

Evaluation of the efficacy, safety and immunity of chitosan-based oral fowl typhoid vaccine

Onuigbo Ebele, Attama Anthony, Chah Kennedy, Gyang Moses and Okore Vincent
University of Nigeria, Nigeria

Salmonella enterica serovar Gallinarum (S. Gallinarum) is the causative agent of fowl typhoid (FT). S. Gallinarum (SG) resides in the gastrointestinal tract after oral contamination and results in 80% mortality of susceptible birds. Fowl typhoid has been eradicated in developed countries by stringent biosecurity measures and vaccines but is still of considerable importance in many developing countries. The local live attenuated FT vaccine produced by National Veterinary Research Institute (NVRI), Jos, Nigeria is given subcutaneously which is cumbersome in the vaccination of large numbers of chickens. Oral delivery of the local FT vaccine has not yet been fully exploited. Oral FT vaccine would also be beneficial to rural farmers in developing countries like Nigeria who cannot access veterinarians easily. Therefore, a safe and efficient oral delivery system is needed. In this research, we are developing a thermostable oral fowl typhoid vaccine encapsulated in alginate-coated chitosan nanoparticles. Chitosan is a natural cationic polysaccharide that has the ability to enhance the immunogenicity of antigens. It is non-toxic, biodegradable and mucoadhesive. However, chitosan is hydrophilic and is easily soluble in acidic solutions, hence, the coating with an acid-resistant polymer such as anionic alginate sodium onto the surface of chitosan nanoparticles. Alginate-coated chitosan nanoparticles protects vaccines better from degradation in acidic solution (pH 1.5) than the chitosan nanoparticles alone. From various *in-vitro* stability studies done in the past, alginate-coated chitosan nanoparticles conferred thermostability on the associated antigen. Formulation, characterization and thermostability of the coated chitosan nanoparticles would be performed. Immunogenicity and safety studies of the formulated oral alginate-coated chitosan FT vaccine would be compared to the parenteral commercial FT vaccine.

ebeleonuigbo@gmail.com