American Journal Of Applied Science And Technology
(ISSN – 2771-2745)
VOLUME 02 ISSUE 04 Pages: 42-46
SJIF IMPACT FACTOR (2022: 6. 108)
OCLC – 1121105677 METADATA IF – 5.582
Publisher: Oscar Publishing Services

Journal Website: https://theusajournals.com/index.php/ajast

Research Article

THE ROLE OF ENZYMES IN CHEESE PRODUCTION

Submission Date: April 18, 2022, Accepted Date: April 25, 2022,
Published Date: April 30, 2022
Crossref doi: https://doi.org/10.37547/ajast/Volume02Issue04-06

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ABSTRACT

This article presents the results of studies on the importance of the fermentation process in cheese production, the type of enzyme, and the effect of the amount of enzyme on the yield of finished cheese after pressing. The article mainly provides information on the effect of three enzymes Fromase 220 TL, Lot F6073, DSM Food Specialties, SG - 50 and Maxiren 1800, Lot R 5664, DSM Food Specialties on the amount of finished cheese at the output, including the same amount of enzymes in the amount of 1 .25 g per 100 kg of the mass of the mixture.

KEYWORDS

cheese, enzyme, parmesan, tryptophan, lysine, fermentation, coagulation.

INTRODUCTION

To increase the volume of milk and dairy products in recent years and radically improve the process of processing dairy products, the President of the Republic of Uzbekistan on February 22, 2017, with the participation of the International Fund for Agricultural Development Resolution 2795 sets out several

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priorities. At the same time, the project of the President of the Republic of Uzbekistan on the establishment of small milk processing enterprises in the regions to implement the strategy for 2020 is being implemented.

Every year, the country hosts an international exhibition of small-scale food technology and food ingredients. The exhibition will feature presentations of mini-technological systems and products by major food manufacturers from developed countries. Among the food products, milk and dairy products play an important role in our lives with very high demand [1].

Today, it is impossible to imagine a rational diet without milk and dairy products. There are more than 50 types of milk and dairy products, among which cheese has a special place. Cheese is a dairy product obtained by fermenting casein in milk.

Materials and methods. Cheese has many beneficial properties and plays an important role in human health. Cheese not only has nutritional value but also has a high biological value. The biological value of cheese is also measured by the number of amino acids, vitamins and enzymes produced by beneficial microorganisms [2,3].

It is known that milk protein is a complete protein in terms of amino acid structure. Therefore, cheese protein is also a complete protein, it is rich in unique amino acids such as tryptophan, lysine, and methionine. They improve mood and fight stress. It has a positive effect on circulatory activity by lowering cholesterol.

Cheese has dietary and healing properties. It is light and almost completely digested. The cheeses are mostly hard and soft cheeses depending on how they are prepared. Depending on the method of fermenting milk, cheeses are divided into sour cheeses and sour cheeses. The main cheeses produced today are syrup cheeses. In the production of syrup cheeses, milk is fermented using syrup enzymes. In the production of sour cheeses, it is fermented under the influence of lactic acid. Some cheeses (e.g. soft varieties) go through a stage of fermentation and coagulation [4].

The enzymes used in cheese production vary depending on the type of cheese. The amount and type of enzymes are important in cheese making. Depending on the type of enzymes, the shelf life of cheeses also varies [5,6].

Usually semi-hard and hard cheeses are stored in the refrigerator for about two weeks (if they are packaged), however, there are varieties of cheese that can be stored for up to four months, for example, these are gauda, Dutch, masdam, Russian cheeses. The shelf life of Parmesan cheese is up to six months. The types of enzymes and their quantity play an important role in the production of cheese. The following table provides information on the type and amount of enzyme used in cheese production.

Table 1

Dependence of types of enzymes on the quality indicators of cheese

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№	Naming of indicators	Enzyme type		
		Fromase 220 TL, Lot F6073, DSM Food Specialties	СГ -50	Maxiren 1800, Lot R 5664, DSM Food Specialties
1	Enzyme consumption per 100 kg of mixture, gr	1,25	1,25	1,25
2	Mixture description: amount, kg oil content,% acidity, ° T density, kg/m^3	 10280 2,8 18,0 1,028	 11308 2,8 19,0 1,028	 11600 3,2 18,0 1,028
3	Fermentation periodicity, min	30	40	30
4	Mass of cheese after pressing, kg	906,0	1034,0	998,0
5	The mass of the finished cheese, kg	838,7	986,0	914,0
6	Output of finished cheese after pressing, %	92,57	95,36	91,58

RESULTS AND DISCUSSION

As can be seen from the table, depending on the type of enzymes used in the production of cheese, the yield of the finished cheese after pressing varies. When using the same amount of enzymes per 100 kg of the mixture in the production of cheese, ie using the enzyme "Fromase 220 TL, Lot F6073, DSM Food Specialties", the yield of finished cheese after pressing was 92.57%. When using the enzyme Maxiren 1800, Lot R 5664, DSM Food Specialties, the yield of the finished cheese was 91.58%. SG-50 had the highest yield when using the enzyme. When using the enzyme SG-50 in the production of cheese, the yield of finished cheese after pressing was 95.36%.

In the production of cheese, processing using various non-traditional sources is also significantly effective. Among such non-traditional sources, we can include rays such as IR, ultraviolet spectrum (US), and ultra-high frequencies (UHF). When non-traditional sources are used, it will be possible to achieve significant elimination of microorganisms in milk compared to traditional technology. The use of non-traditional sources in food production processes, especially in the production of cheese, helps to improve the coagulation of the mixture, the rapid formation of the cheese mass and improve the organoleptic characteristics of the finished cheese [7-13].

The production of cheese, along with the type of cheese, also depends on the type of quantity added per 100 kg of mixture mass. Information on the yield of finished cheese, depending on the amount of enzyme used in the production of cheese SG-50, is given in the table below.

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Table 2

Effect of SG-50 enzyme on finished cheese output

№	Naming of indicators	Enzyme consumption per 100 kg of mixture, gr		
		1,0	1,20	1,25
1	Mixture description: amount, kg oil content,% acidity, ° T density, kg/m^3	 11308 2,8 19,0 1,028	 11308 2,8 19,0 1,028	 11308 2,8 19,0 1,028
2	Fermentation periodicity, min	40	40	40
3	Mass of cheese after pressing, kg	950	995,0	1034,0
4	The mass of the finished cheese, kg	878,56	940,47	986,0
5	Output of finished cheese after pressing, %	92,48	94,52	95,36

It can be seen from the table that a change in the amount of a single enzyme from 1.0 g to 1.25 g per 100 kg of mixture mass leads to an increase in the mass of cheese after pressing from 39 kg to 84 kg. At the same time, the mass of the finished cheese increases from 45.53 kg to 107.44 kg. The yield of the finished cheese after pressing was 92.48% with the addition of 1.0 g of enzyme per 100 kg of the mixture, while with the addition of 1.25 g of SG-50 enzyme this figure was 95.36%.

CONCLUSION

In summary, the SG-50 enzyme showed the highest efficiency in cheese production from Fromase 220 TL, Lot F6073, DSM Food Specialties, Maxiren 1800, Lot R 5664, DSM Food Specialties and SG-50 enzymes. It is also possible that when the amount of enzyme SG-50 is increased from 1.0 g to 1.25 g per 100 kg of the mixture, the yield of the finished cheese after pressing will increase from 0.84% to 2.88%.

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