Lab-report # 7

Date: 97-12-05 Time: 12.50 – 14.40

Determination of ethanoic acid content of vinegar:

Work to be done:

- To find out how much ethanoic acid common vinegar contains.

Chemicals and apparatus:

- Vinegar
- Standard flask (100 cm^3)
- Standard sodium hydroxide solution (0.1M)
- Phenolphthalein indicator
- Balance (accurate to 0.01 g)
- Pipette (25cm^3 and 50 cm^3)
- Conical flask (100 cm^3)
- Wash bottle/distilled water
- Dropping pipette

Lab:

First I weighted 20.09 grams of vinegar into a 100 cm^3 standard flask and added distilled water until I reached the 100 cm^3 mark, and mixed the solution very well. I then took 10 cm^3 of this solution and used it in a titration with the 0.1M sodium hydroxide solution, using phenolphthalein to indicate the acid-base equilibrium.

I did this titration three times and the results were 19 cm^3, 19.2 cm^3 and 20.7 cm^3 (average 19.63 cm^3).

I then use the formula n = c * v for the amount of NaOH;

$19.63 * 10^{-3} * 0.10 = 1.963 * 10^{-3}$ mol

And since the equation for the reaction is

$NaOH + CH_3COOH \rightarrow CH_3COONa + H_2O$

there must be the same amount of CH_3COOH

and $1.963 * 10^{-3}$ mol of CH_3COOH weight;

$1.963 * 10^{-3} * 60 = 0.11778g\ CH_3COOH / 10\ cm^3 * 10 = 1.1778g / 100\ cm^3$

$$\frac{1.1778g}{20.09g} * 100 = 5.86\%$$

The conclusion is that vinegar contains 5.86% ethanoic acid. On the bottle of vinegar it said that is contained 6%, so I think that the experiment was a success.