

Ice cream experiment procedure

FABE 325 – Dr. Gönül Kaletunç

TA – Kerry Hughes

Winter 2006

Ice cream process

I. Equipment: Ice cream maker, digital thermometers

II. Materials:

Ice cream ingredients: Heavy cream, whole milk, sugar, vanilla, salt

III. Pre-Lab Assignment

Calculate the amount of ingredients necessary to be mixed to produce 0.7 kg of vanilla ice cream. Use MATLAB to determine the amounts of heavy cream, milk, sugar, vanilla, and salt that must be used to make the ice cream.

The compositions of the raw materials are:

Heavy cream – 36% fat, 64% water.

Whole milk – 3.2% fat, 4.8% carbohydrate, 3.2% protein, 88.8% water.

Sugar – 100% carbohydrate

The ice cream mixture should contain:

10.47% fat, 19.5% carbohydrate, 1.87% protein, 0.86% vanilla, 0.2% salt, 67.1% water

IV. Procedure:

- ✓ Calculate the amounts of ingredients
- ✓ Weigh the ingredients and mix all ingredients in a bowl
- ✓ Weigh the ice cream mixture of a fixed volume
- ✓ Assemble the ice cream maker and turn it on
- ✓ Pour the ice cream mixture into the freezer bowl of the ice cream maker.
- ✓ Put the thermometers in.
- ✓ Collect temperature (center and side), mixing speed, and mixing force data
- ✓ After 30 minutes turn the machine off
- ✓ Weigh the ice cream of a fixed volume

V. Calculations:

- 1) Calculate the density of ice cream mixture and ice cream
- 2) Calculate overrun
- 3) Plot the temperature as a function of time
- 4) Calculate the power of mixing.
- 5) Estimate the viscosity of ice cream.

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Ice cream experiment data sheet

Time (min)	Center T (F)	Surface T (F)	RPM	Weight (g)
0				
0.5				
1				
1.5				
2				
2.5				
3				
3.5				
4				
4.5				
5				
5.5				
6				
6.5				
7				
7.5				
8				
8.5				
9				
9.5				
10				
10.5				
11				
11.5				
12				
12.5				
13				
13.5				
14				
14.5				
15				
15.5				
16				
16.5				
17				
17.5				
18				
18.5				
19				

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Time (min)	Center T (F)	Surface T (F)	RPM	Weight (g)
19.5				
20				
20.5				
21				
21.5				
22				
22.5				
23				
23.5				
24				
24.5				
25				
25.5				
26				
26.5				
27				
27.5				
28				
28.5				
29				
29.5				
30				