Some histochemical observations on leaf abscission zone in *Capsicum annuum* L.

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Abstract. The present observations were conducted on NP 46-A and Pusa jwala varieties of *Capsicum annuum* L. Investigations on changes in cell wall components of the cells of leaf abscission zone associated with the process of abscission were based on specific qualitative histochemical staining procedures. It was observed that the loss of pectic and cellulosic substances preceded the separation phase of abscission from middle lamella and cell walls of the cells of separation layer of abscission zone. The abscission zone was characterized by thin cutin deposition on epidermal cells and poor lignification in vascular elements of this region. Separation of senescent part of petiole was followed by deposition of suberin in cells of some outer layers of abscission zone and by the deposition of lignin in cells of the remaining layers of abscission zone to form a protection layer on exposed part of petiole stump. Development of tyloses, tannins and calcium oxalate crystals was not found associated with abscission in the present plant material.

Keywords. Leaf abscission zone; histochemistry; *Capsicum annuum* L.

1. Introduction

Since Facey (1950) first studied the changes in cell wall constituents of leaf abscission zone many papers have appeared on the subject (Webster 1973). Among these is a report on some anatomical changes associated with leaf abscission in *Capsicum annuum* L. by Gawadi and Avery (1950). The present studies were, therefore, conducted to evaluate histochemical changes associated with leaf abscission in *Capsicum*.

2. Material and methods

All the investigations reported in this paper were conducted on NP 46-A and Pusa jwala varieties of *Capsicum annuum* L. Plants were grown in pots in the...
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Botanical Garden of Meerut University. Samples were collected from abscission zone of leaf 5 and fixed in FAA, dehydrated and embedded using standard techniques (Jensen 1962).

Longitudinal sections were cut at 20 \( \mu \) on a rotary microtome and fixed on glass slides by Haupt's adhesive (Jensen 1962). Slides with sections of each stage of leaf abscission zone development were processed for specific qualitative histochemical staining procedures to find out the localization of cell wall constituents in the abscission zone. As both the varieties of \textit{Capsicum annuum} L. had identical histochemical changes in the process of leaf abscission, the microphotographs obtained from the material of Pusa jwala only have been included in this paper.

2.1 Localization of pectic substances

For this study 'Ruthenium red' method (Webster 1970), the hydroxylamine-ferric chloride method (Reeve 1959) as modified by Webster (1973) and the benzidine-\( \beta \)-naphthol method (Pearse 1968) were tried.

2.2 Localization of cellulosic substances

Zinc chloro-iodide method (Rawlin and Takahashi 1952) and iodine-potassium iodide-sulphuric acid method (Johansen 1940) were employed for this purpose.

2.3 Localization of lignin

The phloroglucinol-hydrochloride method (Webster and Leopold 1972) and calcium hypochlorite-sodium sulphite method (Jensen 1962) were used.

2.4 Localization of tannins

Johansen's (1940) method of using aqueous solution of ferric chloride and sodium carbonate was employed to study the development of tannins before or after the separation stage of abscission.

2.5 Localization of cutin and suberin

Alcoholic Sudan IV method (Johansen 1940) was used for both these substances. All the procedures were repeated for all the stages of abscission at least four times at normal laboratory conditions during March-April 1979.

3. Observations

Based on qualitative histochemical changes in walls of cells of abscission zone inferences about quantitative changes were made, based on comparative intensity of colour reactions.

3.1 Pectic substances

Out of three methods ruthenium red proved most effective and satisfactory. The colour developed with hydroxylamine-ferric chloride was not as intense as that with ruthenium red. Benzidine-\( \beta \)-naphthol did not give a positive reaction.