

**PASSIVE HEMAGGLUTINATION TEST VERSUS  
THE CLASSIC TECHNIQUES USED IN DIAGNOSIS  
OF ENTERIC FEVER**

**THESIS**

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## **ABBREVIATIONS**

AIDS:	Acquired ImmunoDeficiency Syndrome
AMS:	Automicrobic system
BCG:	Bacillus Calmette Guérin
CSF:	Cerebrospinal fluid
COA:	Coagglutination test
C3:	Complement 3
CIE:	Counterimmunoelectrophoresis
DCA:	Desoxycholate citrate agar
Na <sub>2</sub> HPO <sub>4</sub> :	Disodium hydrogen phosphate
EPS:	Enteropathogen screen card
ELISA:	Enzyme-Linked Immunosorbent Assay
EDTA:	Ethylenediamine tetra acetic acid
FN:	False negative rate
FP:	False positive rate
H:	Flagellar
HE:	Hektoen enteric agar
H <sub>2</sub> S:	Hydrogen sulphide
IFL:	Immunofluorescence technique
IgA:	Immunoglobulin A
IgG:	Immunoglobulin G
IgM:	Immunoglobulin M
LPS:	Lipopolysaccharide antigen
MA:	Microagglutination test
NBGL:	Novobiocine brilliant green glycerol lactose
PHA:	Passive hemagglutination technique
PBS:	Phosphate buffer saline
RIA:	Radioimmunoassay
RBCs:	Red blood cells
S:	Salmonella
SS:	Salmonella-Shigella agar

SGOT:	Serum glutamate oxaloacetate transaminase
SGPT:	Serum glutamate pyruvate transaminase
NaCl:	Sodium chloride
NaH <sub>2</sub> PO <sub>4</sub> :	Sodium dihydrogen phosphate
SPS:	Sodium polyanetholsulfonate
O:	Somatic
TSI:	Triple sugar iron agar
TN:	True positive
TP:	True negative
TSB:	Trypticase soy broth
TAB:	Typhoid, paratyphoid A and B vaccine
Vi:	Virulence
BSA:	Wilson and Blair's Brilliant green bismuth sulphite agar
XLD:	Xylose lysine deoxycholate agar

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## **Introduction & Aim of the Work- I**

### **Introduction:**

Human salmonellosis is a major public health problem and although mortality is low, the disease has important social and economic consequences (*Ivanoff et al., 1994*).

Between 1981 and 1986, the number of strains received for serotyping by the Public Health Laboratory Service (PHLS), Division of Enteric Pathogens has increased by 66%. This is predominantly due to strains of *Salmonella typhimurium* and *Salmonella enteritidis* (*Humphrey et al., 1988*).

Although most *Salmonella* infections are limited to the gastrointestinal tract, invasion of the blood stream and focal complications can occur (*Blaser and Newman, 1982*). Young infants are at particular risk for focal complications such as meningitis (*Menon et al., 1994*), bone and joint infection (*Editorial, 1983*) and foot abscess (*Chagla et al., 1986*).

Diagnostic tests for typhoid bacillus, such as Widal's test, are tube dilution tests which measure agglutinating antibodies against O and H antigens. The O or somatic antigens are prepared from the bacterial cell wall, the H or flagellar antigens from bacterial flagella, and the Vi or virulence antigen from a thermolabile structure surrounds the cell wall (*Levine et al., 1978*).

*Salmonellae* are divided into distinct serologic groups on the basis of O antigens, and further differentiated into more than 1,200 serotypes on the basis of H antigen. Group D comprises 78 *Salmonella* serotypes, all organisms in group D have O antigen 9, and 59 of the 78 serotypes also have O antigen 12. Antibodies to any group D salmonella will cross-react with other members of that group. The importance of this cross-reactivity is difficult to assess, since the frequency of antibody response to other *Salmonella* infections has been measured with the more sensitive enterobacterial hemagglutination technique rather than the standard agglutination methods used in Widal's reaction (*Schroeder, 1969*).

Serodiagnosis of enteric fever by the Widal test was once considered a useful alternative to hemoculture. But lately, it has been found unreliable (**Reynold et al., 1970**). Resulting in renewed effort to find improved methods for serodiagnosis such as passive hemagglutination (PHA) (**Neter et al., 1965**), counterimmunoelectrophoresis (**Gupta and Rao, 1979**), enzyme linked immunosorbent assay (**Appassakij et al., 1987**) and the radioimmunoassay (**Tsang et al., 1981**).

However, counterimmunoelectrophoresis, the enzyme-linked immunosorbent assay, and the radioimmunoassay are technically too complicated. So, passive hemagglutination test was simple, sensitive and specific serological test for diagnosis of enteric fever (**Petchelai et al., 1987**).

**Aim of the Work:**

To evaluate the passive hemagglutination test (PHA) by microtitration technique used for diagnosis of enteric fever in comparison to the classical methods used to diagnose such cases.

# REVIEW OF LITERATURE