Ginger Milk Curd – Ginger Juice to Milk Ratio

Objective

The successful setting of a liquid using a gelling agent and the texture of the set gel/curd depend on the amount of the gelling agent used. For example, the typical range of powdered gelatine to liquid ratio is from 0.5% to 1.0% for making soft gels and that for making firmer gels is 1% to 3%. Is there a critical ginger juice to milk ratio for making ginger milk curd? How does the ginger juice to milk ratio affect the texture of the ginger milk curd? In this experiment, you will investigate the effects of ginger juice to milk ratio on the setting and the texture of the ginger milk curd.

Principles

In the presence of suitable enzymes, soluble milk protein can be converted into insoluble form and results in the formation of a curd. For example, rennin (which is found in the gastric juice of human babies and calf) is used to make curd from milk in cheese manufacture. Another example of enzyme that can convert milk into curd is ginger protease (i.e. zingipain). This protease in ginger juice is responsible for making curd from milk in making the dessert Ginger Milk Curd.

The ginger protease, like all other enzymes, is protein in nature. It can be denatured by physical means (e.g. high temperature) and chemical means (e.g. by solutions with extreme pH values). Being an enzyme, the activity of the ginger protease is affected by temperature, pH as well as its concentration.

Part I – Experimental Work

Apparatus and Materials

Apparatus		Materials	
bowls (250 ml)	× 6	old ginger	1 piece (about 200g)
plate	× 1	fresh milk	550 ml
fine grater	× 1	sugar	50 g
tea drainer / flour sieve	× 1		
tea spoon	× 1		
measuring cup	× 1		
measuring spoons	× 1 set		
milk pan	× 1		
induction cooker	× 1		
thermometer	× 1		
stop watch	× 1		

Procedure

1. Label 5 bowls as A, B, C, D and E.
2. Scrap off the skin of the ginger. Grate and squeeze juice using a tea spoon and tea drainer.
3. Stir the ginger juice well and put the respective amounts of ginger juice into the bowls as shown below:

Bowl	A	B	C	D	E
Amount of ginger juice	¼ tsp	½ tsp	1 tsp	1 tbsp	2tbsp

4. Put 550 ml of fresh milk into a milk pan and add 50 g sugar to it. Heat the milk until it smokes (about 75 °C; do NOT boil the milk). Record the temperature of the milk.
5. Stir well the ginger juice in bowl A and pour 100 ml of the heated milk prepared in step 4 from 15 cm above the bowl into it. Check every 1 minute to see how long it takes for the milk to set.
6. Repeat step 5 for bowls B to E.
7. Observe and record the texture of the ginger milk curd in bowls A to E. Taste the ginger milk curd in each bowl and rate the taste.

Results

Bowl	A	B	C	D	E
Amount of ginger juice	¼ tsp	½ tsp	1 tsp	1 tbsp	2 tbsp
Ginger juice to milk ratio					
Time taken to set (min)					
Texture of the ginger milk curd					
Taste	1 2 3 4 5	1 2 3 4 5	1 2 3 4 5	1 2 3 4 5	1 2 3 4 5

Part II - Report Writing

Discussion

1. Referring to the results, describe how the amount of ginger juice affects the setting and the texture of the ginger milk curd.

2. Explain the effects of the amount of ginger juice on the setting and the texture of the ginger milk curd.

3. What will happen to the milk in bowls A and B when they are left in a refrigerator for some days? Why?

4. Taking the taste into account, how would you apply the findings of this investigation in making ginger milk curd?

5. Many recipes for making Ginger Milk Curd emphasise the importance of heating the milk to a suitable temperature to ensure successful formation of the milk curd. Devise an investigation to find out how the milk temperature would affect the setting of ginger milk curd.

Conclusion