

Table 3. Chemical composition of cell walls in poplar xylem.

| Stage of xylem development | Component (% dry weight)  | Composition  | Reference   |
|----------------------------|---|--|---|
| Primary-walled stage       | Pectins (47%)   | galacturonic acid, galactose, arabinose and rhamnose in a molar ratio 5:2:2:1<br><u>Main chain</u> : rhamnogalacturonan [(1→4)-D-galacturonosyl-(1→2)α-L-rhamnosyl-].<br><u>Side-chains</u> branching from rhamnose units at carbon 4 contain: (1→4)β-D-galactan and (1→5)-L-arabinan, with occasional terminal arabinose, or a fucose | Simson and Timell, 1978a,c  |
|                            | Cellulose (22%)   | (1→4)β-D-glucan, degree of polymerization 4200   | Simson and Timell, 1978a,d  |
|                            | Xylan (11%)   | (1→4)β-D-xylan   | Simson and Timell, 1978a  |
|                            | Xyloglucan (6%)   | 3 species giving an average molecular mass of 62 kDa<br><u>Main chain</u> : (1→4)β-D-glucan<br><u>Side-chains (70% of the glucose residues are substituted)</u> : xylose residues, some of which are further linked to a terminal galactose, galactose–galactose or galactose–fucose   | Simson and Timell, 1978a,b  |
|                            | Glucomannan (1%)  | (1→4)β-D-glucan, (1→4)-β-D mannan oligomeric units   | Simson and Timell, 1978a  |
|                            | Proteins (10%)  | Various structural proteins and cell wall bound enzymes  | Simson and Timell, 1978a  |
|                            | Mature wood (secondary wall plus the middle lamella and the primary wall) | Cellulose (43–48%)   | (1→4)β-D-glucan, degree of polymerization 9300  |
| Xylan (18%–28%)            |   | <u>Main chain</u> : (1→4)β-D-xylan<br><u>Side-chains</u> : (1→2)β-4-O-methyl-α-D-glucuronic acid, acetyl and arabinosyl residues   | Jones <i>et al.</i> , 1961, Bolwell, 1993; Panshin and de Zeeuw, 1980; McDougall <i>et al.</i> , 1993 |
| Glucomannan (5%)           |   | (1→4)β-D-glucan, (1→4)β-D-mannan oligomer units in a molar ratio 1:2   | Sultze, 1957; Northcote, 1972; Panshin and de Zeeuw, 1980   |
| Pectin and xyloglucan (3%) |   | As in primary-walled stage   | Panshin and de Zeeuw, 1980  |
| Lignin (19–21%)            |   | H, G and S units   | Panshin and de Zeeuw, 1980; McDougall <i>et al.</i> , 1993  |