

ISOLATION AND IDENTIFICATION OF YEAST IN TRADITIONAL COTTAGE CHEESE WITH STRAWBERRY AS COAGULANT

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Abstract

*Cottage cheese is one of the popular unripened cheese which made by acid addition for coagulate the casein. In traditional cheesemaking, fruit juice extract which has high acidity used to replace rennet as coagulants. The addition of fruit juice extract in the making of traditional cottage cheese has given specific characteristic such as flavor which also affected by the presence of microorganisms such as yeasts. The research aims to determine the presence of yeast in traditional cottage cheese that coagulated by Strawberry juice extract. Strawberry juice extract selected as cottage cheese coagulant because it has high acidity with the pH of 3.34. Cottage cheese made with pasteurized cow milk and mixed with 20%, 30%, 40% of strawberry juice extract until the pH turn to 5.85-5.93, curdled and added with 0.4% NaCl then solidified aseptically (modification of McMahon, 2005). Total yeasts counted by using total plate count method on the Malt Extract Agar with the addition of 10 ppm antibiotic (Roostita, et al., 2011) The yeasts colony identified using Remel RapID Yeast Plus to determine the species. Results showed that 40% addition of strawberry juice extract resulting the best yield of 32.07%, with the total yeasts of 5.98×10^7 cfu/g and *Cryptococcus albidus* as yeasts dominantly found in products.*

Key words: Cottage Cheese, Strawberry, Yeast, *Cryptococcus albidus*.

INTRODUCTION

It is widely recognized that yeasts can be an important component of the microflora of many cheese varieties because of the low pH, low moisture content, high salt concentration and refrigerated storage of these products. Nevertheless, yeasts play a dual role depending on the cheese. In fact, in some cheese types they make a positive contribution to the development of flavor and texture during the stage of maturation, while in other varieties, yeasts can be regarded as spoilage organisms. Yeast spoilage is recognized as a problem primarily in fermented milk and cheese (Abd. El-Gawad and Ahmed, 2011). Yeasts in some cheese types can periodically cause both economic and public health problems. Yeasts themselves are not commonly the cause of defects in cheese unless they ferment lactose. In this case, they can grow rapidly and produce a characteristic yeasty or fruity flavor and obvious gas. There are numerous references concerning the significance of the presence of yeasts in dairy

products, where they may contribute positively to the characteristic taste and flavor development during the stage of maturation or, on the contrary, may lead to product spoilage.

Cottage cheese is one of the popular unripened cheese which made by acid addition for coagulate the casein. In traditional cheesemaking, fruit juice extract which has high acidity used to replace rennet as coagulants. The addition of fruit juice extract in the making of traditional cottage cheese has given specific characteristic such as flavor which also affected by the presence of microorganisms such as yeasts.

In this study, we sought to obtain a dominant yeasts that presence on cottage cheeses with various level of strawberry juice as coagulant.

MATERIALS AND METHODS

Cottage cheese made with pasteurized cow milk and mixed with 20%, 30%, 40% of strawberry juice extract until the pH turn to 5.85-5.93, curdled and added with 0.4% NaCl then solidified aseptically (modification of

McMahon, 2005). Total yeasts counted by using total plate count method on the Malt Extract Agar with the addition of 10 ppm

antibiotic (Roostita, et al., 2011). The yeasts colony identified using Remel RapID Yeast Plus to determine the species.

RESULTS AND DISCUSSIONS

Cottage Cheese Yield

Abd El-Gawad and Ahmed (2011) describes different aspects related to cheese yield: characteristics of the milk (contents of protein and fat, genetic variants of proteins, somatic cells), cheesemaking conditions (incorporation of whey proteins in the curd, homogenization of the fat, type of coagulant, use of different starters, curd firmness, type of vat, treatment of the curd). The same authors also consider different predictive formulas for determine cheese yield and strategies in order to minimize cheesemaking losses.

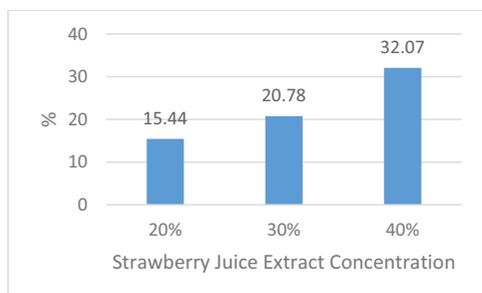


Figure 1. Cottage cheese yield with strawberry juice extract addition

The results showed that higher strawberry juice extract addition gave high cottage cheese yield and 40% strawberry juice extract addition gave the highest yield of 32.07% from the raw material.

Acidity of strawberry juice extract resulting coagulation. Yield of cottage and other cheeses is dependent upon casein content of milk.

The degrading effect of psychrotrophic proteases is much greater on casein than on whey proteins.

Any factor affecting the casein content of raw milk has a potentially great impact on yield of cottage cheese (Abd. El-Gawad and Ahmed, 2011).

Casein also sensitive to acid, the lower pH and high volume of strawberry juice extract tend to higher casein degradation that resulting the higher yield.

Yeasts Population

The cheese microbiota especially yeasts has long been known to be the major contributor to cheese flavor, aroma, texture, and appearance. The diversity and population of specific types of organisms present in cheese depend on the microbial quality of the raw material, handling and heat treatment of the raw material, manufacturing and curd-handling conditions, temperature and humidity during ripening, amount and manner of salting, and exposure of the cheese to exogenous microorganisms during and after manufacture (Bajara et al., 2015).

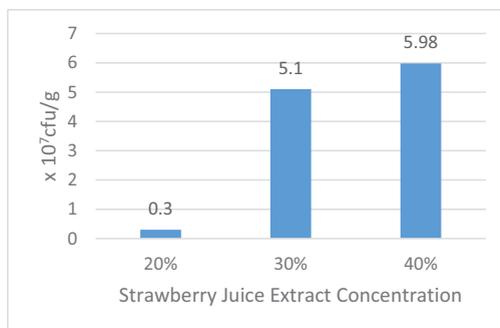


Figure 2. Yeasts population on cottage cheese with strawberry juice extract addition

Results showed that the highest strawberry juice extract addition resulting higher yeasts population. The 40% addition of strawberry juice extract resulting in 5.98×10^7 cfu/g yeasts population. Allegedly the yeasts population were came from the strawberry juice extract. Strawberry juice extract not only have a role as natural coagulant, but also as microbial contributor especially yeasts population that could gave a different characteristics on the cottage cheese product.

Yeasts Identification

The yeasts isolated differed between cheeses, cheese types, and samplings, as would be predicted. Yeast species that were not consistently detected between samplings or within a manufacturer's products are likely contaminants. The source(s) might be predicted

based on fungal ecology (i.e., farm environment, factory environment, or personnel), but cannot be conclusively traced. It is important to examine the production line and identify possible points in the process where the cheeses are exposed to yeast contamination (Banjara et al., 2015).

Results showed that the yeasts identified from the cottage cheese is *Cryptococcus albidus*. *Cryptococcus* spp. were one the yeasts that found on traditional cheese from Egypt (Soliman and Aly, 2011). This kind of yeasts has the ability to convert lipid from cheese whey (Seo et al., 2014).

Rapid Yeast Plus												
								Run Date: 1/11/2016				
								Facility: Universitas Padjadjaran				
Microcode: 736050								Reference No: CCI				
System Tests	+GLU	86%	+TRE	69%	-NAGA	00%	-ONPG	00%	+PHS	90%	-PRO	70%
	+MAL	61%	+RAF	11%	+αGLU	90%	-αGAL	01%	-PCHO	88%	-HIST	61%
	+SUC	81%	-LIP	14%	+βGLU	92%	-βFUC	18%	+URE	90%	-LGY	11%
ID = Cr. albidus ..Rare Biotype												
Choice	Probability			Bioscore			Contraindications					
Cr. albidus	> 99.9%			1/5310			RAF [11] PCHO[88]					
Probability Level: Adequate												
Biofrequency: Rare												

Figure 3. Yeasts identification with RapID Yeasts Plus System

CONCLUSIONS

Results showed that 40% addition of strawberry juice extract resulting the best yield of 32.07%, with the total yeasts of 5.98×10^7 cfu/g and *Cryptococcus albidus* as yeasts dominantly found in products.

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