.3 a
CIT	11.8 ± 0.6 a	30.1 ± 1.5 b	18.3 ± 1.3 b	1.8 ± 0.1 a
CLC	18.8 ± 1.5 c	26.4 ± 0.6 a	14.8 ± 1.8 a	2.7 ± 0.1 b

Different letters indicate differences based on a Fisher test at a level of significance of $P < 0.05$.

milk having fat levels lower than 3.5% resulted in a product with unacceptable flavour, body and texture (Chawla *et al.* 1985, 1987; Arya and Bhaik 1992).

Effect of the type of coagulant on Ricotta yield and physical, chemical and sensory properties

Calcium chloride improved Ricotta yield (19.2% w/w) (Table 4). In contrast, CIT produced the lowest yield, whereas ACE and LAC showed intermediate values. Similar results were reported by Bandyopadhyay *et al.* (2005) on Chhana cheese. Calcium is known to exert large impact on the functional properties of milk products (Deeth and Lewis 2015). The use of CLC resulted in a higher recovery of milk fat and protein (*ca.* 100, 93, 86 and 70% for CLC, ACE, LAC and CIT, respectively), indicating that Ca ions had a positive effect on milk acid coagulation. Casein curd formation is known to be determined by the balance between the electrostatic and hydrophobic forces (Udabage

Table 5 Moisture, pH, hardness (force) and colour parameters (a^*, b^*, L^*) of whole-milk Ricotta cheese produced with acetic acid (ACE), lactic acid (LAC), citric acid (CIT) or calcium chloride (CLC) as coagulants.

		Time at 4 °C (day)			
	Treatment	*0*	*3*	*7*	*10*
Moisture (% w/w)	ACE	53.0 ± 1.3 cde	52.7 ± 1.6 cd	52.7 ± 1.8 c	56.2 ± 2.4 g
	LAC	53.2 ± 3.2 cdef	53.7 ± 3.6 def	53.3 ± 4.0 cdef	54.0 ± 4.4 f
	CIT	49.2 ± 4.0 ab	48.3 ± 3.9 a	49.0 ± 3.1 ab	49.8 ± 5.5 b
	CLC	56.1 ± 6.1 g	57.3 ± 6.7 h	53.8 ± 5.3 ef	55.8 ± 7.8 g
pH	ACE	5.6 ± 0.4 a	5.9 ± 0.1 bcde	5.8 ± 0.0 bcd	5.8 ± 0.0 abcd
	LAC	5.9 ± 0.3 cdef	5.8 ± 0.2 abcd	5.9 ± 0.1 cdef	6.0 ± 0.1 defg
	CIT	5.7 ± 0.2 ab	5.6 ± 0.2 ab	5.7 ± 0.1 abc	5.7 ± 0.1 abc
	CLC	6.2 ± 0.3 ab	6.0 ± 0.3 defg	6.2 ± 0.1 g	6.2 ± 0.2 fg
Force (*N*)	ACE	1.4 ± 0.3 cd	1.1 ± 0.2 b	1.5 ± 0.2 d	1.3 ± 0.2 c
	LAC	1.4 ± 0.3 d	1.3 ± 0.3 c	1.6 ± 0.2 e	1.1 ± 0.1 ab
	CIT	1.0 ± 0.3 a	1.1 ± 0.2 ab	1.5 ± 0.3 e	1.1 ± 0.1 ab
	CLC	1.6 ± 0.2 e	1.5 ± 0.2 d	1.7 ± 0.2 e	1.5 ± 0.2 d
a^*	ACE	−3.0 ± 0.2 b	−3.3 ± 0.3 d	−3.3 ± 0.2 de	−3.5 ± 0.3 g
	LAC	−3.1 ± 0.2 c	−3.5 ± 0.5 g	−3.5 ± 0.3 gh	−3.6 ± 0.2 hi
	CIT	−3.4 ± 0.1 ef	−3.6 ± 0.3 i	−3.7 ± 0.2 i	−3.8 ± 0.2 k
	CLC	−2.9 ± 0.4 a	−3.1 ± 0.4 c	−3.3 ± 0.3 de	−3.4 ± 0.4 fg
b^*	ACE	15.9 ± 2.1 d	16.4 ± 2.7 ef	16.5 ± 2.1 efg	16.6 ± 1.8 fg
	LAC	16.0 ± 2.2 d	16.7 ± 3.0 fgh	16.7 ± 2.6 fgh	16.9 ± 2.3 gh
	CIT	17.1 ± 1.9 h	17.8 ± 2.5 i	17.8 ± 2.3 i	17.8 ± 1.9 i
	CLC	14.5 ± 2.2 a	14.9 ± 2.6 b	15.4 ± 2.0 c	16.2 ± 2.6 de
L^*	ACE	90.8 ± 3.6 bc	90.8 ± 3.1 bc	92.0 ± 1.5 de	93.0 ± 2.1 fg
	LAC	92.4 ± 2.8 ef	92.3 ± 1.2 ef	92.4 ± 1.4 ef	92.6 ± 2.7 efg
	CIT	89.9 ± 3.6 a	91.1 ± 1.7 c	90.1 ± 2.1 ab	91.4 ± 2.2 cd
	CLC	94.0 ± 2.7 hi	93.8 ± 1.9 hi	93.4 ± 2.4 gh	94.2 ± 2.1 i

Different letters indicate differences based on a Fisher test at a level of significance of $P < 0.05$.

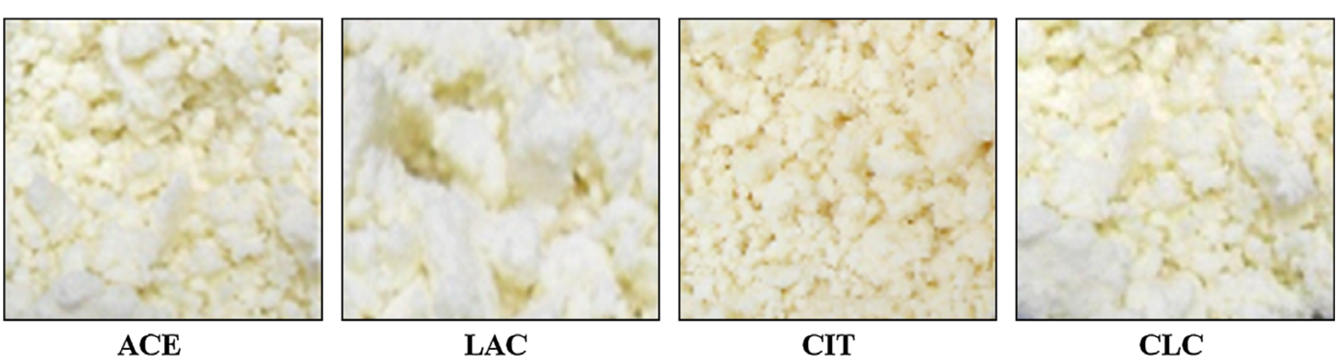

Figure 2 Appearance of milk Ricotta cheese produced with acetic acid (ACE), lactic acid (LAC), citric acid (CIT) or calcium chloride (CLC). [Colour figure can be viewed at wileyonlinelibrary.com]

Table 6 Sensory scores for colour, flavour, texture and acceptability of milk Ricotta cheese produced with acetic acid (ACE), lactic acid (LAC), citric acid (CIT) or calcium chloride (CLC) as coagulants.

	Sensory score			
Treatment	*Colour*	*Flavour*	*Texture*	*Acceptability*
ACE	6.5 ± 1.9 bc	5.7 ± 2.1 a	5.8 ± 2.2 a	6.0 ± 2.1 ab
LAC	5.5 ± 2.3 a	5.6 ± 2.2 a	5.8 ± 2.2 ab	5.7 ± 2.0 a
CIT	6.2 ± 2.1 ab	5.9 ± 1.9 ab	5.9 ± 1.9 ab	6.2 ± 1.8 ab
CLC	7.1 ± 1.9 c	6.4 ± 2.0 b	6.5 ± 2.2 b	6.7 ± 2.0 b

Different letters indicate differences based on a Fisher test at a level of significance of $P < 0.05$.

et al. 2001). Marchessau *et al.* (2002) showed that calcium greatly increased the binding response between phosphorylated caseins and that a level as low as 2 mM will favour the formation of casein aggregation. Guo *et al.* (2003) showed that the calcium phosphate microcrystals formed when using phosphate salt in milk provide a substrate for protein adsorption, with subsequent cross-binding of the casein micelles. The yield increase of CLC Ricotta was also due to higher moisture content in the product (Table 5).

Citric acid Ricotta presented as having higher protein content, with no differences between the remaining coagulants (Table 4). The fat content ranged between 14 and 18.5% (Table 4) with the highest values in CIT Ricotta.

In contrast, CLC Ricotta had the lowest level of fat. Ricotta hardness was directly related to cheese fat content (Table 5). It was noteworthy that most differences arising from the clotting agent used (Figure 2) remained throughout storage (Table 5). CIT Ricotta had more yellow (higher b^*) colour and lower lightness (lower L^*) as opposed to CLC Ricotta, which was whiter (Table 5).

During storage, all the Ricottas turned yellow, however, the differences in colour among treatments were still observed even after 10 days at 4 °C. Sensory evaluation resulted in CLC Ricotta being given the best score (Table 6). This was observed for texture, flavour, colour and overall acceptability. Calcium has been also shown to improve the body and texture and overall acceptability of Paneer cheese (Sachdeva and Singh 1987).

The Ricotta made with CLC had the highest pH value (*ca.* 6.1) (Table 6), whereas no major differences were found between the CIT, ACE and LAC Ricottas, which ranged between pH 5.6 and 5.8. In contrast to Borba *et al.* (2014), who found a reduction in Ricotta pH during storage, no major changes were observed in the present study, regardless of the coagulant used.

CONCLUSIONS

Our results show that milk fat content markedly affects the physical, chemical and sensory properties of Ricotta cheese. Similar to other cheeses, fat-free Ricotta was harder, whiter and received the lowest acceptability scores compared to the other Ricotta cheeses. Interestingly, reduced-fat and full-fat Ricotta showed no differences in acceptability, indicating that fat content could be substantially reduced without impairing cheese sensory properties. The coagulant used also exerted a marked effect on Ricotta yield and quality. Citric acid coagulation decreased Ricotta moisture, firmness and yield. Instead, CLC yielded highly accepted, firm and white Ricotta. The differences induced by the coagulant type and milk fat content decreased but remained appreciable throughout the storage. This information may be useful for the production market of milk Ricotta cheese.

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