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Studies on rheological properties of flavoured mayonnaise

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Abstract
The present study investigated the rheological properties of flavoured mayonnaise texture profile analysis and viscosity. Mayonnaise is semi-solid oil-in-water emulsion with starch in its formulations when fat-reduced. Mayonnaise is probably one of the most widely used sauces worldwide. The oil content of traditionally mayonnaise is more than 65%. Fat has a role in creating viscosity, color and texture but might cause many diseases and disorders in human. In the rheological properties of flavoured mayonnaise it carried out the Hardness (gm), Adhesiveness (10^{-3} Nm), Firmness (N), Cohesiveness and Viscosity.

Keywords: Rheological properties, flavoured mayonnaise, discontinuous phase

Introduction
The word mayonnaise was not used for a dressing before the start of the 19th century. Mayonnaise belongs to the food products widely consumed in Europe. It has been in existence origin France. It is first produced commercially in early 1900s, becoming popular in America from 1917 to 1927 and recently in Japan where sales increased by 21% in the years from 1987 to 1990. Because of its low pH and high fat content, mayonnaise is relatively resistance to microbial spoilage (Depree and savage, 2001) [2].
Mayonnaise the oil-in-water emulsion where oil is the discontinuous phase and water is the continuous phase obtained by emulsifying edible vegetable oil in an aqueous phase (Pradhanganga and Adhikari, 2015) [7].
The rheology of emulsions, i.e.-mayonnaise–salad creams, is influenced by several structural parameters: inter particle interactions (more important in concentrated emulsions) particle size, shape. The emulsions stability also depends upon structural parameters and is related to the rheological properties of these products. Structural parameters are influenced by the processing parameters (temperature, residence time and rotational speed), in addition to the oil and /or emulsifier concentration (Franco *et al*., 1995) [4].
Rheological and textural properties of mayonnaise are very complex, as the structure is semi-solid with pronounced viscoelastic properties, but it grows liquid under applied shear; even if the shear is only moderate. The rheological behaviour of mayonnaise is very important for the sensory properties contributing to its perceived texture as well as the quality evaluation and control. Many investigations have been conducted on the rheology of mayonnaise. Mayonnaise flow properties were investigated by static viscosity measurement with a viscometer (Peter *et al*., 2007) [8].
Texture of mayonnaise depends on oil, the more oil is used then the better texture is resulted. Oil has important function in characteristic of rheology. Low fat mayonnaise can be produced by decreasing dispersed phase and increase aqueous phase. Using fat replacer is recommended to decrease fat content (Evanuarini *et al*., 2015) [3].
The main rheological characteristic of salad cream and mayonnaise is the presence of a yield stress. Another important parameter is emulsion stability, with respect to creaming and coalescence. In order to enhance the stability, various polysaccharide stabilizers such as xanthan gum, or alginates are used in the preparation of mayonnaise and salad creams **(**Hennock *et al*., 1984) [5].

Materials and Methods
Materials
Texture Profile Analyser, Brookfield Viscometer

Method's

Texture Profile Analyser

Texture of selected mayonnaise was measured using *TA XT2* texture analyser (stable micro system) within 24 hours after preparation. Textural determinations were made by using cutting probe.

Viscosity

Viscosity was determined for various compositions of casting solutions using the Brookfield viscometer MV-E at different speed and 25° C with a spindle number S-64 and it were expressed in terms of centipoise.

Result and Discussion

Textural properties of mayonnaise are very complex as the structure is semi solid with pronounced viscoelastic properties but it grows liquid under applied shear, even if the shear is only moderate. Texture of flavoured mayonnaise depends on oil, the more oil is used then the better texture is resulted.

Table 1: Texture profile analysis (TPA) of flavoured mayonnaise

Texture Profile Analysis (TPA)				
Formulation	**Hardness (g)**	**Adhesiveness (10^{-3} Nm)**	**Firmness (N)**	**Cohesiveness**
T_0	10.27	1.89	0.53	0.96
T_2	28.86	2.15	1.08	2.65
SE (±)	0.413	0.029	0.100	0.450
CD at 5%	1.261	0.087	0.302	1.356

*Each value represents the average of three determinations

T_0- 35% SMP +40% Oil + 0% Cardamom flavour T_2- 35% SMP +40% Oil + 1% Cardamom flavour

Texture profile analysis of control and T_2 mayonnaise sample was shown in table13. The texture analysis of flavoured mayonnaise discussed as follows Hardness of T_0 and T_2 sample was found to be 1.027 and 28.86g respectively. It was seen from Table 1 that the adhesiveness, firmness, cohesiveness was found to be for T_0 sample were 1.89, 0.53, 0.96 respectively. Where as these value was recorded maximum in T_2 sample i.e. 28.86, 2.15, 1.08 respectively. The T_2 mayonnaise products had higher adhesiveness, firmness, cohesiveness and gumminess compared to the control sample of mayonnaise (T_0). Increased textural firmness and stickiness is due to higher oil content.

Singla *et al.*, (2013) [9] reported that T_2 sample stronger gel network results from the prominent hydrogen bonding network of xanthan gum, maltodextrin present as thickening agent in the sample, presence of high amount of thickening agent leads to increased firmness and stickiness values. This result in probably caused by increasing the viscosity of the emulsion due to addition of xanthan gum in the formulation.

The presence of gums might create a gel like structure that trap oil droplets, and slow down their movements and raising the viscosity. The highest firmness and adhesiveness was observed in T_2 sample because of decreasing the soyabean oil. The similar results were obtained by Amin *et al.*, (2014) [1] and Nikzade *et al.*, (2012) [6].

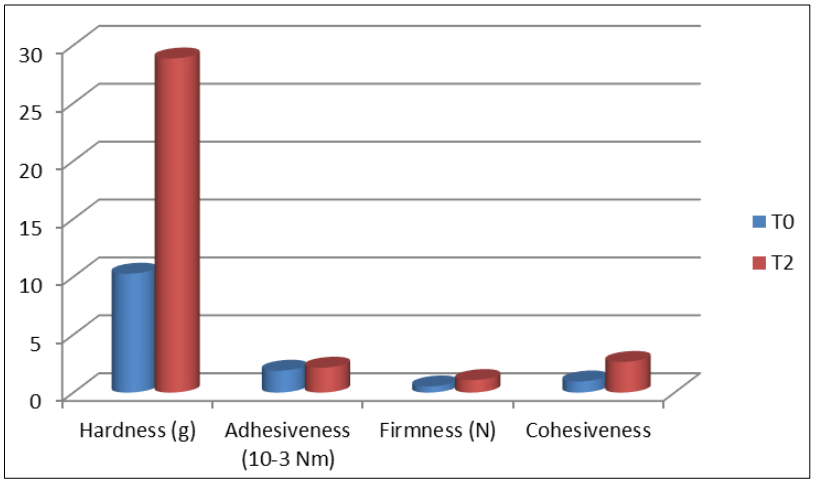

Fig 1: Texture profile analysis (TPA) of flavoured mayonnaise

It could be revealed that adding xanthan gum to the low fat mayonnaise i.e. T_2 formulation is very important to have a product with good textural characteristics and high emulsion stability due to increase in viscosity.

Texture profile analysis of low fat mayonnaise products had higher firmness, adhesiveness, hardness and cohesiveness.

Viscosity of flavoured mayonnaise at different temperature

The effect of viscosity of flavoured mayonnaise at refrigerated and room temperature were studied upto 30 days storage period. Results on changes in viscosity of flavoured mayonnaise are given in table 2.

Table 2: Effect on viscosity of flavoured mayonnaise at different temperature

Storage Days	Room temperature (28 ºC)		Refrigerated temperature (4 ºC)	
	T_0 (centipoise)	T_2 (centipoise)	T_0 (centipoise)	T_2 (centipoise)
Fresh	2200	2300	2200	2300
7	2200	2300	2200	2390
14	2230	2320	2230	2400
21	2250	2330	2250	2450
30	2260	2350	2255	2460

*Each value represents the average of three determinations

Fresh flavoured mayonnaise sample had viscosity at room temperature and refrigerated temperature for T_0 sample was 2200 and for T_2 sample was 2300 respectively. In 7th day it was observed that flavoured mayonnaise sample was increasing viscosity day by day at room temperature and refrigerated temperature i.e. for T_0 2200 and 2300 where as for T_2 sample was found to be 2200 and 2390 respectively.

In 14th day storage period of flavoured mayonnaise sample the viscosity at room temperature and refrigerated temperature was observed 2230 and 2320 for T_0 sample respectively. Whereas for T_2 sample were 2230 and 2400 respectively. In 21th day storage of the viscosity of the flavoured mayonnaise at room temperature and refrigerated temperature was observed 2250 and 2330 for T_0 sample and for T_2 sample was found to be 2250 and 2450 respectively at the 21st days of storage. at 28th day of storage period the viscosity of the flavoured mayonnaise at room temperature and refrigerated temperature was found to be 2260 and 2350 respectively for T_0 sample and for T_2 sample were 2255, 2460 respectively. Results are more or less varied than Evanuarini *et al.,* (2015) [3].

The viscosity of flavoured mayonnaise was shown to be increased slightly with increase in storage period upto 30 days in both the storage condition.

References

1. Amin M, Elbeltegy A, Mustafa M, Khalil A. Development of low fat mayonnaise containing different types and levels of hydrocolloids gum, Journal of Agrolimentary Process and Technology. 2014; 20(1):54-63.
2. Depree JA, Savage GP. Physical and flavour stability of mayonnaise. Trend in food Science and Technology. 2001; 12 (1):157-163.
3. Evanuarini H, Indratiningsih N, Hastuti P. Characteristics of low fat mayonnaise containing prang flour as stabilizer. Pakistan Journal of Nutrition. 2015; 14(7):392-395.
4. Franco J, Berjanol M, Guerrerol A, Muiiozl J, Gallegosl C. Flow behaviour and stability of light mayonnaise containing a mixture of egg yolk and sucrose stearate as emulsifiers. Food Hydrocolloids. 1995; 9(2):111-121.
5. Hennock M, Rahalkar R, Richmond P. Effect of xanthan gum upon the rheology and stability of oil – water emulsions. Journal of Food Science. 1984; 49:1271-1274.
6. Nikzade V, Tehrani M, Tarzjan M. Optimization of low cholesterol low fat mayonnaise formulation, effect of using soy milk and some stabilizer by a mixture design approach. Food Hydrocolloids. 2012; 28(2):344-352.
7. Pradhananga M, Adhikari B. Sensory and quality evaluation of mayonnaise and its effect on storage stability. Sunsari Technical college of Journal. 2015; 2(1):48-53.
8. Peter S, Kamila M, Jan P, Helena V. Effect of oil on the rheological and textural properties of mayonnaise. Journal of Food and Nutrition Research. 2007; 46(1):1-8.
9. Singla N, Verma P, Ghoshal G, Basu S. Steady state and time dependent rheological behaviour of mayonnaise, (egg and eggless). International Food Research Journal. 2013; 20(4):2009-2016.