

Effect of Thyme on The Quality and Shelf Life of White Syrian Cheese

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ABSTRACT : Effect of incorporation of thyme powder in making White Syrian Cheese (Akawi) was investigated. Thyme powder was added in 0.1, 0.2 % in making cheese. The processed product was tested for chemical composition (total solids, acidity, salt, ripening rate) in cheese throughout 2 months of storage at room temperature (25°C) and determine the effect of different brine concentration on some properties of Syrian White cheese. Cheeses made from pasteurized milk (72 °C for 15 sec) were stored in 8, 10 % for 60 days at room temperature. Some physicochemical and biochemical analyses were carried out during storage time. The effects of brine concentrations and thyme powder on total solid, salt, and ripening rates were found to be significant ($P < 0.05$). On the contrary, total solids, salt, and ripening rates of the experimental cheeses were significantly ($P < 0.05$) affected by storage time.

Keywords : white cheese, brine salting, Thyme powder, ripening, Chemical analyses, Storage time, proteolysis.

I. INTRODUCTION

White cheese is becoming increasingly popular in Syria and worldwide, with continuous increase in its consumption and production, and the cheese industry is spread all over the world, as there are now hundreds of varieties that are manufactured in different regions and which differ from each other according to the type of milk in the first degree and the manufacturing methods used and differentiated from one brand to another [1]. Herby cheese, a semi-hard, salty and herb added, is manufactured in small family businesses for their needs. Herby cheese is few in Syria, where there is only one type of cheese added to herbs, such as chinchillas, but other types of cheese found in the local market such as (Akkawi) and others are made without adding herbs. While there are Herby cheese in other countries such as Turkey, Greece etc.

Milk used in manufacture of Herby cheese is coagulated with rennet and added different herbs (*Allium* sp., *Ferula* sp., thyme etc) in curd. The cheeses are ripened in a cool place without temperature control throughout ripening. Thyme is an aromatic plant belonging to the *lamiaceae* family, used for medical and spice purposes almost everywhere in the world. Thyme is largely of considerably abundant herb growing at different regions in Africa, and possesses a variety of the growing species of this family. The main uses of

thyme in culinary and food processing are defined by the properties of thyme components for aroma and flavor, antioxidant and antimicrobial activities. It could also be used in the food and aroma industries as culinary ingredient and it serves as a preservative for foods, especially, because of its antioxidant effect. [2-5] ((Aureli *et al.*, 1992, Taylor and Robber, 1999, Abd-Alla *et al.*, 2000 and El-Nemer *et al.*, 2003).

The purpose of salt added in cheese is to control the indigenous microflora, particularly pathogens. However, salt has a major influence on acid development and rennet coagulation. In order to avoid use of excessive salt, pasteurization has been recommended for eliminating pathogenic bacteria [6]. Salting of curd is an important step in the manufacture of most cheese varieties. Salt fulfills many important functions in cheese: it contributes directly to cheese flavour, it controls the growth of starter and nonstarter bacteria, it regulates the activity of rennet and other enzymes, and it promotes curd syneresis [7]. Thoroughly mixed into the curds. After the curd was set. Several aspects of Herby cheese have already been studied [8-10], but there is no study about the effect of salt concentrations during ripening. Thus, the aim of this study was to determine the influence of different salt ratios on microbiological, chemical characteristics of Herby cheese.

This work was aimed to use different concentration of thyme in making good quality of white Syrian (akawi) cheese. The effect of these additives on the chemical, properties of the resultant cheese were measured during storage.

II. MATERIALS AND METHODS

Fresh green thyme was purchased from the market and the thyme leaves were taken and dried in a shaded (dry shade) drying and ground in a special mill until a very fine thyme powder was obtained which was later used as an additive to Syrian white cheese in concentrations 1 and 2% thyme powder.

Cheese making

After the milk arrived at the laboratory and filtered from impurities, it was pasteurized at a temperature of 72 °C. for 15 seconds and cooled using a water bath to a temperature of (35 -40) °C. And the starter of the curd was added by 0.5% with mixing and stirring well.

After adding the starter, the milk was incubated at a temperature of (40 -42) °C for a quarter of an hour, and then added 0.02% calcium salt with mixing and stirring well, and then added the renin (rennet used in the form of tablets and added one of them Whose strength is equal to 1/18000) and incubated the milk at a temperature of (40 - 42) °C for half an hour for Renin activity. After the spotting process and the curd is formed, it is cut directly into small cubes, longitudinally and transversely, with a sharp knife to facilitate the exit of the serum from it. Then the pieces of the thrombus are transferred to a special strainer and furnished with a cotton cloth (gauze), where the pieces of the thrombus are placed on the gauze to separate the serum from them. Meanwhile, thyme powder is added to preserve the proportions of 1% and 2%. By gauze, where they merge with each other and take a specific shape, which is the shape of the template. Then the thrombus is compressed for a period of (2) hours, using appropriate gravity. Then the mold is cut into cubes of equal dimensions (3 * 3 * 3) cm³. Soft cheese undergoes an initial salting (dry salting 3%) for a few minute. And brine solutions were prepared at concentrations of 11% and 8% for preservation. The cheese was divided into four groups to store in brine solutions:

Group (1): cheese with 1% added thyme powder and preserved in 8% saline solution at room temperature.

Group (2): cheese with 1% added thyme powder and preserved in 11% saline solution at room temperature.

Group (3): cheese with 2% added thyme powder and preserved in 8% saline solution at room temperature.

Group (4): cheese with 2% added thyme powder and preserved in 11% saline solution at room temperature

Chemical analysis [11]:

Determine the percentage of the dry matter using the oven drying method at a temperature of 105 ± 2 °C until the weight is stable.

Determine the percentage of sodium chloride using the official Charpentier-Vohlards method.

Determine the content of total and dissolved nitrogen in the Kildahl method, and in the determination of nitrogen, a semiautomatic device was used (Gerhardt - Vapodest 4S).

- The ripening coefficient was calculated as follows:

Ripening coefficient = dissolved nitrogen / total nitrogen * 100

statistical analysis :

Statistical analysis of the data obtained using Genstat-12 and ANOVA calculation was performed based on the design of the complete randomized

sectors and the analysis of variance was performed for each individual test according to the design analysis and calculating the value of the least significant difference of L.S.D at a confidence level of 5%

III. Results and discussion

It was noted from the results of the first table that there were significant differences in the ratio of dry matter between different treatments, as the ratio of dry matter in cheese 2% powder is higher than the ratio of dry matter in cheese 1% powder in time 0, and an increase in the percentage of total solids until today 45 storage and then decreased, where the increase in the percentage of solids was found by increasing the salt concentration and the concentration of the added powder.

As adding the powder with a higher concentration increases the percentage of the total solids in the cheese mass as well as the high concentration of the brine, as for acidity an increase in acidity is observed in all samples with an increase in storage time until day 45 stored and then decreased and the largest acidity percentage was in the added samples 2 % Powder and stored in 8% salt concentration, ,Where it was observed that the higher acidity in the added cheese has a higher percentage of powder and this may be due to the presence of some components in thyme that caused the acidity of the product to rise when the added quantities are increased. The large increase in acidity at room temperature during storage is due to the growth and activity of resistant bacteria and the presence of enzymes that cause Lactose breaks down into milk acid. since the percentage of salt in the cheese added to the powder has a percentage of 2%, and it is stored in a brine 11% higher than the cheese added to the powder by 1% and stored in a brine 11%. This is evidence of The greater the salt absorption by the added cheese, it has a powder of 2%. The higher the concentration of the added powder, the greater the salt concentration inside the cheese mass. As for the ripening factor in the cheese added to the thyme powder 1% is greater than the ripening factor in the cheese added to the thyme powder 2%,

where the ripening factor in the cheese stored with a salt concentration is 11% less than the ripening factor in the cheese stored in a saline solution 8% and thus increase The concentration of salt reduces the rate of degradation in cheese during the

storage period, and in this case we have the effect of two factors, namely salt and thyme powder. It was observed that the effect of

salt with the powder has a role in reducing soluble nitrogen and protein degradation during the storage period.

Table (1): Effect of brine concentration and concentration of powder on dry matter during storage period:

salt	0)		15		30		45		60	
	%8	%11	%8	%11	%8	%11	%8	%11	%8	%11
1 %	36.528b	36.528b	39.023d	40.556c	40.075d	42.949c	38.531d	45.311b	34.983d	44.55b
2 %	41.313 a	41.313 a	42.617b	43.77 a	43.269b	48.223a	42.512c	47.980a	42.011c	47.49a
L.S.D	**	**	**	**	***	***	**	**	***	**

Table (2): Effect of salt concentration and concentration of powder on acidity during storage period:

salt	0)		15		30		45		60	
	%8	%11	%8	%11	%8	%11	%8	%11	%8	%11
1 %	0.2a	0.2a	0.47b	0.36a	0.52c	0.45a	0.61c	0.53a	0.47b	0.41a
2 %	0.46c	0.46c	0.55c	0.5c	0.88d	0.58c	0.62c	0.69c	0.43a	0.6d
L.S.D	***	***	**	***	***	***	N.S.	***	**	***

Table (3): Effect of brine concentration and powder concentration on salt during storage period:

Salt	0)		15		30		45		60	
	%8	%11	%8	%11	%8	%11	%8	%11	%8	%11
1 %	0.36a	0.36a	3.23a	5.08b	4.66a	6.09c	3.81a	5.75c	3.22a	5.11c
2 %	0.43b	0.43b	5.11bc	6.96d	6.20c	7.55d	4.96b	6.31d	3.919ab	5.90cd
L.S.D	***	**	***	***	***	***	***	***	**	**

Table (4): Effect of brine concentration and powder concentration on ripening factor during storage period:

salt	(0)		15		30		45		60	
	%8	%11	%8	%11	%8	%11	%8	%11	%8	%11
1 %	3.44a	3.44a	8.755c	5.43a	10.61cd	8.19b	15.6d	11.38b	19.72d	15.89b
2 %	4.24b	4.24b	10.81d	6.61b	10.04c	7.31a	14.522c	10.37a	18.23c	13.50a
L.S.D	**	**	***	**	*	**	**	**	**	**

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