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Leaf Anatomy of Patchouli (Pogostemon patchouli) with Reference to the Disposition of Mesophyll Glands

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Abstract:
Two groups of secretory glands, epidermal and mesophyll types, were examined in the young leaves of patchouli plants with light and electron microscopes. The structural characteristics of the component cells and features of the neighboring cells were clarified at the cyto-histological aspect. Glandular trichomes originate from both the adaxial and abaxial epidermis. Considerable attention is focused on internal, mesophyll glands arising in the palisade tissue. The secretory cell of the mesophyll glands is covered by a cuticular layer, and secretory materials are collected in a subcuticular space made between the cuticle and wall materials. In the vicinity of the glands, a vascular system occurs in spongy parenchyma. It includes vessel elements, sieve elements, large-sized cells of vascular bundle Sheath and morphologically specialized idioblasts; among them, relatively small sized-cells are present. The idioblasts have highly branched plasmodesmata in the wall and numerous mitochondria in the cytoplasm, but are lacking in a large, central vacuole. The branched plasmodesmata occur in groups. They intrude into the walls of sieve elements running in the interior of the vascular bundles and also into the walls of enlarged cells forming the bundle sheath. From a spatial viewpoint, it is likely that the vascular system has a relation to the transfer of nutrients into the mesophyll glands from the surrounding cells with photosynthetic activities. On the basis of these observations, the peculiar morphology of the mesophyll glands is discussed in terrns of their location and function in patchouli leaf blades.

Keywords:
Aromatic substances, Electron microscopy, Gland, Idioblast, Patchouli, Plasmodesm, Pogostemon, Vascular bundle

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