

TITLE: Beverage Application Inquiry

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DISTRIBUTION: TECTA-PDS Sales team

We have had several inquiries regarding testing of beverage products for E. coli and coliform bacteria using the TECTA technology. We know that all beverages cannot be tested using the default TECTA method (100 mL added to test cartridge) because there are matrix components in some beverages that will interfere with the growth of bacteria or the test.

We can place the anticipated matrix effects into three categories:

- 1) pH and other matrix inhibitors of bacteria growth
- 2) matrix inhibitors of enzyme expression or measured enzyme activity
- 3) matrix interference of product uptake and detection

We have previously developed modified methods to overcome matrix effects for certain samples, such as using 1:10 dilution (i.e. 10 mL sample plus 90 mL sterile RO water in the cartridge) to allow testing of salt water samples to obtain identical results to control samples of only RO water. The list of such samples include ocean salt water (~3.5% NaCl by weight, plus other ions), vegetable wash water, diet iced tea, decarbonated diet Coke, decarbonated Coke zero and other diet beverages. The AOAC PTM Method approval (Certificate 010801) for TECTA method included diet iced tea and vegetable wash water as some of the test matrices.

For diet beverages and vegetable wash water, previous experience has shown that the TECTA test method should obtain identical results to control samples if the starting pH is between 7.0 to 8.0 after dissolution of the granular reagents of the TECTA test cartridge. If starting pH is in the range of 6.0 to 7.0, bacteria will likely be detected but the TECTA time to detection (TTD) may be significantly longer than for a control water sample containing the same concentration of bacteria. In this case, recommendation would be to further dilute sample to be greater than pH 7.0 or use the custom calibration feature of the TECTA for conversion of the TTD into CFU/100mL concentration. It is not recommended to test samples with starting pH of 6.0 or lower since bacterial growth may be hindered. If the diluted beverage to test is lower than a pH of 6.0, additional pH buffer materials would need to be added as a preliminary step to neutralize more of the acid before initiating the TECTA test.

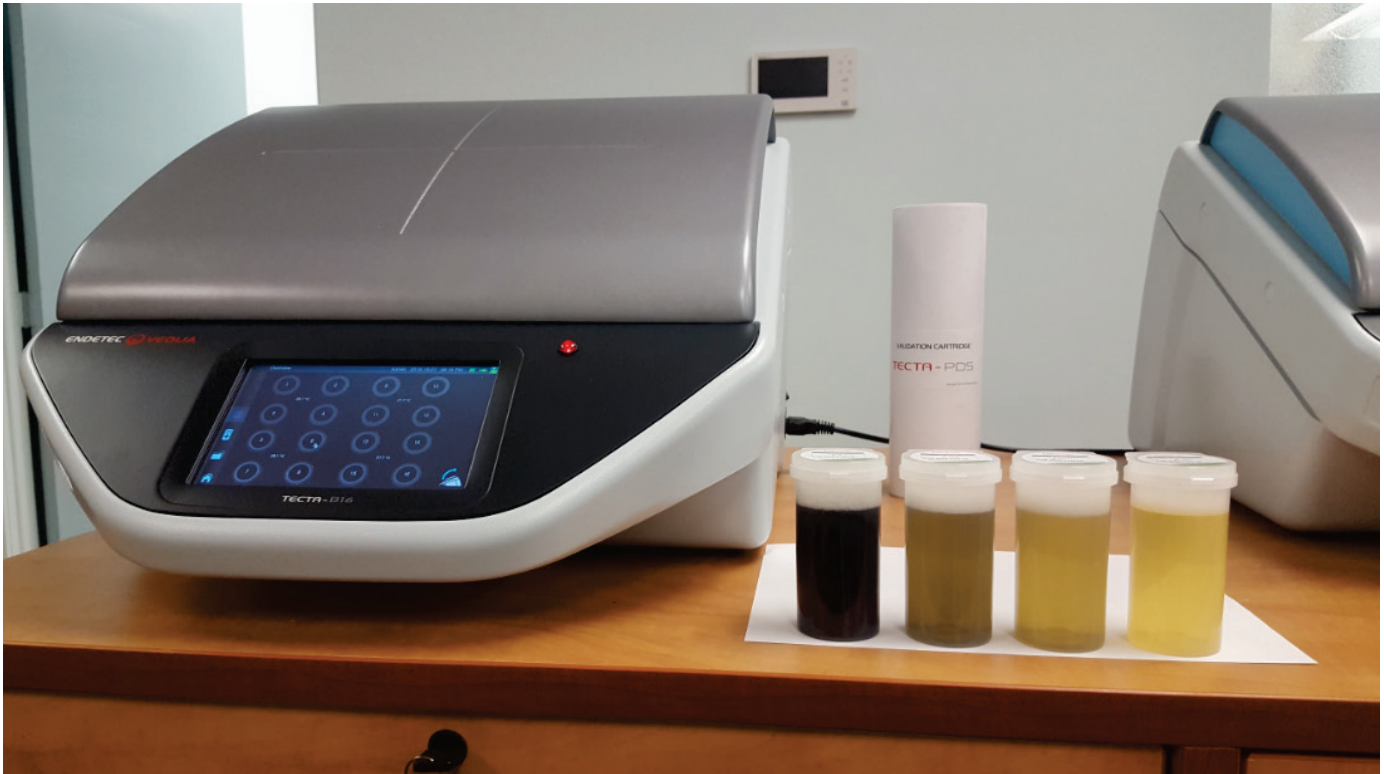
For decarbonated Coca cola, or non-diet beverages and syrups containing natural sugars, selective E.coli enzyme expression inhibition has been observed in some 1:10 diluted samples. Total Coliform or Fecal Coliform testing however remains possible at 1:10 dilution. If an E.coli specific test is necessary for these beverage types, the recommended dilution is 1:100 (1 mL sample plus the addition sterile RO water up to the 100mL fill line printed on the TECTA cartridge).

For dairy product testing, fat content of the matrix can be correlated to reduced product uptake in the TECTA method. The fat is competing with the proprietary polymer partition element of the TECTA cartridge for adsorbing the fluorescent product which in high enough concentration will reduce the signal intensity observed by the TECTA system. Previous experience has concluded that Total Coliform or Fecal Coliform can be tested with a 1:20 dilution for skim milk (0.1% fat) and a 1:100 dilution for whole milk

(3.25% fat). For E.coli specific testing in milk the recommendation is a 1:100 dilution since milk contains natural sugars and therefore may cause specific enzyme expression inhibition.

Optically, there is no turbidity upper limit where the Tecta test method becomes affected. All optical detection is isolated to the polymer partition element located under the cartridge, which is outside of the sample water. The limitation is on the chemical composition of the turbidity causing one of the 3 listed matrices effects and the need for having sufficient water in the sample to mass transfer the product molecules into the polymer partition element.

As a turbidity example, the below picture shows a series of prepared samples ranging from 1000 NTU to 50 NTU (left to right in the picture) of a fine graphite suspension which all produced equivalent results to the control RO water sample.



For any further questions on this bulletin, please contact:

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