

SPECIFICATIONS FOR PESTICIDES USED IN PUBLIC HEALTH

1967

DETERMINATION OF ACIDITY AND ALKALINITY

Method WHO/M/3

Approved 25 October 1965

Determine the acidity or alkalinity by titration using methyl red as the indicator where possible. In those cases where the sample is so highly coloured that the change in colour of this indicator is masked, or the indicator is absorbed, or the active ingredient is not sufficiently soluble in a 1:3 mixture of acetone and water, the end-point can be determined electrometrically in solution in a 10:1 mixture of acetone and water.

1. Methyl red indicator determination

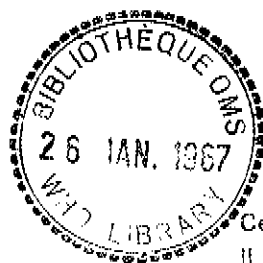
1.1 Procedure

1.1.1 Technical products

Weigh exactly 10 g of the sample and dissolve in 25 ml of acetone, with gentle warming if necessary. Add 75 ml of distilled water and titrate immediately with 0.02 N sodium hydroxide, using methyl red as indicator. Carry out a blank determination of 25 ml of acetone and 75 ml of distilled water with 0.02 N sodium hydroxide.

1.1.2 Water-dispersible powders and dusting powders

Weigh exactly 10 g of the sample, disperse in 25 ml of acetone, and warm to effect solution of the active ingredient. Add 75 ml of distilled water, filter, and titrate immediately using methyl red as indicator. Depending upon the reaction of the material use either 0.02 N sodium hydroxide or 0.02 N hydrochloric acid. Carry out a blank determination on 25 ml of acetone and 75 ml of distilled water.



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1.1.3 Emulsion concentrates

Weigh exactly 10 g of the sample, dilute with 100 ml of distilled water and titrate immediately using methyl red as an indicator. Depending upon the reaction of the material use either 0.02 N sodium hydroxide or 0.02 N hydrochloric acid. Carry out a blank determination on 100 ml of distilled water.

1.2 Calculation

1.2.1 Acidity

Acidity calculated as H_2SO_4 is found as follows:

$$\% \text{ weight as } H_2SO_4 = 0.0098 \times (a - b)$$

where a = volume of 0.02 N sodium hydroxide used for the sample (ml)

b = volume of 0.02 N sodium hydroxide used for the blank (ml)

Note: The blank may take the form of a small titre with 0.02 N hydrochloric acid, in which case

$$\text{acidity as } H_2SO_4 (\%) = 0.0098 \times (a + c)$$

where c = volume of 0.02 N hydrochloric acid used for the blank (ml)

1.2.2 Alkalinity

Alkalinity calculated as NaOH is found as follows:

$$\% \text{ weight as NaOH} = 0.008 \times (d + e)$$

where d = volume of 0.02 N hydrochloric acid used for the sample (ml)

where e = volume of 0.02 N sodium hydroxide used for the blank (ml)

Note: The blank may take the form of a small titre with 0.02 N hydrochloric acid, in which case

$$\text{alkalinity as NaOH} (\%) = 0.008 \times (d - f)$$

where f = volume of 0.02 N hydrochloric acid used for the blank (ml)

2. Electrometric Determination

2.1 Special reagent

Buffer solution Mix 100 ml of 2N acetic acid and 100 ml of 1N sodium hydroxide and make up to 1000 ml with demineralized water.

2.2 Procedure

2.2.1 Apparent pH of acetone/buffer-solution mixture

Determine the apparent pH of a mixture of 50 ml of distilled acetone and 5 ml of buffer solution with the electrodes and pH meter to be used in the titration, at 20°C.

2.2.2 Technical products

In the titration vessel of the pH meter dissolve 10 g of the technical product to be tested in 50 ml of distilled acetone.¹ Add 5 ml of distilled water and titrate electrometrically with 0.02N sodium hydroxide to the apparent pH of the acetone/buffer-solution mixture at 20°C.

2.2.3 Water-dispersible powders and dusting powders

Transfer 10 g of the sample to a 200 ml conical flask. Add 75 ml of distilled acetone and stir for five minutes. Filter through a fritted glass crucible into a 250 ml suction flask. Rinse the conical flask and the crucible with four portions of 5 ml of acetone each. Transfer the combined acetone extracts to the titration vessel, rinsing the suction flask with 5 ml of acetone. Add 10 ml of water and titrate electrometrically with 0.02N sodium hydroxide or with a 0.02N hydrochloric acid to the apparent pH of the acetone/buffer-solution mixture at 20°C.

2.2.4 Emulsion concentrates

In the titration vessel of the pH meter dissolve 10 g of the sample in 50 ml of acetone, add 5 ml of distilled water and titrate electrometrically with 0.02N sodium hydroxide or with 0.02N hydrochloric acid to the apparent pH of the acetone/buffer-solution mixture at 20°C.

2.3 Calculation

¹Some technical products such as dieldrin require more solvent to prevent precipitation during titration. In such cases 100 ml of distilled acetone and 10 ml of distilled water should be used.

2.3.1 Acidity calculated as % by weight H_2SO_4 is found as follows:

$$= 0.0098 \times a$$

where a = volume of 0.02N sodium hydroxide used for the titration of the sample to the apparent pH found in section 2.2.1

2.3.2 Alkalinity calculated as % by weight NaOH is found as follows:

$$= 0.008 \times b$$

where b = volume of 0.02N hydrochloric acid used for the titration of the sample to the apparent pH found in section 2.2.1