ABSTRACT

In most Asian countries, Haemorrhagic septicaemia (HS) caused by Pasteurella multocida, is recognised as a disease of utmost economic importance. All countries where HS is enzootic, adopt vaccination as a preventive measure against the disease.

In India, the most widely used vaccine against HS today is the alum precipitated vaccine. Its main drawback is that it does not render adequately long immunity, necessitating frequent vaccination. For cross-bred animals, the HS oil adjuvant vaccine is employed. It is considered to be superior in affording immunity; however, the vaccine is cumbersome to administer when a large number of animals are to be injected at one time. Thus it has not gained much favour. Improvement of the existing HS vaccine therefore appears to be a problem that deserves further attention, especially in our country.

The main aim of the present study, was to separate the capsular antigen of the organism Pasteurella multocida P-52 strain, check its immunogenicity and explore the possibility of using it as a vaccine. The first attempt was to try out different media to obtain the maximum capsular growth. Heart infusion agar gave the best results. In order to obtain capsular protein of a superior quality and maximum quantity, the crude extract was prepared from the
bacterial suspension by three different methods, the Maheshwaran's method being the best. In order to determine the relation between the amount of protein in a dose and the protection afforded, active immunisation was carried out in mice. The minimum protective dose was found to be 10 μg of protein per ml. The next step was to produce a vaccine from the crude extract using alum and incomplete Freund's adjuvant.

Both the vaccines proved to be potent. Although this was a limited trial the results were encouraging. The duration of immunity of the experimental CE vaccines was tested by the passive mouse protection and the indirect haemagglutination tests. Both the vaccines proved to be as good as the traditional vaccines.

The next step was to determine whether a single protein fraction was responsible for rendering immunity. The crude extract was subjected to gel filtration on Sephadex G-200. Two peaks were obtained, which were tested for their immunising capacity. It was seen that the minimum protective dose was as low as 5 μg protein per ml and that only the 1st peak was immunogenic.
A vaccine was produced from the Peak I in the incomplete Freund's adjuvant. It was found to be potent.

The two peaks were biochemically analysed for their contents of phosphorus, nitrogen, uronic acid, hexose, heptose and reducing sugars. This analysis could be useful for further detailed studies of the two peaks along with amino acid sequencing which could be utilised for synthetic vaccine production.

The experimental vaccines rendered immunity within 5-7 days after vaccination. Therefore they could be safely used in the face of an outbreak. They also showed cross-protectivity. The cost of production of the experimental vaccines is much less than the traditional vaccines especially when they are produced on a larger scale. It was observed that the experimental vaccines were heat stable, thus reducing the cold storage cost. Therefore, when considered from all angles, it appears that the experimental vaccines are very promising. The only aspect that remains is carrying out extensive field trials with these vaccines to confirm the laboratory findings before they are employed commercially.