WORLD JOURNAL OF PHARMACEUTICAL RESEARCH
SJIF Impact Factor 8.084
Volume 8, Issue 12, 158-164. Research Article ISSN 2277– 7105

EVALUATION OF SENSORY CHARACTERISTIC (TASTE AND TEXTURE) BY USING DIFFERENT METHODS OF COAGULATION

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Article Received on
10 Sept. 2019,

Revised on 30 Sept. 2019,
Accepted on 20 Oct. 2019,

DOI: 10.20959/wjpr201912-15386

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ABSTRACT

Concerning the taste, the points attained when using renin, Osher (50%) and Jibeen (50%) enzymes, 8.08± 0.71, 6.25± 0.82, and 7.20± 0.88 respectively. 8.54± 0.77, 5.83± 0,76 and 6.58± 0.71 when using renin, Osher (75%) and Jibeen (75%) enzymes respectively, and 8.45± 0.88, 5.79± 0.83 and 6.50± 0,78 for renin, Osher (100%) and Jibeen (100%) enzymes respectively. For texture, the points given when using renin, Osher (50%) and Jibeen (50%) enzymes were 8.97± 0.77, 5.83± 1.04 and 7.12± 0.97 respectively. Scored points when using renin, Osher (75%) and Jibeen (75%) enzymes were 8.66± 0.70, 5.91± 0.71, and 8.12± 0.67 respectively, and 8.58± 0.88, 5.97± 0.72, and 8,08± 0.71 for renin, Osher (100%) Jibeen (100%) enzymes respectively.

INTRODUCTION

Humans have used their senses to evaluate food for several thousands of years and individuals can often tell by sight, smell, taste and to lesser extent touch, whether or not given food or beverage items are good or bad, e.g. safe or toxic (Drake et. al. 2009).

According to Farell et. al. (1990), sensory evaluation of cheeses were affected by so many factors, such as quality of milk, its chemical composition, methods of coagulation and the experiences of evaluators, and significant differences ($p < 0.05$) for flavor, taste and texture for cheese processed by different types of enzymes were detected.

Engels et. al. (2005) mentioned, the production of lactic acid by organisms used in fermented dairy products determines the flavor of the product, whereby, these microorganisms play a number of major beneficial roles in the food industry, since they transform organic matter in

foods and thereby contribute not only to the preservation of food, but also to flavor and texture.

Furthermore, Takala (1990) mentioned that sensory evaluation in general was also affected by types of animals, chemical composition of the animal feeds, period of storage and enzymes.

The Sudanese Standards and Metrology Organization, SSMO (2002) described the sensory evaluation of white soft cheese as follows:

- Color: normal if the cheese is white or white – yellowish.
- Taste: Palatable if the cheese free of bitter taste, rancidity and rottening.
- Smell: Normal if cheese shows no external or foreign odors.
- Consistency: Texture firm, homogenous all over the mass and easily to cut.

Kumosinski et. al. (1991) reported, the taste, texture and flavor of cheese were affected by the method of coagulation and found significant differences for taste and texture ($p<0.05$) and a mild difference for flavor, but these differences were not significant.

According to Jackob et. al. (2011) no significant differences were found between sensory evaluation, when different types of plants, microbial or renin enzymes were used. This was clear to taste and flavor, but some differences were found for the texture, even among the same spp. of plant enzyme, although these differences were not statistically significant.

Talib et. al. (2006) assessed the organoleptic characteristics of cheese made by using different concentrations (5,10,15 and 20%) of enzyme extracted from solanumdubium (Jibeen seeds). The results obtained, showed that the cheeses were scored high in color, texture and flavor, taste and appearance for the first three concentrations, while the cheese produced by the high concentration (20%) of Jibeen seeds was scored least in overall appearance by the panelists, because of the bitter taste and nutty flavor associated with it.

MATERIAL AND METHODS

Procedures of Manufacturing

Renin Cheese

1. 5kg of milk were taken from the milk of the dairy herd of Kenana farm.
2. Milk was heated to 72^{o}C, then cooled to 42^{o}C.
3. Starterculture was added (1%) and then temperature was adjusted to 42^{o}C for 45 minutes.

4. Renin enzyme was added, then coagulation of milk was observed.
5. Time of coagulation was recorded from the addition of the renin enzyme till the complete coagulation of milk occurred.
6. When coagulation occurred, the curd was put on wooden trail, surrounded by clothes with harrow orifices to ensure good draining of whey.
7. Cheese was salted by socking it into salty solution, where the concentration of Nacl was 10% for 24 hours.
8. The weight of cheese was determined after the salting was completely done after 24 hours from the beginning of cheese salting.

Osher Enzyme (Calotripisprocera) Cheese

1. 5 kg of cow milk were obtained from the milk of Kenana farm dairy herd.
2. Milk was heated to 72^{o}C and then cooled to 42^{o}C.
3. 1% of starterculture was added and temperature was adjusted to 42^{o}C for 45 minutes.
4. The extracted Osher enzyme was added at three different concentration (50%, 75%, and 100%) respectively during the first, second and third two months after calving respectively.
5. Time of coagulation was recorded from the addition of the enzyme till the complete coagulation of milk.
6. Cheese was salted by socking it into 10% solution of Nacl for 24 hours.
7. Cheese was weighted and its final weight was determined.

Jibeen Cheese (Solanumdubium)

1. 5kg of cow milk from Kenana dairy herd were used for cheese.
2. Milk was heated to 72^{o}C then cooled to 42^{o}C.
3. 1% of the starterculture was added and temperature was adjusted to 42^{o}C for 45 minutes.
4. Jibeen enzyme was added with three different concentrations (50%, 75% and 100%).
5. Time of coagulation was recorded from the addition of the enzyme till the complete coagulation occurred.
6. When coagulation occurred, the cheese was surrounded with clothes with narrow orifices and then put on wooden trails for complete draining whey.
7. Cheese was salted by Nacl by socking it into 10% Nacl solution for 24 hours.
8. Cheese weight was then determined.

RESULTS

Table (1): Average evaluation points given for taste by using renin, Osher (50%) and Jibeen (50%) enzymes for lactation stages and whole lactation period for all treatments.

Treatment		Renin Control		Osher (50%)		Jibeen (50%)		Significance
Lactation Stage		Mean	SD	Mean	SD	Mean	SD	
(1)	1st stage	8.25	0.70	6.75	0.70	8.00	0.75	*
(2)	2nd stage	8.62	0.74	6.00	0.75	7.12	0.64	*
(3)	3rd stage	8.37	0.74	6.00	0.75	6.50	0.53	*
Total	Whole period	8.08	0.71	6.25	0.82	7.20	0.88	*

NS ≡ not significant

* ≡significant ($p < 0.05$)

Table (2): Average evaluation points given for taste by using renin, Osher (75%) and Jibeen (75%) enzymes for lactation stages and whole lactation period for all treatments.

Treatment		Renin Control		Osher (75%)		Jibeen (75%)		Significance
Lactation Stage		Mean	SD	Mean	SD	Mean	SD	
(1)	1st stage	8.12	0.83	5.62	0.74	6.50	0.53	*
(2)	2nd stage	8.50	0.53	5.75	0.70	6.75	0.70	*
(3)	3rd stage	9.00	0.75	6.12	0.83	6.50	0.92	*
Total	Whole period	8.54	0.77	5.83	0.76	6.58	0.71	*

NS ≡ not significant

* ≡significant ($p < 0.05$)

Table (3): Average evaluation points given for taste by using renin, Osher (100%) and Jibeen (100%) enzymes for lactation stages and whole lactation period for all treatments.

Treatment		Renin Control		Osher (100%)		Jibeen (100%)		Significance
Lactation Stage		Mean	SD	Mean	SD	Mean	SD	
(1)	1st stage	8.00	0.75	5.50	0.92	6.37	0.74	*
(2)	2nd stage	8.50	0.92	6.25	0.70	6.75	0.70	*
(3)	3rd stage	8.87	0.83	5.62	0.74	6.37	0.91	*
Total	Whole period	8.45	0.88	5.79	0.83	6.50	0.78	*

NS ≡ not significant

* ≡significant ($p < 0.05$)

Table (4): Average evaluation points given for texture by using renin, Osher (50%) and Jibeen (50%) enzymes for lactation stages and whole lactation period for all treatments.

Treatment		Renin Control		Osher (50%)		Jibeen (50%)		Significance
Lactation Stage		Mean	SD	Mean	SD	Mean	SD	
(1)	1st stage	9.00	0.75	5.87	0.83	6.87	0.64	*
(2)	2nd stage	8.75	0.70	5.62	0.74	6.75	0.70	*
(3)	3rd stage	8.62	0.91	6.00	1.51	7.75	0.70	*
Total	Whole period	8.97	0.77	5.83	1.04	7.12	0.97	*

NS ≡ not significant

* ≡significant ($p < 0.05$)

Table (5): Average evaluation points given for texture by using renin, Osher (75%) and Jibeen (75%) enzymes for lactation stages and whole lactation period for all treatments.

Treatment		Renin Control		Osher (75%)		Jibeen (75%)		Significance
Lactation Stage		Mean	SD	Mean	SD	Mean	SD	
(1)	1st stage	8.62	0.74	6.00	0.75	8.12	0.64	*
(2)	2nd stage	8.75	0.70	5.75	0.70	8.25	0.70	*
(3)	3rd stage	8.62	0.74	6.00	0.75	8.00	0.75	*
Total	Whole period	8.66	0.70	5.91	0.71	8.12	0.67	*

NS ≡ not significant

* ≡significant ($p < 0.05$)

Table (6): Average evaluation points given for texture by using renin, Osher (100%) and Jibeen (100%) enzymes for lactation stages and whole lactation period for all treatments.

Treatment		Renin Control		Osher (100%)		Jibeen (100%)		Significance
Lactation Stage		Mean	SD	Mean	SD	Mean	SD	
(1)	1st stage	8.62	0.91	5.62	0.74	8.25	0.70	*
(2)	2nd stage	8.62	0.91	5.75	0.70	8.00	0.75	*
(3)	3rd stage	8.50	0.92	6.00	0.75	8.00	0.75	*
Total	Whole period	8.58	0.88	5.97	0.72	8.08	0.71	*

NS ≡ not significant

* ≡significant ($p < 0.05$)

DISCUSSION

Table (1) shows the points given for taste of cheese using renin, Osher (50%) and Jibeen (50%) enzymes for the stages and whole lactation period for all treatments. Average points given for the whole lactation period were 8.08±0.71, 6.25±0.82 and 7.20±0.88 for renin, Osher (50%) and Jibeen (50%) enzymes respectively.

Table (2) shows the points given for taste using renin, Osher (75%) and Jibeen (75%) enzyme for the stages of lactation and whole lactation period for all treatments. The average points for the whole lactation period obtained were 8.54±0.77, 5.83±0.76 and 6.58±0.71 for renin, Osher (75%) and Jibeen (75%) enzymes cheese respectively.

Table (3) shows average evaluation points for taste using renin, Osher (100%) and Jibeen (100%) enzymes for lactation stages and whole lactation period for all treatments. The average points for the whole lactation period were 8.45±0.88, 5.79±0.83 and 6.50±0.78 for renin, Osher (100%) and Jibeen (100%) enzymes cheese respectively. The scored points revealed a significant difference ($p<0.05$) between the means given for taste of the cheeses prepared by renin enzyme and different coagulation of Osher and Jibeen enzymes for all stages, overall lactation period and all treatments. Renin cheese scored the highest points for taste compared to other plant enzymes. Jibeen cheese showed a relatively high scores raher than Osher cheeses. This indicated that the taste of the soft cheese was affected by the type of coagulant used, beside the factors affecting flavor previously mentioned, in addition to the concentration of the plant enzymes used. This agreed with that reported by Talib, et. al. (2006), Takela (1990) and Farell, et. al. (1990), but were in contrast with the results given by Jacob, et. al. (2011).

Table (4) shows the average points given for texture of cheese using renin, Osher (50%) and Jibeen (50%) enzymes for the different stages and whole lactation period. The average points given for the whole lactation period and all treatments were 8.97±0.77, 5.83±1.04 and 7.12±0.97 for renin, Osher (50%) and Jibeen (50%) cheeses respectively.

Table (5) shows the average scored points for cheese texture using renin, Osher (75%) and Jibeen (75%) enzymes for all stages, whole lactation period and all treatments. The average points obtained for the whole lactation period for cheese texture were 8.66±0.70, 5.91±0.71 and 8.12±0.67 when renin, Osher (75%) and Jibeen (75%) enzymes were used.

Table (6) shows average evaluation points given for cheese texture using renin, Osher (100%) and Jibeen (100%) enzymes for all stages, whole lactation period and all treatments. The average scored points for cheese texture for whole lactation period were 8.58±0.88, 5.97±0.72 and 8.08±0.71 for renin, Osher (100%) and Jibeen (100%) enzyme cheeses respectively. Also a significant difference was detected hereby ($p<0.05$). The texture of renin cheese was firm followed by Jibeen and Osher cheeses. This cleared the effect of the type of

enzyme used for coagulation on cheese texture. Plant enzymes have an excessive proteolytic activity that affect the texture of the finished cheese (especially during the ripening process) and this might be the reason for non-firmness of some cheeses produced using plant enzymes e.g. Calotropisprocera (Osher) plant, (Yousif, et. al. 1996). Also results given by (Talib et. al. 2006) and Kumosinski et. al. (1990), followed the same trend.

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