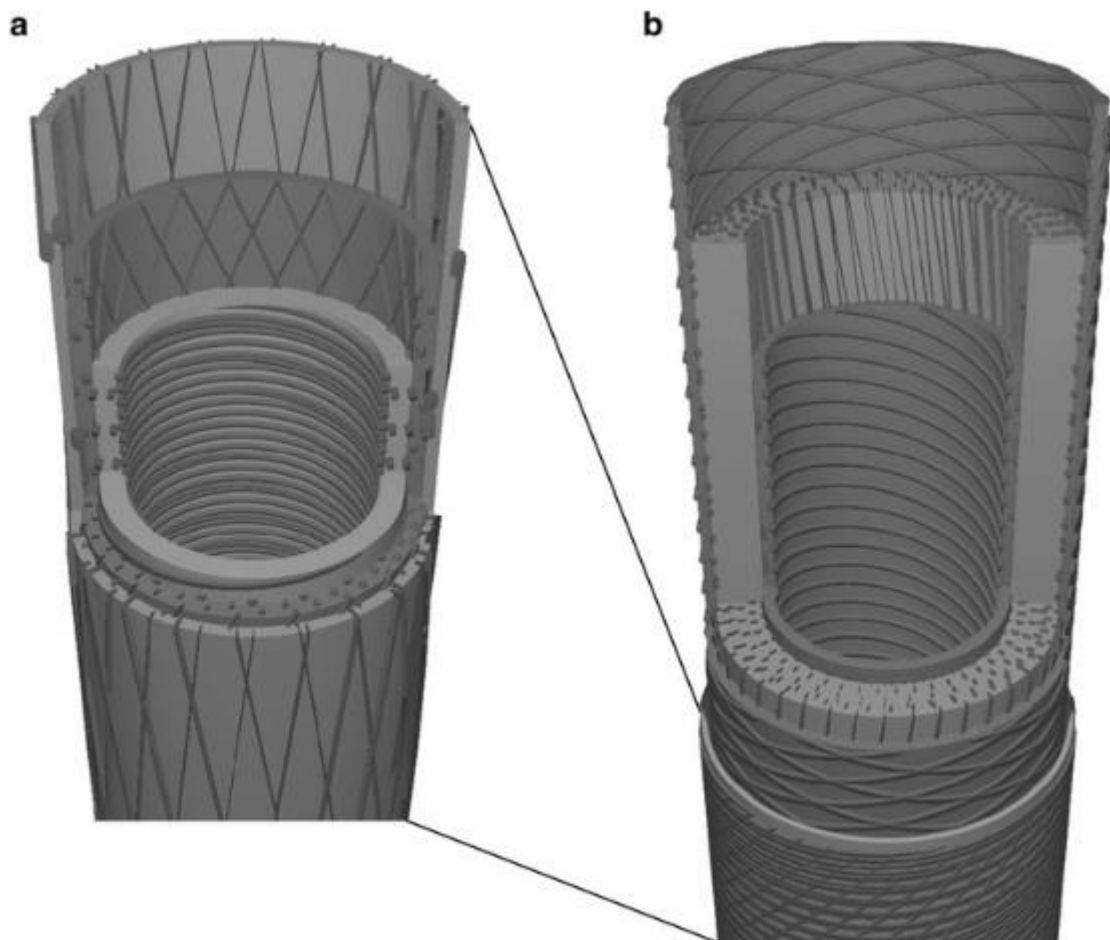


# Micromechanics of Cell Walls

## **Abstract**

In this chapter, we discuss the mechanical properties of primary and secondary cell walls with regard to cell wall structure and composition. The first sections of the chapter are devoted to defining the mechanical terms used and to giving a general introduction into the mechanical behaviour of composites. The specific structure–property relationships of primary and secondary cell walls are then discussed with a focus on unravelling the mechanical role of individual cell wall components. In these terms, the mechanical characterization of genetically modified plants is highlighted as it allows for the targeted alteration of both cell wall polymers as well as their cross-linking capacities, in turn resulting in a distinct influence on entire cell wall properties.



**Fig. 5** View of the cell wall assembly as a composite structure (a) primary cell wall during growth with cellulose fibrils tilted toward the cell axis in the outer cell wall layers (b) secondary cell wall using the example of the wood cell structure