Second experiment

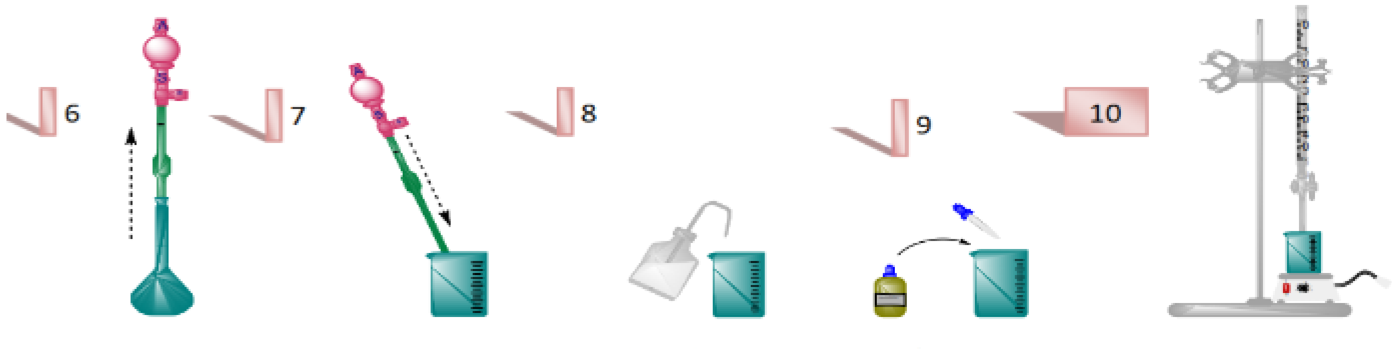
Determination of acetic acid CH3COOH using the previous potassium solution.

First step: Preparation of the dilute vinegar solution.

To determine the acidity of the vinegar, first dilute the commercial solution. commercial solution. To do this, follow steps 1 to 4 below:

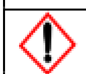
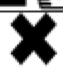
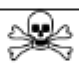
1- ⟶ Pour a sample of vinegar into a beaker. 2- ⟶ Pipette 5 ml of vinegar from the beaker. 3- ⟶ Introduce the 5 ml of vinegar into a 100 mL volumetric flask. 4- ⟶ Dilute: add demineralized water, (stirring) up to the mark. 5- ⟶The diluted solution is ready.

Step 2: Dose this solution with the calibrated potassium hydroxide solution.



6-⟶ Pipette a 10 ml test sample of the diluted vinegar solution for determination.7-⟶ Pour the test sample into a tall beaker. 8- Dilute with a little demineralized water. 9- ⟶ Add 3 drops of Phenolphthalein, stir. 9- Fill burette with potassium hydroxide solution. 10-⟶ Dose the solution until the colour changes. of the color indicator. Perform two tests under the same conditions. In the event of a large deviation (0.5 ml), perform a third test if necessary.

Safety information on the reagents used in TP n°2.

	Danger	oxalic acetic	Acide acétique	Acid Potassium	Phenolphthalein	Major effects
	Irritant	*	*	**		May cause sensitivities (allergies)
	Corrosive	**	*	**		May damage skin and clothing.
	Harmful			**		Intoxication, by ingestion and inhalation.
	Fatal	*			*	May cause cancer, if slow exposure.
	Flammable	*	*			May ignite on contact contact with ignition source.

TP CHIMIE1

TP N° 2 DETERMINATION OF VINEGAR ACIDITY BY TITRATION

ACIDO-BASIC TITRATION

Application: Degree of acidity of white vinegar

White vinegar is essentially an aqueous solution of acetic acid (or ethanoic acid). The aim of this practical test is to determine the percentage of acetic acid in vinegar, known as the vinegar's degree of acidity. To do this, we'll use one of the strong bases (sodium hydroxide or potassium hydroxide) in the presence of an appropriate color indicator.

A solution of potassium hydroxide KOH with a titre of around 0,1 mol.L^{-1} has been prepared in the laboratory (for several days). Its concentration changes over time through carbonation (KOH is consumed by capturing carbon dioxide from the air, CO_2, to give K_2CO_3).

1) $CO_2 + H_2O \longrightarrow H_2CO_3$ **2)** $H_2CO_3 + 2KOH \longrightarrow K_2CO_3 + 2H_2O$

It is therefore important to calibrate it first, before using it to titrate the acidity of vinegar.

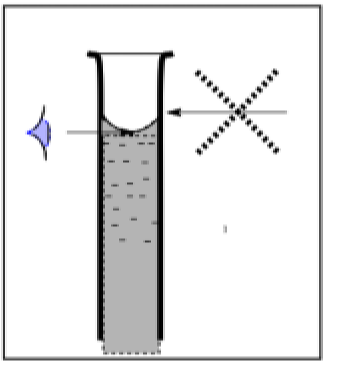
→This practical work will therefore involve two manipulations.

First experiment: Calibration of a 0,1M potassium hydroxide solution.

Since potassium hydroxide is a base, we dose it using an acid (e.g. oxalic acid, the concentration of which is known and remains stable over time).

Procedure: proceed as shown in the following figures.

1- →Transfer a quantity of potassium hydroxide solution (to be titrated), from the flask to the beaker. 2-→ Fill the burette with potash (to be titrated). 3-→ Transfer a quantity of the 0.1 N oxalic acid solution, from the flask to the beaker. 4- →Take 10 ml of 0.1 N oxalic acid, then 5- →introduce it into an Erlenmeyer flask. 6-→Dilute by adding, approximately, 20 mL of water. 7- →Add two to three drops of phenolphthalein while stirring. 8→Proceed with the dosage from the burette, until the solution is ready. from the burette, until the color changes. Make 2 trials, and a 3rd if necessary.



Last name………………….……….. First name……………….………………… subgroup ………

TP n° 2 report

TP n° 2 objectives

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Purpose of the first manipulation.

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Purpose of the second manipulation .

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Equipment and glassware used	Reagents and solvents used
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……………………………………………	……………………………………………………
……………………………………………	……………………………………………………
……………………………………………	……………………………………………………
……………………………………………	……………………………………………………
……………………………………………	……………………………………………………

First manipulation: experimental data

N_A = ... V_A = ...

V_{Eeq1} = ... V_{Eeq2} = ... V_{Eeq3} = ... V_{Eeq} . . . .

Chemical equations at the equivalent point………………………………………………………………

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Mathematical relationship to equivalence: ……………………………………………………………

Normality, N_B and molar concentration, C_B of potash:

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………………………………………

Conclusion : …………………………………………………………………………………………..

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Second manipulation……………………………………………………………………………

N_B ………………………….. V_A ……………………………………………..

V_{BEeq1} ……………………V_{BEeq2} ……………………..V_{BEeq3} ………………V_{Eeq} …………………..

Chemical equation(s) at equivalent point(s)

………

………

Relationship to equivalence: ………………………………………………………………………………

Calculation of normality and molarity of dilute acetic acid.

1) Normality: ………………………………………………………………………………………

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2) Molarity: ……………………………………………………………………………………………

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Deduce the molar concentration of acetic acid in vinegar and its degree of acidity (the degree of acidity of vinegar is the % by mass of acetic acid). degree of acidity of vinegar is % acetic acid by mass) d = 1.013.

Concentration of acetic acid in commercial vinegar:

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Vinegar acidity (percentage by mass)

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Conclusion……………………………………………………………………………………………

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