SUMMARY

A 256 KDa lectin (AdL) was purified from the hemolymph of the forceps snapping shrimp *A. digitalis* by ion-exchange chromatography, gel filtration chromatography and RP-HPLC. AdL is a pentamer with subunits of 82.4, 62.5, 50.92, 32.98, and 27.63 kDa. Hemagglutination profile and cross adsorption tests revealed a strong reactivity with rabbit erythrocytes. The agglutination activity at required Ca\(^{2+}\) and was insensitive to EDTA, stable in a pH range (7.5 – 8.0) and labile at or above 68\(^{\circ}\)C. Ammonium sulphate and trichloro acetic acid completely precipitated the hemagglutination activity suggesting it is a protein. Moreover, treatment with trypsin, potassium metaperiodate oxidation of hemolymph abolished the agglutinating activity. Hemagglutination inhibition assay performed with different carbohydrates and glycoproteins revealed unique specificity of the hemolymph agglutinin for N-acetylneuraminic acid and fetuin.

A galactose specific hemolytic lectin was purified from the muscle extract of a bivalve *V. cyprinoides* (VcL) using affinity chromatography with fetuin sepharose 4 fast flows. The lectin showed highest activity with rabbit erythrocytes (RRBC) and was confirmed by erythrocyte agarose plate assay and spectrophotometer assay. Trypsinated RRBC increased and papain treated decreased the activity. Thermal stability had decreased above 40\(^{\circ}\)C and the lytic activity was lost at 62\(^{\circ}\)C. The lectin showed optimum binding at hydrogen ion concentration between 7.0-8.0 and requires divalent cations for their activity. Kinetics of hemolysis indicated that 1.5% suspension showed maximum absorbance. The purified clot lytic lectin had a molecular mass of 91.56 kDa as confirmed by MALDI-ToF. On sodium dodecyl sulphate polyacrylamide gel electrophoresis in the presence of 2-mercaptoethanol it migrated as two distinct bands of 36.36 KDa and 26.52 kDa. The purified conjugate
of lectin and streptokinase enhanced performance in clot lysis process when tested for clot lysis assay and antimicrobial activity against \textit{B. subtilis} and \textit{V. harveyi}.

A insect lectin from the dragon fly nymph \textit{B. geminata} was purified by three steps, ammonium sulphate precipitation, fetuin linked CNBr-activated Sepharose 4 fast flow and the gel filtration chromatography using Sephacryl S-300 HR. The purified \textit{B. geminata} lectin (BgL) showed a single protein band with an apparent molecular mass of 89.84 and 56.31kDa when subjected to SDS-polyacrylamide gel electrophoresis under reducing conditions. The native molecular mass of BgL determined was approximately 146 kDa. The purified lectin agglutinated erythrocytes from rabbit and human A1 blood group with high titer than other erythrocytes used and the cross adsorption test evidenced that rabbit erythrocytes are highly specific to the lectin. The trypsinated and papain treated rabbit erythrocytes showed higher activity than none treated HA titer, whereas, neuraminidase treated erythrocytes reduced the hemagglutination titer. The BgL was specific to N-acetylneuraminic acid at of (MIC) of 25 mM and for fetuin at a MIC (0.625 mg/mL). The purified lectin was \textit{Ca}^{2+} ions dependent. Thermal stability of the lectin was up to 25-30° C and was lost at 74°C and in pH ranging from 7.5 to 8. \textit{FeCl}_2 and \textit{HgCl}_2 inhibited the hemagglutinating process, whereas \textit{CaCl}_2, \textit{MgCl}_2, \textit{ZnCl}_2, \textit{MnCl}_2, \textit{BaCl}_2, \textit{MnSO}_4, and \textit{MgSO}_4 did not. The stage specific agglutinin from \textit{B. geminata} larvae showed that the third stage larvae were found to be having high hemagglutination titer while the next stage (stage –IV) and adult astonishingly reduced the agglutination titer. Lectin exhibited antibacterial activity against pathogenic bacteria such as \textit{E.coli} and \textit{V. harveyi} and agglutinate bull and human sperms.