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AN EASY METHOD FOR THE DIMENSIONAL STUDIES OF PLANT CELLS BY MACERATION WITH NITRIC ACID

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A simple and easy method for the maceration of plant tissues is described. Use of different grades of nitric acid is employed and the material is heated in nitric acid for the dissociation of the middle lamellae. The results obtained were quite satisfactory.

Keywords : Maceration; Nitric acid; Plant cell.

Introduction

Microtome sections in various planes of different plantparts are inadequate to convey the real nature of the cells. Only the isolated cells can give a three dimensional picture of the cells. Different methods for the dissociation of cells were reported by some earlier workers, which includes the retting of the tissues[1], use of picric acid[2], maceration with chlorine water and sodium sulfite[3] and Jeffrey's method[4].All these methods are not rapid and takes some hours to days for the dissociation of the cells.

In the present method, studies were undertaken to test the action of different grades of nitric acid on the young stem, wood, root and fruit of a number of angiospermous plants, including the following species : Accacia nilotica, *Adhatoda vasica, Azadirachta indica, Cassia fistula, Dalbergia sissoo, Emblica officinalis, Hibiscus rosa-sinensis, Holoptelea integrifolia, Mangifera indica* and *Polyalthia longifolia.* This method has been used successfully and gave satisfactory results.

Materials and Methods

Small pieces (0.5 cm cubes) of wood, root, young stem, fruit parts of fresh, dry or preserved materials were put in test tubes containing nitric acid. (For the hard tissues like wood, root etc. use 50-60% HNO_3 and for soft tissues use 25-30% HNO_3). The acid should be almost fifteen times more than that of the material. Heat the test tube under any low flame, till the material becomes creamish-white or till the cells start separating. Transfer the macerated tissue mass into a petridish, wash with water an neutralise with 1% solution of sodium hydroxide. Wash again the tissue with distilled water.

The tissue mass can be stained as desired. For woody tissues Safranine stain is recommended. For parenchymatous cells Heidenhain's Iron haematoxylene can be used.After proper staining semi-permanent preparations can be made as follows : Put a part of the macerated tissue on a clean slide and add a drop of glycerine gelly or glycerine on the material; tap the material gently with the round end of a glass rod. The

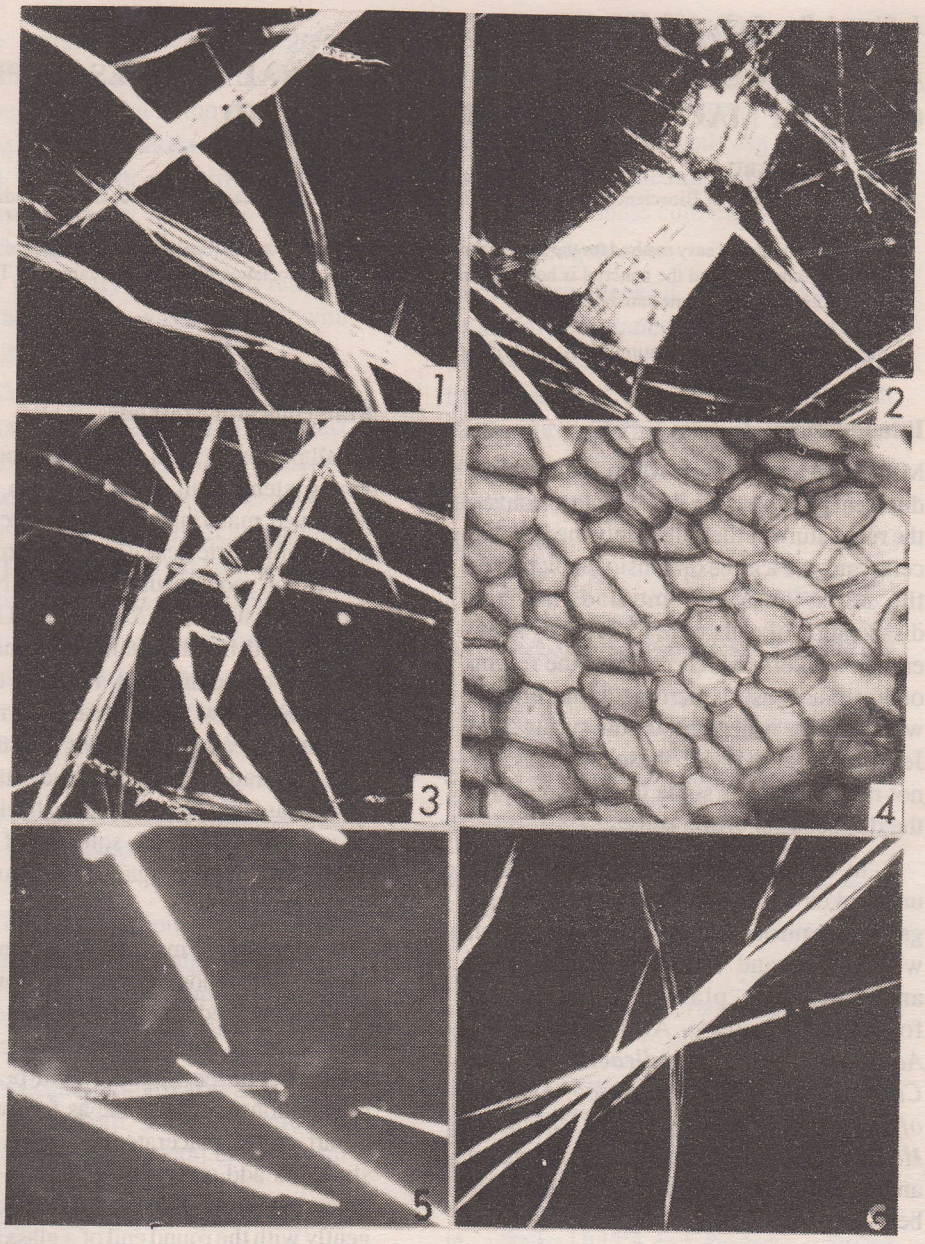

Fig. 1 Wood fibres of *Mangifera indica*,100 x.; 2. Vessel Elements of *Cassia fistula* leaf petiole, 160 x.; 3. Petiole fibres of *Cassia fistula*, 80 x., 4. Bark cells of *Polyalthia longifolia*, 782 x ; 5. Fruit fibres of *Adhatoda vasica*, 118 x; 6. Wood fibres of *Polyalthia longifolia*, 100x.

cells get separated. Put a cover glass over the slide. For making permanent slides, pass the macerated tissue mass through a graded series of alcohol, stain in any alcoholic stain, clear in xylene, and mount in DPX after taping the tissue.

Results and Discussion

The nitric acid which acts as the maceration fluid, penetrates through the intercellular spaces of the tissues and dissolves or weakens the middle lamella of the cells. The low concentrations of the acid does not damage the other cell parts. While taping, the weakened or dissolved middle lamella allows the cells to seperate each other. During heating the colour of the material changes because of the bleaching effect of nitric acid. The figures 1-6 show some results obtained by this method.

The present method can be used to demonstrate for the dimensional studies of cells, as a class-room exercise, since it takes only a few minutes.

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