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New cell surface bound lectins with complex carbohydrate specificity from members of green algae

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Lectins, algal in particular, have immense potential for biomedical applications such as anti-HIV, antitumoral, antimicrobial, anti-inflammatory and antinociceptive activities. In this context, there is a growing interest among researchers on agglutinins from green algae. Here, we have made an attempt to catalogue lectins from various unexplored green algae species. Chlorophyceae members (*Chlorella vulgaris*, *Chlorococcum infusiformis*, *Desmodesmus dimorphus*, *D. subspicatus* and *Scenedesmus quadricauda*) were screened for lectin activity using human, pig, sheep, goat and rabbit erythrocytes. All of them showed surface bound lectin activity with highest agglutination titre towards human blood type B erythrocytes and rabbit erythrocytes. Neuraminidase and protease treatment to human blood type B erythrocytes considerably enhanced the agglutination titre of lectins from *S. quadricauda*, *C. vulgaris* and *D. subspicatus*. However, protease treatment of erythrocytes showed no effect on *C. infusiformis* lectin activity, and decreased the lectin activity of *D. dimorphus*. Lectins of members of chlorophyceae have shown unique glycoprotein binding specificities as their lectin activity was specifically inhibited by glycoproteins exhibiting complex O-glycans, such as bovine submaxillary mucin, porcine stomach mucin and fetuin. All the algal cultures expressed maximum lectin activity during stationary phase of growth except *S. quadricauda* which expressed maximum lectin activity during mid-log to stationary phase of cultivation. Possibly, it is a new report on cell surface bound lectins from unexplored members of chlorophyceae for lectin activity.

Keywords: Agglutination, Carbohydrate specificity, *Chlorella vulgaris*, *Chlorococcum infusiformis*, Chlorophyceae, *Desmodesmus dimorphus*, *Desmodesmus subspicatus*, Lectin, *Scenedesmus quadricauda*