Treating hard water

L W. Samuel
Department of Agriculture

Follow this and additional works at: https://researchlibrary.agric.wa.gov.au/journal_agriculture3

Recommended Citation
Available at: https://researchlibrary.agric.wa.gov.au/journal_agriculture3/vol3/iss4/21

This article is brought to you for free and open access by Research Library. It has been accepted for inclusion in Journal of the Department of Agriculture, Western Australia, Series 3 by an authorized administrator of Research Library. For more information, please contact jennifer.heathcote@agric.wa.gov.au, sandra.papenfus@agric.wa.gov.au, paul.orange@dpird.wa.gov.au.
TREATING HARD WATER

By L. W. SAMUEL, Ph.D., Deputy Government Agricultural Chemist.

On some farms there are ample supplies of water which, although suitable for many domestic purposes, including human consumption, is too "hard" to be satisfactory for washing purposes. Waters are described as "hard" or "soft" depending on the difficulty or ease of obtaining a lather with soap. Not only is it difficult to obtain a lather with soap in a "hard" water but also large quantities of soap curds are formed.

These "hard" waters also cause deposits or "fur" in kettles and other vessels used for heating water and such deposits may be a common source of trouble in domestic hot-water systems.

Hardness in water is usually due to the presence in the water of calcium and magnesium but may also be caused by acid or by large quantities of common salt in the water. All of these materials cause hardness for the same reason. To obtain a lather with soap it is necessary to have soap in solution. The hardness factors cause the separation of a solid soap, the curd, and so prevent lathering. If sufficient soap is used, all of the calcium, magnesium and acid can be used up in curd formation and then further soap can remain in solution and cause a lather, but it is not possible to overcome in this way the hardness due to common salt.

Although the safe upper limit of soluble salts in water is considered to be 150 grains per gallon for general domestic use and human consumption on individual farms, such water will be very hard. There are available to the farmer various methods of dealing with hard water where the hardness is due to acid, calcium or magnesium. Hardness due to relatively large amounts of common salt cannot however be economically removed on the farm as yet and thus even if the calcium, magnesium and acid hardness are corrected in a salty water, the water will still be hard.

ACID WATERS

Where hardness is due to acid in the water, the condition may be easily corrected by adding a small quantity of lime. The quantity required will depend on the degree of acidity but rarely exceeds 8 oz. to each 1,000 gals. of water.

CALCIUM AND MAGNESIUM

There are several methods of treating water containing calcium and magnesium.

1. The hardness may be reduced, though not entirely removed, by simply boiling the water and allowing it to cool.

2. The addition of washing soda will reduce the hardness of water, the quantity of washing soda necessary being dependent on the degree of hardness of the water. The soda has more effect in hot water than in cold water. Care should be taken not to use too much washing soda and a trial could be made using 1 oz. of washing soda per 10 gallons of water and then increasing or decreasing the quantity of washing soda as required. Equal quantities of washing soda and borax mixed can be used instead of washing soda alone.

3. A chemical known as Calgon or Micromet can be added to water to give the same effect as softening. This also works better in hot water than in cold, about twice as much Calgon being required in cold water as in hot water. A trial could be made using 2 ozs. of Calgon per 10 gallons of water. Calgon is available from Imperial Chemical Industries of Aust. & N.Z. Ltd., c/o. Elder, Smith & Co. Ltd., Perth.

4. Soap can be used to soften water in a separate vessel, using the clear water free from soap curds.
5. The use of a soap containing washing soda or other alkaline ingredients or the use of a salt water soap reduces the effects of hard water.

6. Since hardness in water is normally due to salts of calcium and magnesium the water can be softened by removing the calcium and magnesium. This can be done relatively easily by passing the water through a bed of material known as Zeolite or Permutite, when the calcium and magnesium from the water exchange with sodium from the Zeolite. The Zeolite becomes exhausted in time, i.e., can no longer exchange sodium for calcium and magnesium, but the Zeolite can be regenerated by a strong solution of common salt. The sodium from the common salt exchanges with the calcium and magnesium in the Zeolite and so re-forms the original sodium-Zeolite which can then be used to soften more water (after washing out the excess of salt). Unfortunately these softeners are not usually satisfactory for waters containing more than 100 grains per gallon of total salts because (a) the common salt in the water acts in opposition to the softening action (b) the water will still have some hardness due to the salt and (c) such waters are usually very corrosive after softening.

These softeners are available commercially and some of the firms dealing with them are:—R. J. Fletcher, Chemical Manufacturer; The Western Machinery Co. Ltd.; Tomlinson Steel Pty. Ltd.; W. J. Lucas Ltd.; Atkins (W.A.) Ltd.; David Gray & Co. Ltd.; Westralian Farmers Co-operative Ltd. and J. H. Wilberforce & Co.

Since these softeners work by exchanging sodium for calcium and magnesium they do not reduce the total salt content of the water. In this respect they differ from the newer synthetic resins used for removing all salts from water and which are much more expensive to install and to regenerate and are as yet uneconomic for farm use.

7. For laundry work one of the newer detergents, called "soapless soaps," or soapless cleansers could be used. These materials lather in hard water because there is no precipitation of an insoluble "soap" and are extensively used in England and America.

With the exception of pre-boiling (Method I), and passing the water through a bed of proprietary water-softening compound (Method 6) the methods described are not suitable for the treatment of drinking water but are designed to make the water more suitable for laundry and other household uses. For people subject to skin rashes, alkaline soaps are best avoided, but the proprietary salt-water soaps are usually satisfactory.

In applying methods 1, 2, 3 and 4 it is best to use a separate vessel for the treatment, allowing to settle and using the clear liquid free from scum or sediment.
BANGOR
SLIDING DOOR TRACK AND FITTINGS
A product of Wormald Brothers Industries

Why battle with awkward swinging doors each time you shear

Doors that slide on BANGOR track line, make work simpler and stock easier to handle

* * Ideal for Garages, Storage, Stock Pens, etc.

* *

Save Space and money with BANGOR

Procurable from your local Storekeeper, or
THE W.A. DISTRIBUTORS

McPherson's LTD.
532 MURRAY STREET, PERTH. – BA 9711
Write for illustrated brochure on Bangor

Please mention the "Journal of Agriculture, W.A." when writing to advertisers
Unsurpassed for the Country User Farmer Storekeeper Tradesmen

ALL AGREE THAT THE

STANDARD

VANGUARD

12 CWT. UTILITY PROVIDES

- POWER
- PAYLOAD
- PERFORMANCE
- PETROL SAVING

The strongest chassis of its size ever engineered

MORTLOCK BROS. LTD.

CAR SHOWROOMS, 1016 HAY STREET, PERTH

SPECIALISED STANDARD - TRIUMPH SERVICE

MURRAY STREET WEST AND AT ALL COUNTRY CENTRES

MAIL THIS COUPON

Please send me full details of your 12 cwt. COUPE UTILITY.

NAME
ADDRESS

MAIL THIS COUPON

Please mention the "Journal of Agriculture, W.A.,” when writing to advertisers