

The Possibility of Using Alternative pH Indicators in Neutralization Titration

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1. Abstract

Examination of whether familiar crops can be pH indicators, in Neutralization Titration, like phenolphthalein. Crops such as violet cabbage, purple onion, and black rice, which contain the anthocyanin pigment, were used.

2. Experiments

FIRST INFORMATION

NaOH aq
[sodium hydroxide(aqua)]
about 0.10 mol/L

(COOH)₂ aq
[oxalic acid(aqua)]
0.050 mol/L · 10 mL

① indicator

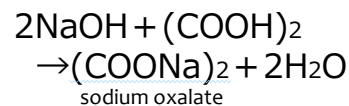
4 indicators:
(1) Phenolphthalein
(2) Violet Cabbage Pigment
(3) Purple Onion Pigment
(4) Black Rice Pigment

② drop several times until solution color changes

③ (NOT NECESSARY BLUE)

CHECK THE AMOUNT OF DROPS OF NaOH aq AND CALCULATE EACH MOLAR CONCENTRATION

3. Formula and Theory



$$a c v = b c' v'$$

valence volume valence volume
molar concentration of H⁺ molar concentration of OH⁻
[valent] [mol] [mL] [valent] [mol] [mL]

4. Result

Result 1 : Phenolphthalein

Sodium hydroxide(NaOH)	1st	2nd	3rd
before dropping[mL]	0.01	11.51	0.25
after dropping[mL]	10.04	21.50	10.22
amount of drops[mL]	10.03	9.99	9.97
average amount[mL]	10.00		



$$c' \cong 0.100 \text{ [mol/L]}$$

Result 2 : Violet Cabbage Pigment

Sodium hydroxide(NaOH)	1st	2nd	3rd
before dropping[mL]	0.21	10.37	1.10
after dropping[mL]	10.12	20.35	11.08
amount of drops[mL]	9.91	9.98	9.98
average amount[mL]	9.96		



$$c' \cong 0.101 \text{ [mol/L]}$$

Result 3 : Purple Onion Pigment

Sodium hydroxide(NaOH)	1st	2nd	3rd
before dropping[mL]	4.60	5.26	3.10
after dropping[mL]	14.50	15.12	13.10
amount of drops[mL]	9.90	9.86	10.00
average amount[mL]	9.92		



$$c' \cong 0.100 \text{ [mol/L]}$$

Result 4 : Black Rice Pigment

Sodium hydroxide(NaOH)	1st	2nd	3rd
before dropping[mL]	11.32		
after dropping[mL]			
amount of drops[mL]	23.10		
average amount[mL]			



This indicator did not show any change of color.

5. Conclusion

It can be concluded that the pH indicators of violet cabbage anthocyanin pigment and purple onion anthocyanin pigment can be used to decide the point of neutralization seen from the change of colors.

And because the pH indicator of black rice pigment did not show a change of color, it can be concluded that it cannot be used as a pH indicator.

6. Further Research

To see if fruits, such as cherry and blueberry, which contain anthocyanin pigments, can be used as pH indicators in Neutralization Titration.

