

ABSTRACT**DETERMINATION of IMPORTANT BACTERIA in FOOD AND WATER
BY FISH AND STANDARD MICROBIOLOGICAL METHODS**

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PhD Thesis, Department of Biology
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2011, 110 pages

This study has been conducted to investigate the determination and enumeration of *E.coli*, *Salmonella*, *S.aureus* and *Legionella* sp. in food and water samples by 'Fluorescence *in situ* Hybridization' and FDA approved 'Cultural Microbiological Methods'. The food samples were collected from a big supermarket and public bazaars in Aydın city; the water samples were collected from the water tanks which supplies potable water to Aydın city. 100 meat and 100 water samples were studied and 1000 analyses were applied with 2 repetitives. Bacterial counts which were determined by FISH and cultural methods were compared statistically by paired t-test and a significant difference ($p<0.01$) between the methods is obtained. 12 different hybridization temperature is experimented for 6 different oligonucleotide probes and hybridization temperatures are specified as 43°C for EUB338, NonEUB338 and Sau; 47°C for ECO1167, 37°C for Sal3 and 45°C for Leg705. *E.coli* cell counts in 84 meat samples have been found higher than Turkish Food Codex limits and 42 of 84 have been observed that were collected from public bazaars. *S.aureus* counts in 100 meat samples were found below codex limits for all meat samples. On the other hand, 18 of 100 meat samples were found *Salmonella* positive and it has been observed that only 3 of 18 positive samples were collected from the supermarket. Besides, *Salmonella* was isolated by FISH from 12 of 82 *Salmonella* negative samples analysed by culture method. 100 water samples were analysed by FISH and cultural methods and *E.coli* and *Salmonella* were not detected by both of the methods. By this study, a FISH method capable of enumerating *E.coli*, *S.aureus*, *Salmonella* and *Legionella* in food within a single day was developed and the total time for FISH analyse with probe ECO1167 was reduced to 8h.

Key words: FISH, *in situ* hybridization, bacteria counting, food, meat, water, standard methods, indicator bacteria