

CROWD: Clean Rivers Of West Dorset

Notes on chemical and biological 'home' testing of river water (from Howard Atkinson)

Nitrate monitoring in Rivers

I bought from Amazon **SimplexHealth Nitrate 0-500 & Nitrite 0-25 Tests Water Test Strips** (50 strips) for £14.99. They claim :

- Simple Dip-Wait-Read Testing Method
- Suitable for any fresh water, including water from tap, well, pond, stream, lake, river, ground, rain
- Test strips are stored in a plastic container to protect them
- Ideal for quick and reliable testing of water
- Accurate results are achieved in one minute.

Their colour matching colour comparison are for 0,10,25,50,100,250 and 500ppm Nitrate and lower levels of nitrite.

WestCountry CSI use LaMotte for phosphate (which I use) but their test strips for nitrate were out of stock at Amazon UK when I purchased. They are available again: LaMotte Insta-Test - Nitrate & Nitrite Test Strips, £33.19 for 50 test strips. They detect 0, 5, 10, 25, 50 nitrate and a lower level of nitrite.

DEFRA (2012) estimated 59% of nitrates and 26% of phosphates in English waters are of agricultural origin. The standard sought is 30mg/L for nitrates and 100µg/L for phosphates. In 2006, 29% and 50% of UK rivers exceeded these values respectively.

River water may need to be diluted to be in range of La Motte strips if nitrate levels are high. In contrast, the SimplexHealth strips may be insensitive if nitrates are low but we may be willing to accept that values below the 30mg/L (i.e. 30ppm) are not accurately defined as they would not be a concern. I will not use the Simplex Health strips until April.

E. coli monitoring

Watersafe Pool & Spa Bacteria Test Strips (10 tests) from SimplexHealth is an antibody-based rapid test kit that detects the presence of bacteria for river but not sea water. Cost: £50 for 10 tests. Detects *E.coli*, *Pseudomonas aeruginosa* and many other coliform and non-coliform bacteria but not individually. Results are available in 15 minutes and no chemicals need to be added. Its detection limit is 1000cfu/ml. It cannot be used in seawater. It is relatively insensitive but should detect sewage outflows particularly if the water companies state that any final treated effluent to rivers is normally below this level. It does not distinguish between coliform and E. coli as does the Environment Agency in its bathing water testing.

Other more sensitive kits are available (a detection limit of c1 cfu/100ml with 2 tests for £18; **AquaVial Well Water Testing Kits** - 2 Pack for E. Coli and Coliform Bacteria Detection | High Sensitivity Water Testing Kit for Drinking Water or Well | Amazon.co.uk: Garden). They require addition of chemicals and a 48-hr incubation. They may require dilution with bacteria-free water (deionised water?) so very low levels of contamination are not recorded as positive.

Another option would be to determine the cost of a lab. carrying out tests 'blind'. A number of approaches such as PCR, ELISA and plating for colonies are available. A quick search has not found a commercial company offering this service for river rather than drinking water. The Environment Agency would probably not do this without charge. I have not explored costs. Possibly we would need a grant as cost/sample will be greater than for the strip tests.

I will look further but we may need expert advice particularly if the options considered are high cost or results from cheaper approaches would be considered unreliable. Possibly the Rivers Trust would advise.

Howard Atkinson, 15th February 2023