

Effect of Calcium on the Structure of Cell Wall  
Polysaccharides during Growth of the  
Suspension-Cultured Cells of Kidney Bean  
(*Phaseolus vulgaris*)

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The suspension cells of kidney bean were cultured in MS medium supplemented with five concentrations [0, 22, 44 (control), 88, 176 mg/L] of calcium chloride and harvested at logistic (15 d) and early stationary (30 d) phases. The concentrations higher than 22 mg/L showed better proliferation than that of 0 mg/L. During the phase, the proliferation rate increased to the concentration. The sugars were fractionated into the symplastic (EtOH and starch) and apoplastic (low-molecular HW, high-molecular pectin, hemicellulose and cellulose) sugars. The high 176 mg/L exhibited the highest sugar amount of the EtOH and starch fraction at the logistic phase, whereas the concentrations lower than 22 mg/L exhibited the highest sugar amount at the early stationary phases. The concentrations higher than 22 mg/L exhibited higher pectin and hemicellulose amounts than that of 0 mg/L at logistic phase. But the concentrations higher than 44 mg/L exhibited higher pectin and hemicellulose amount than other concentrations at the early stationary phase. The cellulose amount was more at 0 mg/L than at the concentrations higher than 22 mg/L. The cellulose contents ranged from 17.4 to 25.5% in the primary cell walls. These results indicate that calcium modulates the symplastic and apoplastic sugar metabolism, suggesting that the cell-wall structure may define the mode of polysaccharide biosynthesis during growth.

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