

WHAT ARE PLANTS COATED WITH? ABOUT THE CUTICLE AND THE EPICUTICULAR WAX LAYER

Summary

The epidermis constitutes the leaf surface. The most characteristic trait of epidermal cells is the fact that they have the cuticle on the outer periclinal wall. The cuticle coats nearly continuously all mature parts of the leaf, and the only breaks or gaps are stomata – the pores between guard cells. The cuticular layer, outside the cell wall, consists of lipid substances (such as waxes, cutin and cutan) and polysaccharides (cellulose and pectins). The cuticular layer is coated with the cuticle proper which lacks polysaccharides and contains more waxes than the underlying layers. On top, there is the epicuticular wax layer, without cutin or cutan. The cuticle proper is covered by a smooth amorphous wax film. Outside the wax film we can find waxes in more ordered form. They form a layer with considerable ultrastructural and chemical diversity. Epicuticular waxes are composed of a mixture of chemical compounds: hydrocarbons, primary alcohols, aldehydes,

fatty acids, esters, β -diketons, terpenoids and phenolics. There is a correlation between their ultrastructure and chemistry.

Plant surfaces are generally not smooth but exhibit considerably different microstructures. Wax structures may be developed as continuous layers, crusts or crystalloids. The crystalloids are of a characteristic shape and size and may appear in particular arrangements or combinations. Many of them are of systemic significance.

The plant cuticle and waxes have many important functions. They reduce the loss of water, reflect or attenuate radiation, form the basis of phyllosphere, protect plant tissues against penetration by fungi, bacteria and insects, as well as from mechanical damage (by wind, rain, soil particles etc.), reduce water retention on the plant surface, and provide a self-cleaning surface.