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AQUACULTURE COLLABORATIVE RESEARCH SUPPORT PROGRAM

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Sustainable Aquaculture for a Secure Future

Title: An Improved Method for Determining the Fineness Value of Agricultural Limestone for Aquaculture

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Date: 14 February 2006 Publication Number: CRSP Research Report 04-A7

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Abstract: The original method for determining the fineness of agricultural limestone was modified for the greater contribution of particles less than 0.25 mm in diameter that is found in the modern agricultural limestone used in aquaculture. Crusher-run limestone was screened to give nine particle size separates. Systems containing 3.0 kg of soil (pH 5 5.21) and 23.5 L of water (total alkalinity 5 0.39 mg/L) were treated with 8.0 g of each separate, and total alkalinity and pH were monitored. After 70 d, total alkalinity equilibrated at 55 mg/L in systems treated with particles less than 0.106 mm. The total alkalinity in systems treated with other particle size separates were as follows: control, 0.52 mg/L; greater than 2.0 mm, 2.28 mg/L; 2.0–0.85 mm, 5.75 mg/L; 0.85–0.42 mm, 12.25 mg/L; 0.42–0.25 mm, 26.8 mg/L; 0.25–0.15 mm, 45.62 mg/L; and 0.15–0.106 mm, 49.30 mg/L. Water pH exceeded 7.36 after 2 weeks for systems treated with particles less than 0.25 mm. Wet soil samples (2.5 kg) of pH 5.04 were placed in trays and treated with 6.7 g of limestone of different particle size separates. After 1 week, pH was 6.9–7.1 in soil treated with particles less than 0.106 mm. By 10 weeks, a pH greater than 6.5 was attained in soils treated with particles less than 0.25 mm. The pH of soil treated with particles greater than 0.25 mm was similar to the control pH. Efficiency factors were assigned to particle size-classes as follows: less than 0.106 mm, 100%; 0.25–0.106 mm, 86.7%; 0.42–0.25 mm, 49.06%; 0.85–0.42 mm, 22.4%; and greater than 0.85 mm, 7.3%. The sum of the products of the proportion of each particle size-class and the corresponding efficiency factor gave the fineness value. Fineness values usually were smaller when determined by the new method instead of the old method.

This abstract is excerpted from the original paper, which was in *North American Journal of Aquaculture* 66:113–118, 2004.

CRSP RESEARCH REPORTS are published as occasional papers by the Program Management Office, Aquaculture Collaborative Research Support Program, Oregon State University, 418 Snell Hall, Corvallis, Oregon 97331-1643 USA. The Aquaculture CRSP is supported by the US Agency for International Development under CRSP Grant No.: LAG-G-00-96-90015-00. See the website at <pdacrsp.orest.edu>.