



## Simple method of isolating humic acids from organic soils

O.H. Ahmed (1), K. Susilawati (1), A.B. Nik Muhamad (1), and M.Y. Khanif (2)

(1) Department of Crop Science, Faculty of Agriculture and Food Sciences Bintulu Campus, Universiti Putra Malaysia Bintulu Campus, 97008 Bintulu, Sarawak, Malaysia, (2) Department of Land Management, Faculty of Agriculture, Universiti Putra Malaysia, 43400 Serdang, Selangor, Malaysia (osman60@hotmail.com / Fax: +086 855415 / Phone: 086 855406)

Humic substances particularly humic acids (HA) play a major role in soil conditioning e.g. erosion control, soil cation exchange capacity, complexation of heavy metal ions and pesticides, carbon and nitrogen cycles, plant growth and reduction of ammonia volatilization from urea. Humified substances such as coal, composts, and peat soils have substantial amounts of HA but the isolation of these acids is expensive, laborious, and time consuming. Factors that affect the quality and yield of HA isolated from these materials include extraction, fractionation, and purification periods. This work developed a simple, rapid, and cost effective method of isolating HA from peat soils. There was a quadratic relationship between extraction period and HA yield. Optimum extraction period was estimated at 4 h instead of the usual range of 12 to 48 h. There was no relationship between fractionation period and HA yield. As such 2 h instead of the usual range of 12 to 24 h fractionation period could be considered optimum. Low ash content (5%), remarkable reduction in K, coupled with the fact that organic C, E4/E6, carboxylic COOH, phenolic OH, and total acidity values of the HA were consistent with those reported by other authors suggest that the HA dealt with were free from mineral matter. This was possible because the distilled water used to purify the HA served as Bronsted-Lowry acid during the purification process of the HA. Optimum purification period using distilled water was 1 h instead of the usual range of 1 and 7 days (uses HF and HCl and dialysis). Humic acids could be isolated from tropical peat soils within 7 h (i.e. 4 h extraction, 2 h fractionation, and 1 h purification) instead of the existing period of 2 and 7 days. This could facilitate the idea of producing organic fertilizers such as ammonium-humate and potassium-humate from humified substances since techniques devised in this study did not alter the true nature of the HA. Besides, the technique is rapid, simple, and cost effective (e.g. less time consuming) and it may be of great benefit to the fertilizer and related industries interested in producing organically based fertilizers that could condition soils apart from boosting crop yield in agriculture.