

*Morganella morganii*

(2002/9/15 2002/5/29 )

*Morganella morganii*

19

418

Enterotoxins

. % 4.54

*M.morganii*

% 42.1

. % 36.84

## A Study on the Enterotoxins Produced by Local Isolates of *Morganella Morganii* Causing Infantile Diarrhoea in Mosul City

Subhi H.K. Al-Jubouri

Sahar S.P. Al-Nakkar

*Department of Biology*

*College of Science*

*Mosul University*

### ABSTRACT

This investigation was done to study the possibility of enterotoxin production by local isolates of the bacterium *Morganella morganii*. Specimens were obtained from infantile diarrhoeal patients of ages 2 years or less in Mosul City. 418 stool specimens were collected, 4.54% of which were *Morganella morganii* (about 19 isolates). Suckling mice assay was depended in detecting heat stable enterotoxin producing strains. It was shown that 42.1% of the strains were producers. On the other hand Delayed rabbit skin permeability assay, Rabbit ligated ileum and the enlargments of mouse thymus were done to study heat labile enterotoxin. Results revealed that 36.84% of isolates were producers. Finally, to determine the nature of effect of enterotoxins on intestinal cells a comparison was made on histological section and control animals. No variations were noticed between untreated and negative animals. However, great differences were noted between intestinal tissue of positive suckling mice and others. A destroyed villi layer was noted with the appearance of red corpuscles. Therefore, we conclude that the enterotoxin is cytotoxic to the intestine.

### Enterotoxins

(Collee et al., 1994; Craig, 1971)

*Salmonella*

*Esherichia coli*

*M . morganii*

(Scotland, 1988)

:

.(Ahren et al., 1990)

Heat–Stable Enterotoxins (ST)

Richards and )

Heat–Labile Enterotoxins (LT)

(Douglas, 1978)

(Baron et al., 1994; Harris, 1988)

.(Everest et al., 1993)

*M. morganii*

ST

.LT

: .1

*M. morganii* 19 •

*Morganella morganii* COD No. A236 1 •

: .2

:

.(Evans et al., 1973) Casamino Acid–Yeast Extract (CAYE) •

.(Ahren et al., 1990; Honda et al., 1982) Casamino Acid-Yeast Extract (CAYE-2) •

1 8.0 7.8 7.5 7.3

Mundell et al., ) 1N HCL 1 1N NaOH

.(1976

.(Majtan et al., 1985; Wadstrom et al., 1976) Brain Heart Infusion BHI •

10 150

1 . 1 121 /

37 24-18

Controlled Environment ) / 200 37 24

(Incubator Shaker

4 30 (g × 8000)

Gianella, 1976; Dean et al., ) 0.45 (Millipore Filter)

: (1972

:

4-1 (Suckling Infant Mouse Assay)

.(Panhotra et al., 1980; Dean et al., 1972)

:

Majtan et al., 1985; Kawakomi )

55 (NH<sub>4</sub>)<sub>2</sub> SO<sub>4</sub> (et al., 1963; Heckly and Nigg, 1958

(g × 8000) 100/

4

72

:

Delayed Rabbit Skin Permeability Test (DPT)(Wadstrom et.al., 1976)

Rabbit Ileal Loop Test (RILT) (Tewari et.al., 1979)

(1990 ) .

:

.3

(Luna, 1968)

(%10)

: ST

8

% 42.1

1

pH 8 (CAYE-2)

25

4

(Ahren et al., 1990)

CAYE

.(Gianella, 1976)

(Evans et al., 1973) *E. coli*

BHI

(1989 )

.(Jiwa, 1981) *Salmonella*

ST

(Hostacka et al., 1984; Ciznar and Hostacka, 1983)

*M. morganii*

(Ahren et al., 1990)

ST

Travellers Diarrhoea

2

3

5 4

(Majtan et al., 1985)

cytotoxic

Vero cell

*M. morganii*

Vero cell cytotoxic

*M. morganii*

7

4

(Janda et al., 1996)

Hep-2

: L T

:

-

LT

*M. morganii*

7

% 36.84

72

24-18

.6

(Jiwa, 1981; Craig, 1971; Richardson, 1969) Induration

BHI CAYE

CAYE-2

(Majtan et al., 1985)

*M. morganii*

(Majtanova et al., 1988)

*M.*

(Ahren et al., 1990)

*morganii*

(Jertborn and Svennerbolm, 1991)

.GM1- ELISA

LT

GM1- ELISA

LT

LT

.(Jertborn et al., 1990)

: -  
7

(Majtan et al., 1991; Ciznar and Hostaka, 1983)

*M. morganii*

: -

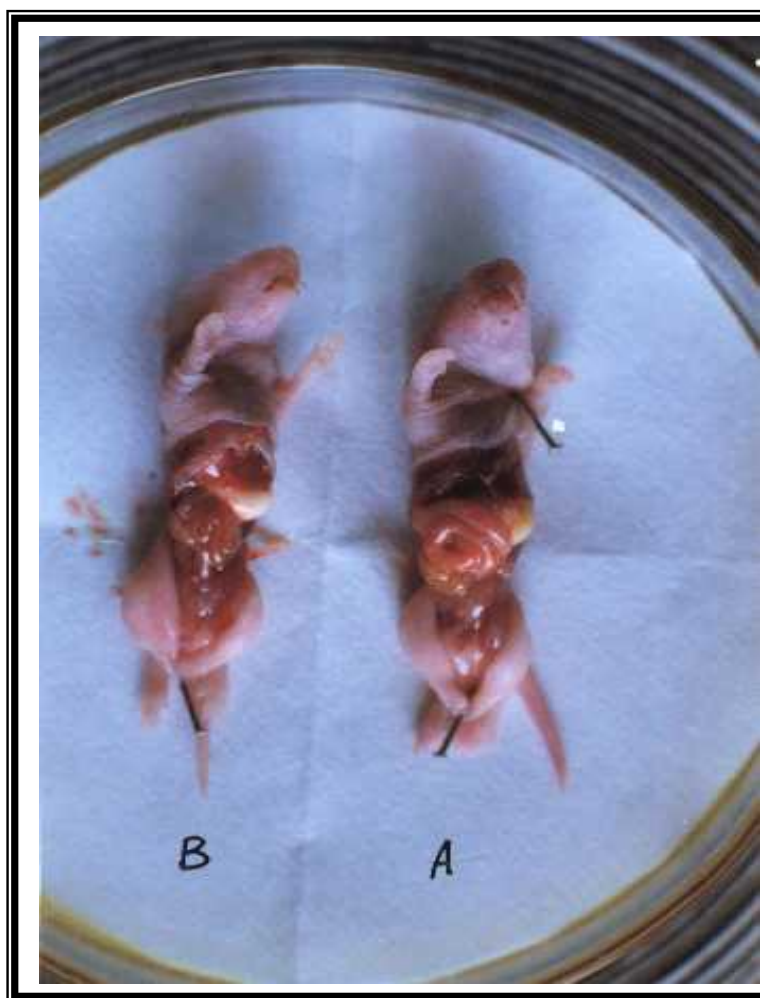
(1990 ) *E. coli* LT

CAYE-2 .LT *M. morganii*

48

.%31.57

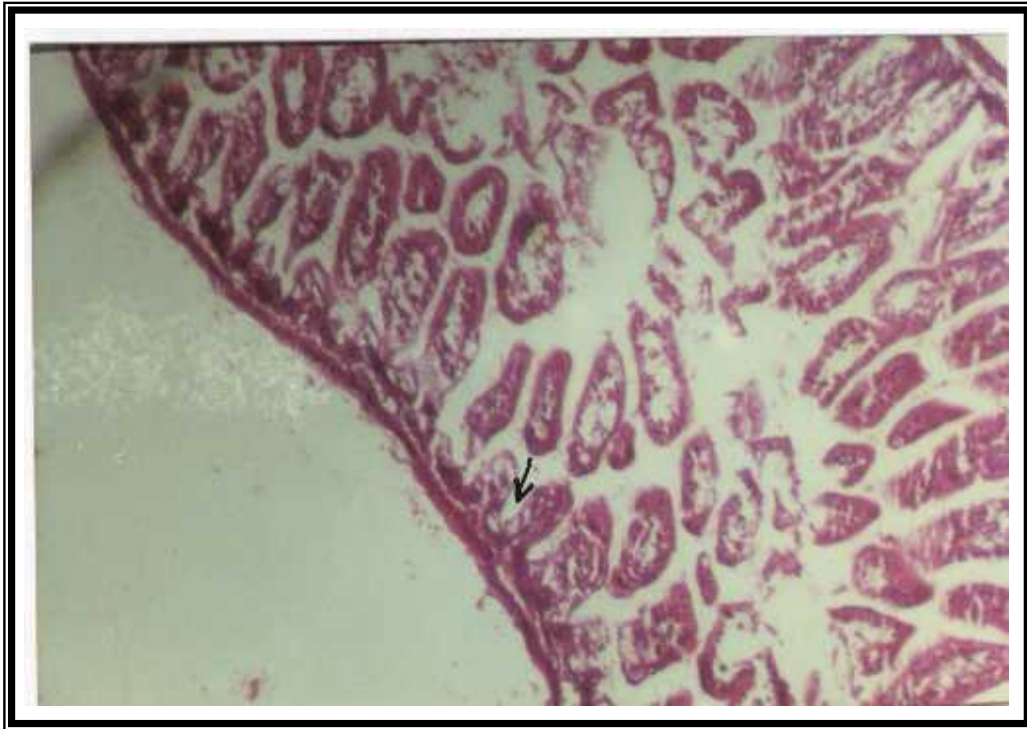
LT ST



:B

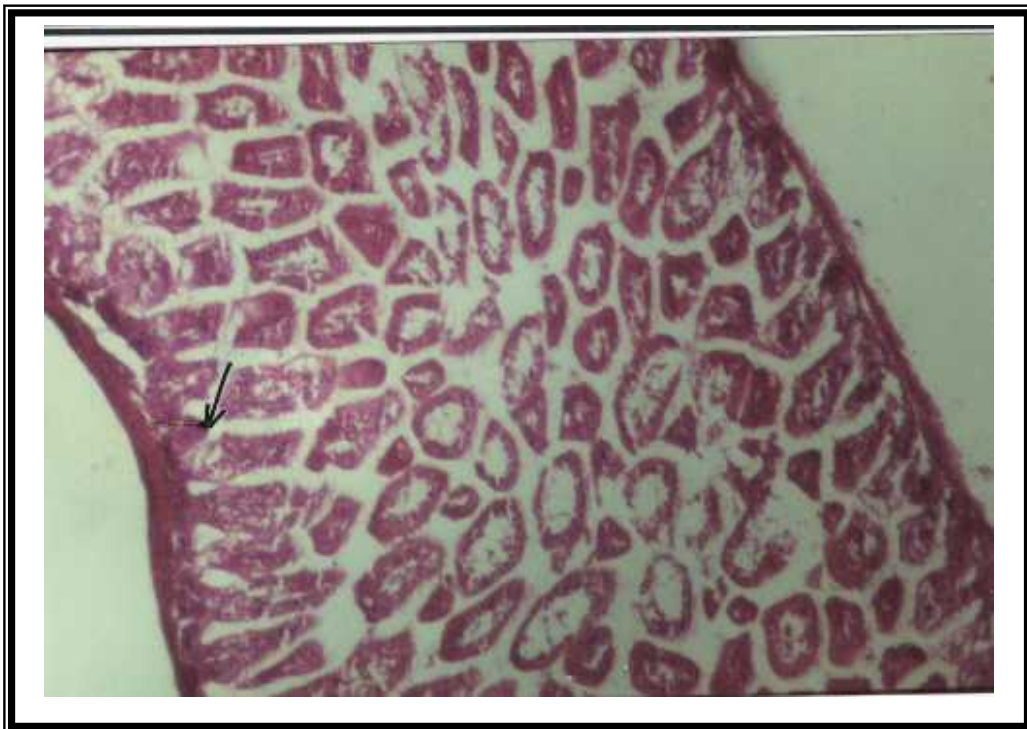
:A

:1



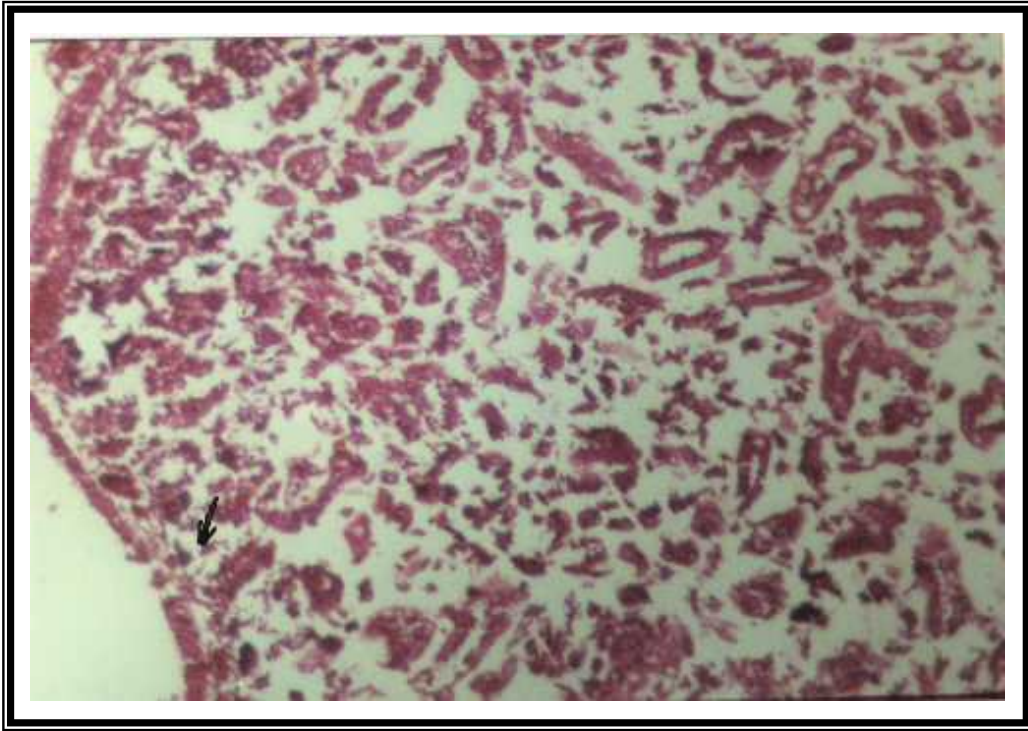
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:2



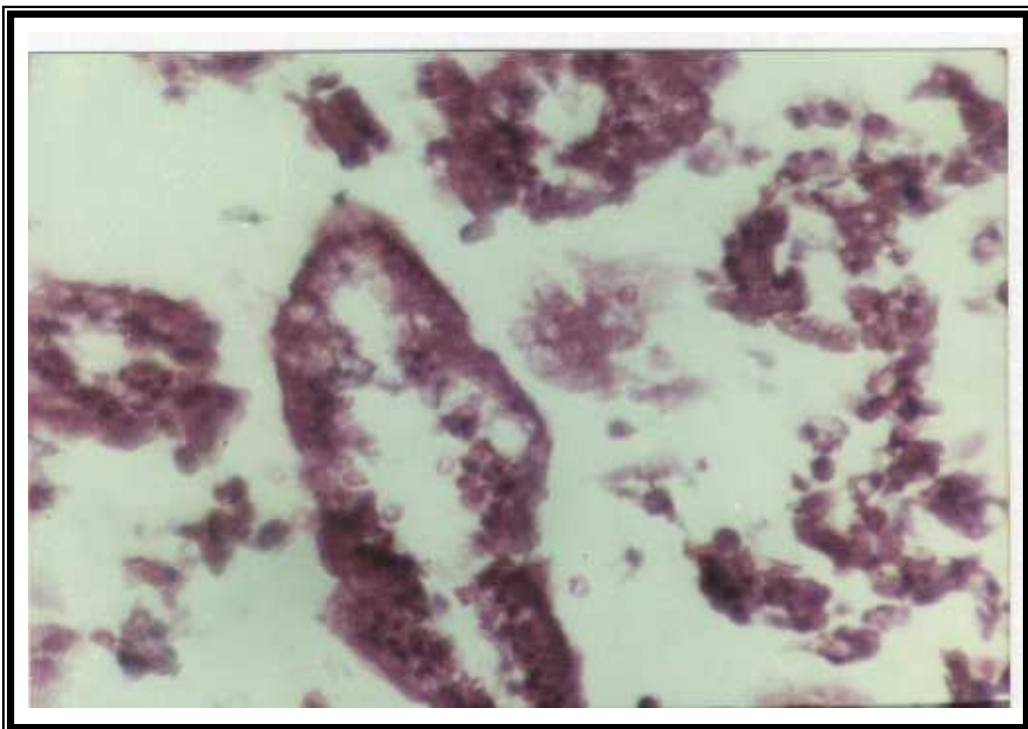
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:3



(X100)

:4



(X400)

:5



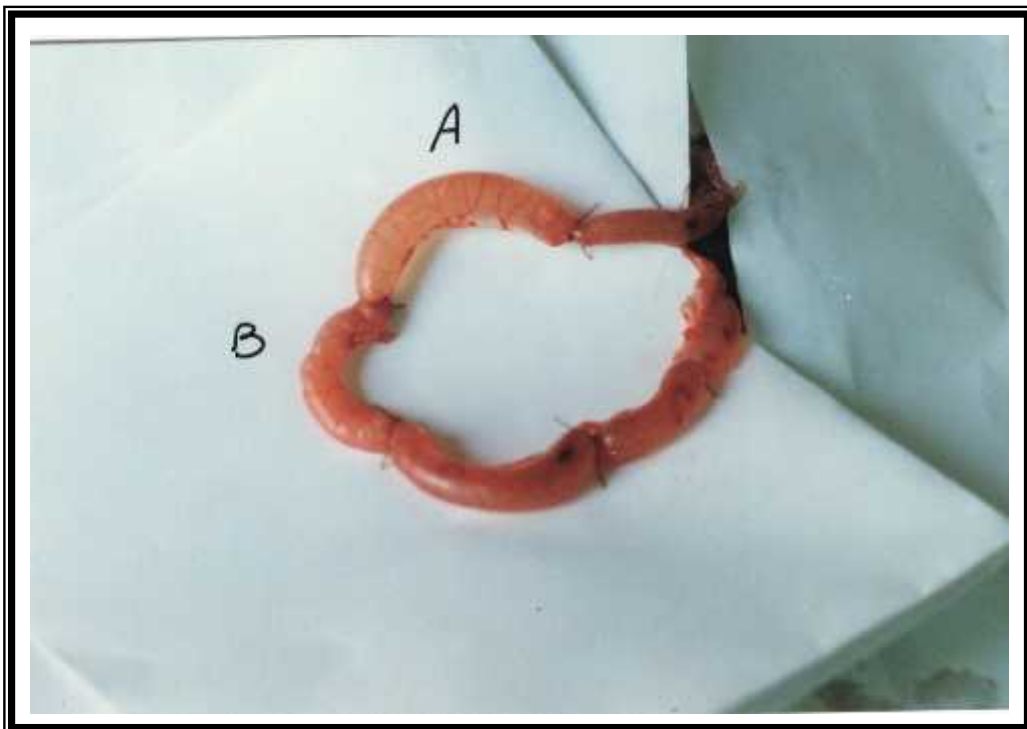


(72)

:6

:B

:A



:7

:B

:A

.1990

.1989

- Ahren, C.M., Jertborn, M., Herclik, L., Kaijser, B., Svennerholm, A-M, 1990. Infection with bacterial enteropathogens in Swedish travellers to South-East Asia-a prospective study. *Epidemiol Infec*, Vol.105, pp.325-333.
- Baron, J.E., Peterson, L.R., Finegold, S.M., 1994. *Bailey and Scott's Diagnostic Microbiology*. 9th. ed., Mosby-USA.
- Ciznar, I., Hostacka, A., 1983. Toxic properties of *Proteus morganii*. *Cs. Epidem. Mikrobiol. Imunol.*, Vol.32(3), pp.126-133.
- Colle, J.G., Marmion, B.P., Fraser, A.G., Simmons, A., 1994. *Mackie and McCartney Practical Medical Microbiology*. 14th. ed., Churchill Livingstone. USA.
- Craig, J.P., 1971. Cholera toxins, p.189-254. In: Kadis, S., Montie, T.C., Ajl, S.J., *Microbial toxins*, Vol.2A, Academic press Inc. New York.
- Evans, D.G., Evans, D.J., Pierce, 1973. Differences in the response of rabbit small intestine to heat labile and heat stable enterotoxin of *E. coli*. *Intec. Immnu.*, Vol.7, pp.873-880.
- Everest, P.H., Goossens, H., Sibbons, P., Lioyd, D.R., 1993. Pathological changes in the rabbit ileal loop model caused by campylobacter jejuni from colitis. *J. Med. Microbid.*, Vol.38 5, pp.316-321.
- Gianella, R.A., 1976. Suckling Mouse Model for detection of Heat-stable *Escherichia coli* enterotoxin: characteristics of the model. *Infec. Immun.*, Vol.14, 1, pp.95-99.
- Harris, R.C., 1988. Review of selected bacterial enterotoxins and their role in gastroenteritis. *Ann. Clin. Lab. Sci.*, Vol.18, 2, pp.102-108.
- Heckly, R.E.J., Nigg, C., 1958. Toxins of *pseudomonas pseudoallei*. *J. Bacteriol.*, Vol.76, pp.423-436.
- Honda, T., Arita, M., Takeda, Y., Miwatani, T., 1982. Further Evaluation of the Biken Test, Modified Elek Test, for detection of Enterotoxigenic *E.coli* Producing Heat-Labile enterotoxin and application of the test to sampling of Heat-stable enterotoxin. *J. Clin. Microbiol.*, Vol.16, 1, pp.60-62.
- Hostacka, A., Ciznar, I., Karolcek, J., 1984. Toxic activity of cellular structures of *proteus morganii*. *Cs. Epidemiol. Mikribiol. Lmunol.*, Vol.33, 4, pp.193-197.
- Janda, J.M., Abbott, S.I., Khashe, S., Robin, T., 1996. Biochemical investigations of biogroups and Subpecies of *Morganella morganii*. *J. Clin. Microbisl.*, Vol.34, 1, pp.108-113.
- Jertborn, M., Ahren, C., Perlman, D., Kaijser, B., Sevennerholm, A.M., 1990. Serum antibody responses to bacterial enteropathogens in Swedish travelers to South –East Asia. *Scand. J. Infec. Dis.*, Vol.22, pp.699-704.

- Jertborn, M., Ahren, C., Perlman, D., Kaijser, B., Svennerholm, A.M., 1990. Serum antibody responses to bacterial enteropathogens in Swedish travelers to South –East Asia. *Scand. J. Infec. Dis.*, Vol.22, pp.699-704.
- Jertborn, M., Svennerholm, A.M., 1991. Enterotoxin-producing bacteria isolated from Swedish travelers with diarrhoea. *Scand. J. Infec. Dis.*, Vol.23, pp.473-479.
- Jertborn, M., Svennerholm, A.M., 1991. Enterotoxin-producing bacteria isolated from Swedish travelers with diarrhoea. *Scand. J. Infec. Dis.*, Vol.23, pp.473-479.
- Kawakami, M., Osawa, N., Milbsuhashi, S., 1963. Experimental salmonellosis, new toxic fraction (L) obtained from salmonella enteritidis and its immunological properties. *J. Bacteriol.*, Vol.86, pp.872-879.
- Luna, L.G., 1968. Manual of histologic staining of the armed forces institute of pathology 3rd. ed. Mc Graw-Hill comp. USA.
- Majtan, V., Hostacka, A., Ciznar, I., Markovic, J., Karolcek, J., 1985. characteristics of Toxic Exoproducts of *Proteus Morganii*. *Biologia*, Vol.40, 3, pp.297-304.
- Majtan, V., Hostacka, A., Kosiarova, A., Majtanova, L., Bartkova, G., 1991. Toxinogenicity and Lysogenicity of *Proteus Mirabilis*, *Morganella morganii* and *pseudomonas aeruginosa* strains. *Biologia*, Vol.46, 11, pp.1031-1038.
- Majtanova, L., Majtan, V., Karolcek, J., 1988. Investigation of Lysogeny in strains of *Proteus mirabilis* and *Morganella Morganii*. *Cs. Epidemiol. Mikrobiol. Imunol.*, 37, 6, pp.323-328.
- Mundell, D.H., Ansutmo, C.R., Wishnow, R.M., 1976.. Factors influencing Heat-Labile *Escherichia coli* enterotoxin activity. *Infec. Immu.*, Vol.14, 2, pp.383-388.
- Panhotra, B.R., Agarwal, K.C., Walia, B.N.S., Ayyagari, A., Joshi, P., 1980. Enterotoxigenic *Escherichia coli*. from acute diarrhoeal disease in infants and children. *Indian. J. Med.*, Vol.72, pp.347-351.
- Penner, J.L., 1981. The Tribe Proteaeae. In. starr et al. The prokaryotes a handbook on habitats, isolation and identification of bacteria. Springer-Verlag. Berlin.
- Richard, K.L., Douglas, S.D., 1978. Pathophysiological effects of *Vibrio cholerae* and enterotoxigenic *Escherichia coli* and their exotoxins on eucaryotic cells. *Microbiol. Rev.*, Vol.42, 3, pp.592-613.
- Scottand, S.M., 1988. Toxins. *J. Appl. Bacteriol. Symp., Suppl.*, Vol.65, pp.1095-1295.
- Senior, B.W., 1987. The typing of *Morganella morganii* by bacteriocin production and sensitivity. *J. Med. Microbiol.*, Vol.23, pp.33-39.
- Tewari, L., Agarwal, S.K., Khan, A.M., Kumar, A., Methrotra, R.M.L., 1979. Enterotoxicity of *Escherichia coli* isolated from infantile diarrhoea in rabbits and infant mice. *Indian. J. Med.Res.*, Vol.69, pp.231-239.
- Wadstrom, T., Aust Kettis, A., Habte, D., Holmgren, J., Meeuwisse, G., 1976. Enterotoxin–Producing bacteria and parasites in stools of Ethiopian children with diarrhoeal disease. *Arch. Dis. Child.*, Vol.51, pp.865-870.