

### Comparison of different culture media in MPN method for the estimation of coliforms and *E. coli* in tea and herbs

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Estimation of coliforms and *E. coli* are two major parameters that are used in microbial quality processes in food and, generally these organisms are tested via Most Probable Number (MPN) method. This method is one of the standard enumerating techniques that perform with different culture media. The objective of this study was to compare some different media used to perform MPN technique to enumerate coliforms and *E. coli* in dried food products, which have water activity less than 0.95. The procedure-1 was performed with MacConkey broth, Brilliant Green Lactose Bile (BGLB) broth and indole test and this was very much similar to the previous standard procedure given as SLS 516 (part-3) 1982. Two other procedures were selected and denoted as procedure-2 (ISO 4831: 2006) and procedure-3 (ISO 7251: 2005). All three procedures are horizontal methods for detection and enumeration of coliforms and *E. coli* via MPN technique. The procedure -2 was performed using Lauryl sulphate tryptose (LST) broth and BGLB. The Procedure-3 contained LST broth and EC broth. Tea and herb samples (dried food products) were subjected to parallel testing by above mentioned procedures. Reference bacterial cultures were tested with each experiment as internal quality control measurements. Some Tea and herb samples were spiked with coliform organisms to obtain detectable counts. Total of Seventeen samples were tested according to these horizontal methods for the detection and enumeration of coliforms and *E. coli* and the results were subjected to statistical analysis (Paired-t test).

According to Procedure 1, coliform counts in tea samples were in a range of 20 – 1100 MPN/g with a mean of 199 MPN/g and *E. coli* counts were in a range of 0.3 – 1100 MPN/g with a mean of 157 MPN/g. The results indicated that coliform counts obtained via procedure-2 for the same tea samples were in the range of 0.3 – 1100 MPN/g. However, *E. coli* counts obtained through procedure-3 were very much similar to that of procedure-1. The procedures -1 and -2 gave similar results for the coliform counts in herbal components. The average coliform counts as per procedure -1 was 320 MPN/g whereas procedure-2 gave 346 MPN/g. *E. coli* counts estimated via procedure-1 and 3 for these samples were varied between 0.3-110 MPN/g and 0.3 – 900 MPN/g respectively. Although there were differences in culture media used, the statistical analysis indicated that results obtained from procedure 1 and procedure 2 for coliforms in tea samples were not significantly different (T-paired value  $0.037 < T$ -table value,  $p = 0.05$ ). Similar results were also obtained for coliforms in herbs as well as *E. coli* in both tea and herb samples.

**Key words:** Tea, Herbs, *E. coli*, coliforms, MPN method

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