

## HISTOCHEMICAL PROFILE OF MITE INDUCED LEAF GALLS OF *CORDIA DICHOTOMA* (L.)

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Present study deals with the histochemical studies on leaf galls of *Cordia dichotoma* Linn. induced by *Eriophyes cordiae* Nalepa. During cecidogenesis, a relative high distribution of various metabolites and activities of enzyme acid phosphatase in the infected tissue changes the metabolism of the host tissue to a certain extent.

**Keywords :** *Cordia dichotoma*; *Eriophyes cordiae*; Histochemical; Metabolites.

Galls on leaves of *Cordia dichotoma* Linn. induced by *Eriophyes cordiae* have been reported from India<sup>1,2</sup>. They are common throughout Rajasthan, specially during spring. Galls are found on the adaxial surface of the leaf. The gall contains a spacious activity and a large ostiole which opens on the underside of the leaf. The cells of inner epidermis are modified into a dense forest of multinucleate hairs in which mites in their various stages of development are lodged<sup>3</sup>. Presently, histochemical aspect on leaf galls of *Cordia dichotoma* Linn. was studied to understand the cellular and sub-cellular changes which lead to the development of abnormal growth.

Normal and gall leaf tissues from the leaf of *Cordia dichotoma* Linn. were collected from Jaipur and adjoining areas. The following metabolites and enzymes were localized histochemically. Proteins (Amido Black stain), Lipids (Sudan III dye<sup>4</sup>), Starch (IKI, reaction<sup>5</sup>), Tannin (Lugol's iodine<sup>6</sup>), Phenols<sup>7</sup>, Lignin (Phloroglucinol test<sup>5</sup>), Acid phosphatase<sup>8</sup>. Their qualitative increase/decrease was assessed in terms of intensity of staining and the degree of distribution of the stain in the tissues.

Histochemical localization on various metabolites and activity of enzyme in normal and gall tissues is shown in Table 1. Gall tissues showed a higher concentration of protein in comparison to normal tissues. Large amount of protein was found near the cells of

the nutritive zone and vascular bundles in mature gall and starch was recorded in both normal and galled leaf. In normal leaf, vascular bundles specially phloem tissue was full of starch. In galls, the nutritive tissue and multi-nucleate hairs were thickly packed with starch granules. The normal leaf of *Cordia* exhibited a very little amount of lipid but in gall tissue lipid globules accumulated in the vascular region and nutritive tissues. Tannin filled cells were present in abundance in nutritive and vascular tissue in leaf galls whereas normal leaf tissue showed less amount of tannin. Phenols in gall tissue were present in high concentration in nutritive tissue and vascular region, as compared to normal tissue. Lignin was present in high concentration in nutritive tissue and mesophyll region in leaf gall tissue than in normal leaf tissue. Normal leaf showed localization of acid phosphate activity in small amount. In gall tissues it appears in scattered groups specially in and around the vascular bundles.

Leaf galls of *Cordia dichotoma* initiated as a result of the attack of the mite on the adaxial surface of a young leaf. Presence of high amount of protein in the gall tissues, maximum being in the nutritive zone, helps the mite in its growth and development. The incidence of protein in nutritive tissue of acarine galls has been reported<sup>9</sup>. Starch occurrence in the galled leaf parenchyma was

**Table 1.** Histochemical locations of metabolite in normal and leaf gall tissue of *Cordia dichotoma* (L.)

S.No.	Metabolite	Normal/Gall	Region Localized	Intensity
1.	Protein	Normal Gall	Epidermis Mesophyll Epidermis Nutritive tissue Vascular region	+ +++ + ++++ +++
2.	Starch	Normal Gall	Phloem Nutritive tissue Multi nucleate hairs	++ ++++ +++
3.	Tannin	Normal Gall	Mesophyll Vascular region Nutritive tissue	++ ++++ ++++
5.	Phenol	Normal Gall	Vascular region Nutritive tissue Vascular region	++ +++ ++
6.	Lignin	Normal Gall	Mesophyll Vascular region Palisade Nutritive tissue	++ +++ +++ ++++
7.	Acid Phosphatase	Normal Gall	Palisade Nutritive tissue Vascular region	+++ ++++ +++

+ Very low intensity, ++ Low intensity, +++ High intensity, ++++ Very high intensity.

significant. There are possibilities of diffusion of soluble saccharides produced by starch hydrolysis towards the nutritive tissues which could be utilized by the cecidozoan<sup>9-12</sup>. Abundance of lipids in the nutritive tissues could be correlated to the continuous wounding as a result of feeding activity<sup>13</sup> of cecidozoan altering the metabolic pathway to synthesis more lipids near the feeding zone which in turn is utilized by the mites to maintain their life activities for a considerable period. Plant phenols has been reported to be utilized by acridids from the nutritive tissue<sup>14</sup>. This may be a adaptive strategy of cecidozoan.

Significantly high activity of acid phosphatase in gall tissue, maximum being in nutritive zone, suggest high metabolic activity in cells of nutritive zone<sup>15-17</sup>. Hence mobilization and accumulation of metabolites in the gall tissues occur, which are then utilized by the gall maker.

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