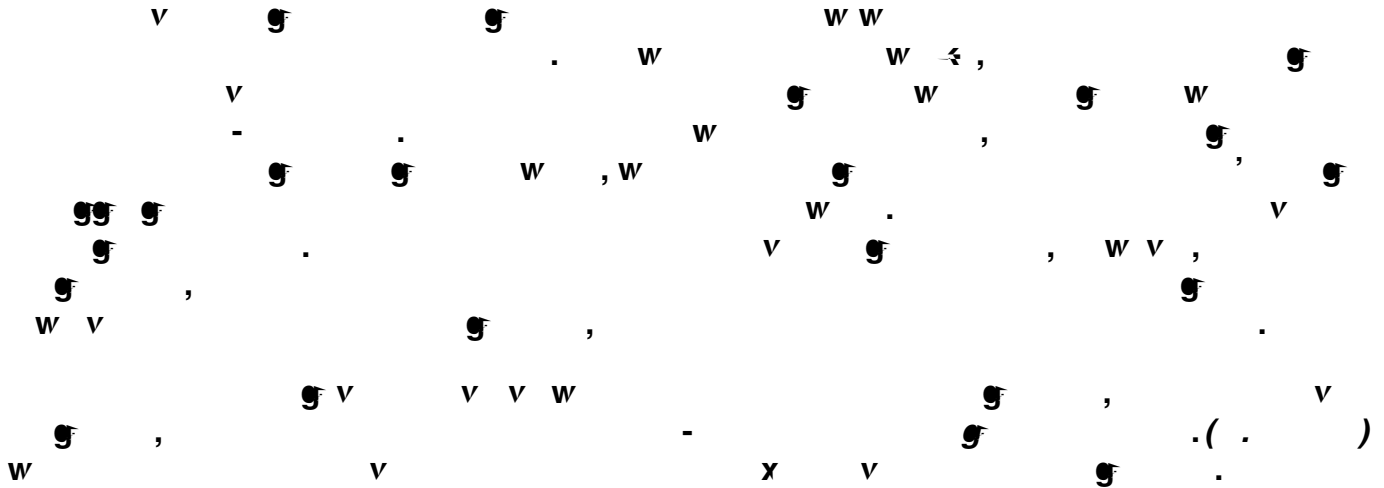
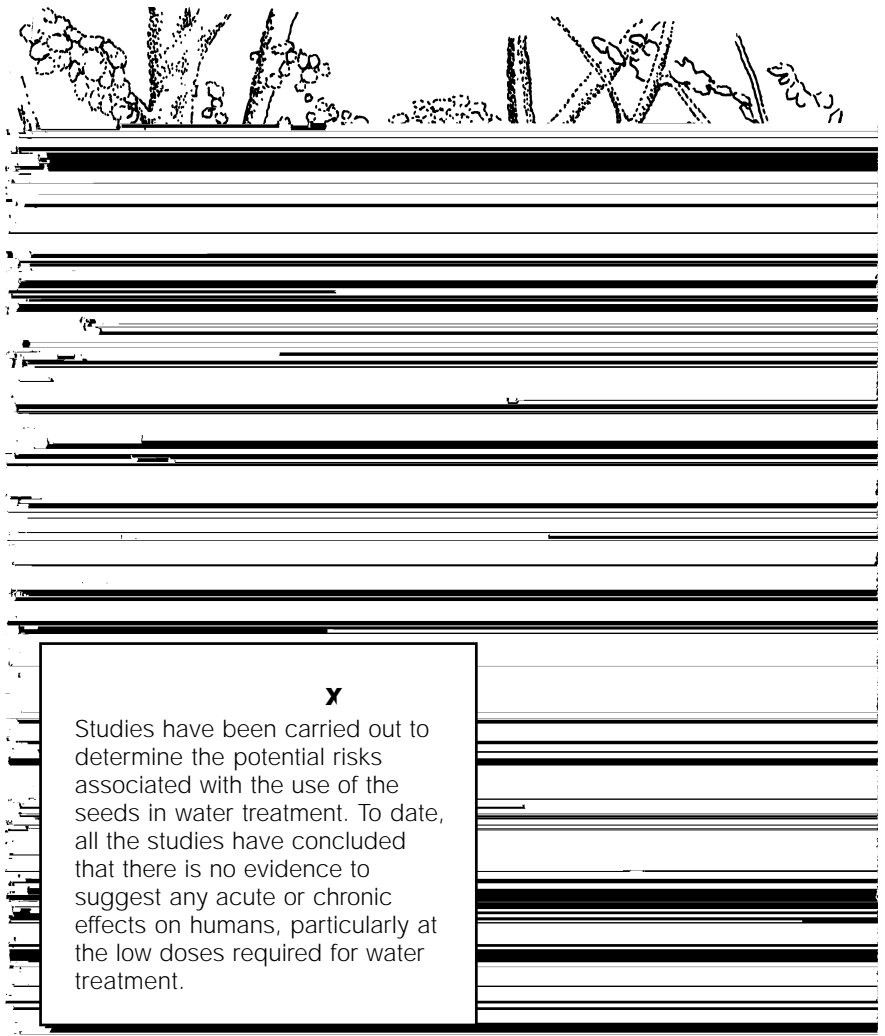


60. Water clarification using seed coagulant



The seed kernels contain significant quantities of a series of low molecular-weight, water-soluble proteins which, in solution, carry an overall positive charge. The proteins are considered to act similarly to synthetic, positively charged polymer coagulants. When added to raw water the proteins bind to the predominantly negatively charged particulates that make raw waters turbid (silt, clay, bacteria etc.). Under proper agitation these bound particulates then grow in size to form the flocs, which may be left to settle by gravity or be removed by filtration.

The traditional use of the *M.oleifera* seeds for domestic household water treatment is limited to rural areas in Sudan. Village women, collecting their water from the River Nile, place powdered seeds in a small cloth bag with a thread attached. This is then swirled around in the turbid water to promote coagulation and flocculation. The flocculated solids are allowed to settle and the treated water is removed before boiling and subsequent consumption.



Studies have been carried out to determine the potential risks associated with the use of the seeds in water treatment. To date, all the studies have concluded that there is no evidence to suggest any acute or chronic effects on humans, particularly at the low doses required for water treatment.

For practical reasons of solution preparation, the use of powdered seed kernels is only recommended for treatment systems up to 10m³/hour.

As with all coagulants, the effectiveness of the seeds may vary from one raw water to another. Jar testing should be undertaken to determine their effectiveness on a particular water, and to establish preliminary dosing regimes depending on the season. The practical application of dosing solutions is exactly the same as for all other coagulants. Figure 1 (above) demonstrates the stage of application in two alternative treatment 'trains'.

9

As for all coagulants, the amount of seed required will vary depending on the raw water source and on the raw water quality. One advantage of seed use is that, in general, there is a wide dose range over which effective

Jahn, S.A.A., *Proper use of African natural coagulants for rural water supplies*, Manual No.191, GTZ, Eschborn, 1986.
Jahn, S.A.A., 'Simplified water treatment technologies for rural areas', *GATE*, GTZ, Issue 1, Eschborn, 1989.
Morton, J.F., 'The horseradish tree, *Moringa pterygosperma* (Moringaceae): A boon to arid lands?'

Prepared by Geoff Folkard, John Sutherland and Rod Shaw



WATER AND ENVIRONMENTAL HEALTH AT LONDON AND LOUGHBOROUGH (WELL) is a resource centre funded by the United Kingdom's Department for International Development (DFID) to promote environmental health and well-being in developing and transitional countries. It is managed by the London School of Hygiene & Tropical Medicine (LSHTM) and the Water, Engineering and Development Centre (WEDC), Loughborough University.

Phone: +44 1509 222885 Fax: +44 1509 211079 E-mail: WEDC@lboro.ac.uk <http://www.lboro.ac.uk/well/>