

## **Ginger Milk Curd – Ginger and Milk temperature**

### **Objective**

Many recipes for making Ginger Milk Curd advise us to use old ginger to prepare ginger juice and heat the milk to just before boiling, so as to ensure successful formation of the milk curd. In this experiment, you are going to evaluate these two pieces of advice.

### **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	young ginger	1 piece (about 200g)
plates	× 2	old ginger	1 piece (about 200g)
fine grater	× 1	fresh milk	450 ml
tea drainer / flour sieve	× 1	sugar	40 g
tea spoon	× 1		
measuring cup	× 1		
measuring spoons	× 1 set		
milk pan	× 1		
induction cooker	× 1		
thermometer	× 1		
stop watch	× 1		

## Procedure

1. Label 4 bowls as A, B, C and D.
2. Scrap off the skin of the young ginger. Grate and squeeze juice using a tea spoon and tea drainer. Stir well and measure 1 tbsp young ginger juice into each of bowls A and B.
3. Scrap off the skin of the old ginger. Grate and squeeze juice using a tea spoon and tea drainer. Stir well and measure 1 tbsp old ginger juice into each of bowls C and D.
4. Put 450 ml of fresh milk into a milk pan and add 40 g sugar to it. Warm the milk (not to exceed 35 °C) to dissolve the sugar completely. Record the temperature of the milk.
5. Stir well the ginger juice in bowl A and bowl C. Pour 100 ml of the warm milk prepared in step 4 from 15 cm above the bowl into each of bowls A and C. Check every 1 minute to see how long it takes for each bowl of milk to set.
6. Heat the milk remaining in the milk pan until it smokes (about 75 °C; do NOT boil the milk). Record the temperature of the milk.
7. Stir well the ginger juice in bowl B and bowl D. Pour 100 ml of the heated milk prepared in step 6 from 15 cm above the bowl into each of bowls B and D. Check every 1 minute to see how long it takes for each bowl of milk to set.
8. Observe and record the texture of the ginger milk curd in bowls A to D. Taste the ginger milk curd and rate it.

## Results

Bowl	A	B	C	D
Ginger juice	Young ginger juice	Young ginger juice	Old ginger juice	Old ginger juice
Temperature of milk (°C)				
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 

## **Part II - Report Writing**

## Discussion

1. Referring to the results, describe and explain the effect(s) of the age of the ginger on the setting of the ginger milk curd.

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2. Referring to the results, describe and explain the effect(s) of the milk temperature on the setting of the ginger milk curd.

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3. Predict what will happen if the mixtures in the bowls are left in the fridge for a few days. Explain your prediction.

4. Devise an investigation to find out how the ginger juice to milk ratio would affect the setting of the ginger milk curd. Discuss the application of this investigation.

5. People with lactose intolerance cannot enjoy this dessert. Describe how the findings of this investigation can be applied to modifying the recipe for the lactose intolerant people.

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## Conclusion

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