2. NEED FOR STUDY

Enterotoxigenic *Escherichia coli* (ETEC) infections result in large mortality rate and usually a frequent cause of diarrhea in infants and a major cause of economic losses in the swine industry. To prevent enterotoxigenic *escherichia coli* infections animal needs an active mucosal immunity at the moment of weaning. Vaccination of sow during pregnancy leads to secretion of antigen specific antibodies in colostrums and milk, which provides immunity to the suckling piglets against infections. After being weaned, however the piglets are deprived of the passive protection and can become susceptible to ETEC infection. At this particular moment, an active immunisation is needed for protection. An effective activation of the protective intestinal mucosal immune response can occur following oral infection. Parenteral immunisation doesn’t work as it tends to stimulate the systemic rather than the mucosal immune system which is not desirable. Newly weaned piglets can be orally immunised with detached F4 fimbriae. These bacteria produce heat labile (LT) and or heat stable (ST) which act on enterocytes resulting in diarrhoea. Oral solid dosage forms can be an attractive carrier to produce a mucosal immunity. Solid vaccine formulations can be mixed with creep food or can be given in a suspension form can be appropriate for successful immune response.

In the present study, F4 fimbriae loaded porous chitosan nanoparticles were developed against ETEC infection using ammonium carbonate as a pore forming agent. Spray-drying is a technique allowing the instantaneous drying of solutions, suspensions, or emulsions. It had been widely used in making nanoparticulate drug delivery systems. The presence of pores in ceramic foams offers the possibility to use these porous ceramics as carriers for local and controlled delivery of drugs.