SPRAY WATER QUALITY

WHY SHOULD YOU CARE ABOUT THE QUALITY OF SPRAY WATER?

Outside of acceptable ranges each of these water quality parameters, both alone and in combination can cause changes in the chemical properties of a product, including the active ingredient, additives and adjuvants.

This can cause the following:

- reduced product efficacy i.e. poor pest control.
- change the solubility of products in water e.g. particles don't dissolve leading formation of solids or films inside tanks, lines and nozzles.
- affect chemical compatibility with other products.
- damage to equipment e.g. residue build up in lines and nozzles.
- cause phytotoxicity on plants e.g. burning of plant parts, impact on growth.

Some product labels will specify water quality requirements such as pH and/or recommend buffering adjuvants.

Temperature

- Temperature can impact product stability and can accentuate other water quality factors. It is not recommended to spray when temperatures are higher than 26°C.

Saline water

- Refers to dissolved salts, this is primarily attributed to sodium chloride (NaCl) but there are others.
- Is measured as the electrical conductivity (EC) of the water.
- An EC of 0.5-1 dSm/cm is considered too saline for spraying.
- > 1000 ppm NaCl is also unsuitable.

Management

- Avoid completely or dilute with non-saline water e.g. rainwater.

pH

- Is a measure of hydrogen ion concentration.
- pH 7 is neutral, water is considered alkaline at pH>8 and acidic at pH<5.

Management

- Use a buffering agent or surfactant, these are preferred over adding a simple chemical to adjust pH e.g. hydrochloric acid.
- Buffers are safe for the user and act as pH stabilisers.
- Strong acidic or alkaline chemicals are dangerous to handle and as additions are made the pH continues to change.

Dirty water (suspended solids)

- Refers to general debris like dust and fine organic matter. For example, many publications refer to the effects of clay colloids.
- A general rule of thumb is if you cannot see a coin at the bottom of a bucket the water is too dirty.
- Turbidity in water tests can give an indication of suitability but there are no specific guideline values for spraying. Additionally, measured values can be complicated by the cause of the water discolouration.

Management

- Filtering.
- Settling in a holding tank prior to use.
- There are settling agents available but should be used with caution and within manufacturers guidelines.

Hardness

- Is the measure of the concentration of positive ions in water. Ones that commonly cause issues are calcium, magnesium, and bicarbonates. These ions also contribute to an increase in pH.
- Water tests normally present this as calcium carbonate equivalents (e.g. $CaCO_3$ ppm or mg/L).
- Hardness over 300 mg/L $CaCO_3$ equivalents is not suitable.
- Bicarbonate levels as low as 175 ppm (mg/L) can affect some products.

Management

- Ammonium sulfate (AmS) alone and in formulated adjuvants can be used to reduce water hardness.
- AmS will not significantly affect pH levels, so any pH concerns need to be addressed separately.

Photo: PublicDomainPictures

WATER TESTING

On-Farm

- Commercially available pH and hardness test strips or kits.
- Observe. What does the water look like? If it is discoloured, murky and/or has lots of bits floating in it, consider treatment.
- Jar test to check for any solubility issues.

The precision/accuracy of do-it-yourself kits vary, and you should compare results to a laboratory test when using for the first time.

Laboratory

- As a minimum a test should include pH, hardness, bicarbonate levels, electrical conductivity (i.e. salinity indicator) and turbidity.
- Your local agronomist or reseller should be able to advise on laboratories in your region.

When to Test

- Water quality can change over time.
- If your spray water is sourced from a bore, an unlined dam, river, or stream, it is recommended that a water test be used to check the quality of the water before spraying.
- Generally, annually would be sufficient with quick on-farm checks more regularly. If you notice pH or hardness change dramatically do a lab test.
- Note that if you are certified under standards like Freshcare, regular lab tests might be compulsory.

Sampling different sources

- **Dam:** collect a sample from as far away from the edge as possible, ideally close to where the pump draws water. Avoid muddy sediment. Alternatively, collect from the first outlet along a supply line. *Caution: Safety measures should be taken when working around dams.*
- **Creek or river:** Collect a sample from the middle of the stream if possible.
- **Bore:** Collect a sample after pumping for 20-30 minutes.
- **Distributions systems (e.g. irrigation or pipelines):** Ensure system is flushed thoroughly before sampling.

How to take a water sample

- Check lab requirements, these will give required volumes, collection vessel specifications and they may provide sample collection kits.
- Use a clean container if you don't have a sampling kit. A new plastic water bottle can be suitable.
- Rinse bottle four times using the water that is being sampled.
- Fill to the top, leave as little air as possible.
- Label with name, water source, location and date.
- Wrap container to limit light exposure.
- Send or drop-off ASAP.

Prepared by Dr Karina Griffin for SFIRP-BC-24, April 2024

References and other useful resources

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