

Screening of tubers of *Nelumbo nucifera* (water lilly) for lectin-like substances using hemagglutination assay

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SUMMARY

The tubers of water lily(*Nelumbo nucifera*)were collected from a tropical lake (Ossudu lake) and the methanol extract is screened for lectin-like substances using agglutination assay. The highest agglutination activity was found with human blood group B+ve with a maximum titre of 2^{11} among human group O and B+ve, goat and chick erythrocytes. To ascertain the molecular mass of the protein present in the extract, one-dimensional SDS-PAGE was performed using standard methods on the Bio-Rad Mini-Protean II system. The electrophoretic gel revealed that the crude extract of tuber of *Nelumbo nucifera* was found to possess a protein with a molecular mass of 19 kDa.

Key Words : *Nelumbo nucifera*, Hemagglutination, SDS-PAGE, Lectin

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Plant tubers are known to contain defense-related proteins such as chitinase and lectins which are of class of proteins, non-immune in origin and show a very specific interaction with carbohydrates. Different lectins bind with specific carbohydrate-containing compounds (e.g. polysaccharides, glycoproteins, and glycolipids), which can be free or bound in cell membranes (Frietas *et al.*, 1997). Another key characteristics of lectin is their ability to agglutinate erythrocytes, which provides an unambiguous indicator of their presence (Goldstein and Poretz, 1986). The first biological activity to be recognised for lectins was their capacity to agglutinate erythrocytes, some lectins being blood group and/or subgroup specific (Horejsi and Kocourek, 1974). Though seeds are the richest source of lectins, these are also often quite abundant in vegetative organs such as

roots, leaves, rhizomes and stems (Van Damme 1996). Lectins have been purified from tubers of *Trichosanthes kirilowii* (Yeung *et al.*, 1986a and b). From the rhizome of *Smilacis glabrae*, a new flavanone (smitilbin) was isolated and evaluated for hypoglycemic property (Chen *et al.*, 1999 and Fugunaka *et al.*, 1997). Two new lectins were purified from tubers of *Arisaema intermedium* Blume and *A. wallichiana* Hook (Kaur, 2005). Four major proteins designated DB1, DB2, DB3, and DB4 were isolated and characterized from the yam tuber *Dioscorea batatas*. (Gaidamashvili *et al.*, 2004) Lectins are also isolated from bulbs of liliaceae members including aloe (Koike *et al.*, 1995), *Helianthus tuberosus* tubers (Suseelan *et al.*, 2000), *Tulipa gesneriana* bulb (Oda *et al.*, 1987) and Oda and Minami, 1986), *Trichosanthes kirilowii* (Yeung *et al.*, 1986a and b) and tubers of *Eranthis hyemalis* (Oliver *et al.*, 2011). Presently an attempt has been made to screen tubers of *Nelumbo nucifera* for lectin like substances using hemagglutination assay.

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MATERIALS AND METHODS

Sample collection :

The tubers of water lilly (*Nelumbo nucifera*) were collected from a tropical lake (Ossudu lake) located at