APPENDICES

APPENDIX A

Slope of the stopped-FIgrams was used to plot versus the concentration of standard phosphate solutions to make a calibration graph. Procedure for evaluation of the slope from the stopped-FIgram was illustrated in Figure A.1.

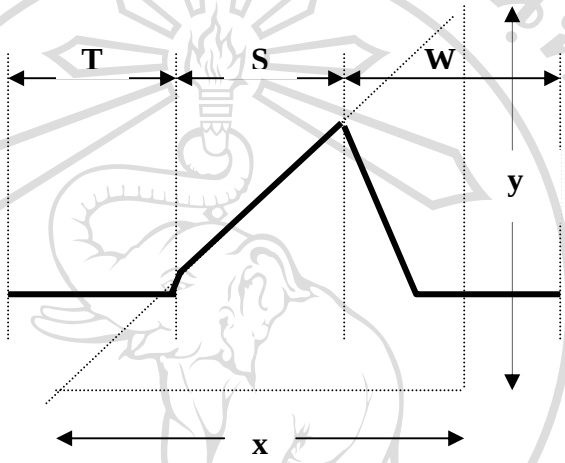

Figure A.1 Procedure of measuring slope of the stopped-FIgram: T = Travelling time , S = Stopping time, W = Washing time, y = detector signal (mV) and x = time(s)

In this work, full scale sensitivity range of recorder was 2 V while is corresponded to x cm on chart.

So, 1 cm length on chart recorder $= \frac{2}{x} = 0.02$ V $= 20$ mV

Then, from Figure A.1;

y-value = height y (cm) * 20 mV (1)

Chart speed of chart recorder was 7.8 cm min^{-1}

Thus, distance 7.8 cm equivalent to the time of 60 s

So; distance x cm equivalent to the time for $\frac{60 * x}{7.8}$ s

$$\text{x-value} = \frac{60 * \text{distance x (cm)}}{7.8\ \text{(cm)}} \quad \ldots\ldots (2)$$

Because of; $\text{Slope} = y / x$ ..... (3)

Putting values from equations (1) and (2) in equation (3).

Hence, $$\text{Slope} = \frac{\text{height y (cm)} * 20\ \text{(mV)} * 7.8\ \text{(cm)}}{60 * \text{distance x (cm)}}$$

Or; $$\text{Slope} = \frac{\text{scale of chart recorder} * 2.6}{\text{distance x}} \quad \ldots\ldots (\text{mV s}^{-1})$$

APPENDIX B

1. Batch method for determination of phosphate [38]

Pipette 15.00 ml of standard phosphate solution into a 25.00 ml volumetric flask. Added 0.02 M sodium molybdate, 0.25 %w/v ascorbic acid and 0.15 M nitric acid at 2.0, 2.0 and 1.0 ml, respectively into the flask. Adjusted the volume to the mark by water and let the mixture at room temperature for 10-15 minutes before measuring absorbance at 660 nm.

2. Titrimetric standard method for determination of chlorate [12]

The procedure is based upon the reaction between chlorate and iodide in the presence of concentrated hydrochloric acid :

$$ClO_3^- + 6I^- + 6H^+ \rightarrow Cl^- + 3I_2 + 3H_2O$$

The liberated iodine is titrate with standard sodium thiosulphate solution.

Place 25.00 ml of the chlorate solution in a glass-stoppered conical flask and added 3 ml of concentrated hydrochloric acid followed by two portions of about 0.3 g each of pure sodium hydrogen carbonate to remove air. Added immediately about 1.0 g of potassium iodide and 22 ml of concentrated hydrochloric acid. Stopper the flask, shaked the contents and allowed it to stand for 5-10 min. Titrate the solution with a standard solution of 0.1 M sodium thiosulphate.

3. Batch method for determination of chlorate [39,41]

-Making a calibration graph

Pipetted 25 mg l^{-1} of standard potassium chlorate solutions: 0.00, 1.00, 2.00, 3.00 and 4.00 ml into a 25.00 ml volumetric flask. Added 3 x 10^{-4} M 5.00 ml indigo carmine solution for each flask and adjusted the volume to the mark by 1:1 hydrochloric acid. Heat the solution in water bath at 50 ^oC for 10 minute before measuring absorbance at 610 nm.

-Determination of soil samples

The extracted chlorate that was prepared as mentioned in 2.4.2 was analysed using the same procedure as above for the calibration graph.

APPENDIX C

1. Sampling of soil samples [42]

Sampling of soil samples from same area was collected throughout at least 15 points and mixed together. This sample was called “composite sample”. Soil was dug at the depth of 6 inches (15 cm).

2. Preparation of samples [42]

Samples were dried in clean room and without dust. After drying, matrix in soil was abandoned. Soil was grinded, sifted with a sieve and collected in plastic bag before analysis.

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List of Publication:

1. Somnam, S., Sangthong, W. and Saiyasombat, W., "Mulberry pulp preparing", 27th Congress on Science and Technology of Thailand, Songkla, 2001.
2. Somnam, S., Jayavasti, S., Jakmunee, J. and Grudpan, K., "Stopped-flow injection analyzer for determination of soluble phosphorus in fertilizer", 28th Congress on Science and Technology of Thailand, Bangkok, 2002.

3. Somnam, S., Jakmunee, J. and Grudpan, K., “Development of stopped-flow injection system for determination of phosphate in soil samples”, 29th Congress on Science and Technology of Thailand, Khon Kaen, 2003.