B.Sc. PLANT BIOLOGY & PLANT BIOTECHNOLGY

Paper 2b PLANT HISTOCHEMISTRY

B.Sc. va (Candidates admitted from the academic year 2008-2009)

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Special Theory

UNIT I

Histochemistry-Definition, staining methods, staining theory. Scope of histochemistry and Cytochemistry in Biology.

Key words: Buffer solution, pH, Gus staining, Qualitative histochemistry, Quantitative histochemistry.

UNIT II

Specimen preparation: Free-hand section, Clearing and whole mounts, squashes, smears and maceration. Serial sections. Principle and types of Microtome.

Key words: Wax-embedded sections, Ultra-thin sections, Rotary microtome, Ultramicrotome, FAA (Formalin Acetic Acid Alcohol), Formaldehyde & Glutaraldehyde fixative (Double fixative), Osmium tetraoxide.

UNIT III

Microscopy: Principles and applications of Bright-field microscopy; polarized light microscopy and fluorescence microscopy.

Key words: Resolving power, Ocular lens, Objective lens, Magnification, Polarizer, Analyser,

UNIT IV

Classification and chemistry of Biological stains. Difference between stain and reagent. Bright-field dyes and flurochromes

Key words: General stain, Specific stain, Monochromatic stain and Metachromatic stain. Acidic stain, Basic stain, Neutral stain, Vital stain, Negative stain.

UNIT V

Detection and localization of structural and storage components in plants using specific dyes and fluorochomes– Starch, protein, lipid, nucleic acids, cellulose, lignin, potassium, magnesium, calcium, iron, alkaloids, terpenoids, phenolics (tannin), glycosoides.

UNIT VI

General design and application of enzyme histochemistry. Immuno histochemistry- Direct and indirect method. Principle and use of immuno histochemistry.

Key words: Fluorophore, Antigen, Antibody, Lectin, Enzyme – Substrate complex.

Suggested Reading

CLARK, G. 1981. Staining procedures. Williams and Wilkins, Baltimore.

CONN, H. J. 1977. Biological stains. R. D. Lillie (ed.). The Williams and Wilkins Co. Reprinted by Sigma Chemical Company. 1991. St. Louis.

ESAU, K. 1972. Plant Anatomy. John Wiley and Sons, New York..

GAHAN, P.B. 1984. Plant Histochemistry and Cytochemistry, Academic Press, London.

GARY, P. 1964. Hand Book of basic microtechnique, John Wiley & Sons, New York.
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JAIN, S. P. 1998. Anatomy of seed plants. Rastogi Publications, Meerut, India.

JENSEN, W. A. 1962. Botanical Histochemistry. Principles and practices. W. H. Freeman and Company, San Francisco.

JOHANSON, W.A. 1982. Botanical Histochemistry-Principles and Practice. Freeman & Co, U.S.A.

JOHANSON, W.A. 1984. Plant Microtechnique. Mc Graw Hill.

KIERMAN, J.A. 1999. Histological and Histochemical Methods. Butterworth Publications, London.

KRISHNAMURTHY, K. V. 1988. Methods in Plant Histochemistry. S. Viswanathan Printers and Publishers private limited, Madras.

O' BRIEN, T. P., AND M. E. MC CULLY. 1969. Plant structure and development. A Pictorial and physiological approach. The Mac millan Company, London.