MILK

DEVELOP SIMPLE METHOD ALLOWING DETERMINATION OF SOME IMPORTANT PROPERTIES OF MILK

▸ Important properties we aim to determine: Density, pH value, Boiling point & Freezing point of milk.

▸ Why we choose density, pH value, boiling point and freezing point as our determination objects: these are basic physical properties of liquid. Viscosity and surface tension maybe also fundamental, but they require some complex instruments to determine. At first, we also try to find some method to determine some chemistry properties of milk, such as fat/protein content, what makes us refuse to choose them is that we have to use some dangerous chemical reagent (like Ethyl Ether).

▸ To set up a comparison of various milk samples, we choose MENGNIU milk, TELUNSU milk and CHENGUANG milk as our experiment objects.

1. DENSITY OF MILK

▸ Principle:

ρ=m/v

▸ Materials & Tools:

milk samples, syringe (10 ml), electronic balance, beaker

▸ Process:

①Settle empty beaker on electronic balance; then make it zero.

②Use syringe to draw 10 ml milk out from the milk pocket, and squirt these milk into the beaker.

③Take a record of the final digital reading on the of the balance.

2. pH VALUE OF MILK

▸ Principle:

pH indicator can reflect the pH value of liquids. With pH indicator's help, we are able to determine the pH value of milk visually.

▸ Materials & Tools:

milk samples, pH indicator (paper strips)

▸ Process :

①Use dropper to add a small amount of milk sample onto the pH indicator.

②Record the color changes of pH indicator, when it's steady, compare it with colourimetric card and find out the pH value of milk

3. BOILING POINT OF MILK

▶ Principle:

liquid has steady boiling point when the room temperature and atmospheric pressure don't change.

▶ Materials & Tools:

milk samples, electronic thermometer, alcohol burner

▶ Process:

①Use alcohol burner to heat the milk samples

②After the milk boiling, use electronic thermometer to determine the temperature of milk
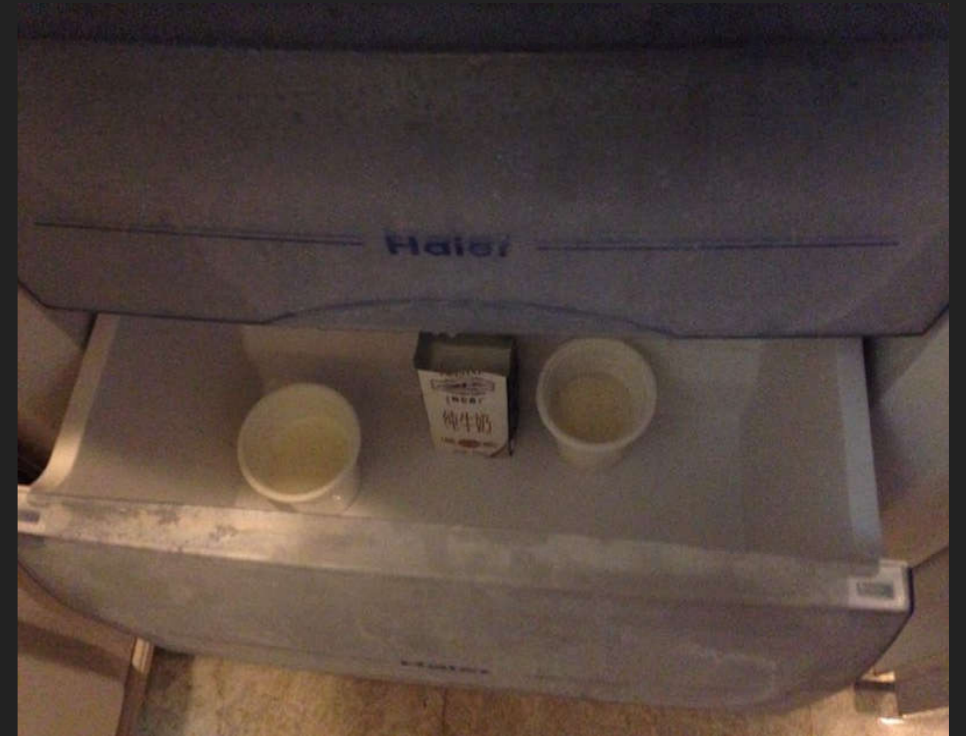
4. FREEZING POINT OF MILK

▸ Principle:

crystal has steady freezing point when the room temperature and atmospheric pressure don't change.

▸ Materials & Tools:

milk samples, electronic thermometer, refrigerator

▸ Process:

①Use refrigerator to freeze the milk samples

②After the milk nearly freezing (solid-liquid mixing), use electronic thermometer to determine the temperature of milk

RESULT

▸ We choose TELUNSU milk, CHENGUANG milk and MENEGNIU milk as our experiment object (three famous milk in China).

▸ TELUNGSU milk:

Density: ≈1g/cm³

pH value: 6

Boiling point: ≈ 98.6℃

Freezing point: ≈ 2.5 ℃

RESULT

▸ MENGNIU milk:

Density: ≈1g/cm³

pH value: 6

Boiling point: ≈ 95.1℃

Freezing point: ≈ 1.3℃

RESULT

▶ CHENGUANG milk:

Density: ≈1g/cm³

pH value: 6

Boiling point: ≈ 95.0℃

Freezing point: ≈ 0.1 ℃

CONCLUSION

▸ Because milk is a special mixture that consists of several complicated chemical substances, its physical properties may not be as simple to determine as pure substances do. That may be the reason why its boiling/freezing point is not so stable, and its density and pH value is nearly the same as water's.

▸ We try our best do determine milk's important properties "density, pH value, boiling point and freezing point" through the methods we introduced you.

Thanks for your attention!