ProductInformation

CONCANAVALIN A
Sigma Prod. No. C2010*

CAS NUMBER: 11028-71-0
SYNONYM: Con-A

PHYSICAL PROPERTIES:

Appearance: white to white with a yellow cast powder
Molecular Weight: 25,500[1] (see Description section for additional details)
Extinction Coefficient: $E^{1\%}$(280nm) = 11.4 (0.1 M NaCl)[2]
$E^{1\%}$(280nm) = 13.7 (0.05 M sodium phosphate pH 6.8 with 0.2 M NaCl)
$E^{1\%}$(280nm) = 12.4 (0.05 M sodium acetate pH 5.2 with 0.2 M NaCl)[3]
Isoelectric point: pI = 4.5, 4.7, 5.0-5.1, and 5.4-5.5 (several isoforms)[4]

DESCRIPTION:

Con-A is a lectin isolated from the jack bean. Con-A is not a glycoprotein.[5] The monomeric molecular weight of Con-A is 25,500.[1] At pH 5.5 Con-A exists as a dimer, and at pH>7 it exists as a tetramer.[6] Con-A does not contain cysteine residues.[2] Unlike most other lectins, Con-A is a metalloprotein and requires a transition metal ion, such as manganese, plus calcium ions for binding.[7]

STABILITY / STORAGE AS SUPPLIED:

Con-A has a shelf-life of three years when stored properly below 0°C. At Sigma, agglutination titer of a three-year-old lot was identical to the original assay value.

SOLUBILITY / SOLUTION STABILITY:

Sigma tests the solubility of C2010 at 10 mg/ml in water which produces a slightly hazy to hazy colorless to faint yellow solution. The solubility of Con-A improves with increasing concentrations of sodium chloride up to 1 molar.

SOLUBILITY / SOLUTION STABILITY: (continued)

Solution stability is also improved with increasing concentrations of sodium chloride. The following solution stability data was obtained using a 20 mM Tris HCl buffer with 1 mM $CaCl_2$ plus 0.5 mM $MnCl_2$ pH 7.0 with the stated concentrations of sodium chloride. Less than 5% loss of activity was observed after 10 days at room temperature in buffer containing 1 M NaCl. An 8% loss in activity was observed after 10 days at room temperature in buffer containing 0.2 M NaCl. A 15% loss in activity was observed after 10 days at room temperature in buffer containing 0.1 M NaCl. Zero percent loss in activity was observed after four to six weeks at 0-4°C in a 0.1 M Tris + 80 mM Glycine buffer pH 5.0 with 3 mM $CaCl_2$ and 3 mM $MnCl_2$.[8]

Solutions of Con A in 1 M NaCl can be frozen and thawed without appreciable loss of activity. KCl should NOT be substituted for NaCl.[10]

Con A has been reported to withstand heat treatment at 45°C for two hours at pH 3.0-3.2 and at 6-8°C for 16-18 hours.[9]

APPLICATIONS:

Con-A binds specifically to mannosyl and glucosyl residues of polysaccharides and glycoproteins.[11] Unmodified hydroxyl groups at the C3, C4 and C6 positions of D-glucopyranosyl or D-mannopyranosyl rings may be essential for binding.[12] Each subunit of Con-A contains one calcium ion and one manganese ion. Removal of these cations by dialysis under acidic conditions abolishes the carbohydrate-binding activity.[11]

Con-A has been used to elucidate structural changes in the membrane surface of transformed cells.[13,14,15,16]

Con-A has been found to have mitogenic activity.[18]

Con-A conjugates of antitumor drugs have been used in drug delivery systems in cultured cells.[19,20,21]

REFERENCES

1. Wang, J. L., et al., *J. Biol. Chem.*, 250, 1503 (1975).
2. Agrawal, B. and Goldstein, I.J., *Arch. Biochem. Biophys.*, 124, 218 (1968).
3. Yariv, j., et al., *Biochim. Biophys. Acta*, 165, 303 (1968).
4. Entlicher, J.V., et al., *Biochim. Biophys. Acta*, 236, 795 (1971).
5. Olson, M.O. and Liener, I.E., *Biochemistry*, 6, 105 (1967).
6. Senear, D.F. and Teller, D.C., *Biochemistry*, 20, 3076 (1981).
7. Sumner, J.B. and Howell, S.F., *J. Biol. Chem.*, 115, 583 (1936).
8. Sophianopoulos, A.J. and Sophianopoulos, J.A., *Prep. Biochem.*, 11, 413 (1981).
9. Sigma data
10. *The Lectins*, ed Liener, et al., p. 53 (1986).

REFERENCES: (continued)

11. Goldstein, I.J., et al., *Biochemistry*, 4, 876 (1965).
12. Yahara, I. and Edelman, G.M., *Proc. Nat. Acad. Sci. USA*, 69, 608 (1972).
13. Shoham, J., et al., *Nature*, 227, 1244 (1970).
14. Inbar, M. and Sachs, L., *Proc. Nat. Acad. Sci. USA*, 63, 1418 (1969).
15. Inbar, M., and Sachs, L., *Nature*, 223, 710 (1969).
16. Burger, M. and Noonan, K.D., *Nature*, 228, 512 (1970).
17. Lin, J., et al., *J. Nat. Cancer Inst.*, 66, 523 (1977).
18. Kitao, T. and Hattori, K., *Nature*, 265, 81 (1977).
19. Tsuruo, T., et al., *Int. J. Cancer*, 26, 81 (1977).

* In addition to C2010 Sigma also offers other grades of Con-A, including tissue culture-tested-sterile Con-A, FITC, TRITC, biotin, peroxidase, and ferritin labeled Con-A, plus a complete line of Con-A-based affinity resins. See the Lectin and Cell Culture sections of the Sigma catalog for complete listings.