**Density of cell wall material**

Density of *swollen* cell wall has been shown to be around 1 g cm-3 (as oppose to *dry* cell wall material with 1.5 g cm-3) and relatively consistent across species ([1], and literature cited therein). However, in our dataset, the calculated swollen cell wall density varied from 1.09 to 2.66 g cm-3 (stack bar graph in Fig. 1). There are several reasons for this discrepancy as discussed below.

Swollen cell wall material density can be calculated as overall wood density divided by total cell wall fraction [1]. And the overall wood density is measured as the ratio of dry wood mass to green or soaked volume (as it is done in many ecological studies, [e.g. 2,3–5]) and cell wall fraction is calculated on swollen material (e.g. soaked material). Here, we did not use total cell wall fraction but fibre wall fraction plus vessel wall fraction (called here ‘wallF+V fraction’), as they were the only wall fractions we had measures for (the remaining ones being parenchyma and conduits15μm walls). So that cell wall material density was calculated as follows: overall wood density / wallF+V fraction (Fig. 1, data in Supporting Information).

A first reason for the discrepancy might be that we did not use the total wall fraction. If we had, the calculated values of cell wall material would have been lower, and hence more in concordance with previous studies ([1], and literature cited therein). A second reason might be that our overall density measurements were overestimated for species, which contained substances such as for example starch or mucilage (starch density is approximately 1.5 g cm-3, [6,7]. If those substances had not contributed to the overall density, this density would have been lower, and the estimated density of cell wall material would similarly have been lower. A third reason is related to the method of cell wall fraction measurements. [1] have shown a discrepancy in wall and lumen fraction estimations from blocks of wood *vs*. from cross-sections. This is because a cut block of wood and a cross-section undergo different levels of deformation (swelling or shrinkage of walls and lumens) during the preparation process. We did not estimate fractions from a twig but only from a cross-section and have no reference point to estimate the error. Nevertheless, for example, in [1] the wall proportion estimated from a wet section varied from 4.4% lower to 9.7% higher relative to the fraction estimated from a surface of a wet block (across five angiosperms and two gymnosperms). Moreover, the authors have indicated that the error was bigger for lower density species. All those reasons were likely to have contributed to the relatively wide variation in the estimated density of swollen cell wall material in this study.

It is also worth noting, that density of cell wall material has frequently been cited to be c. 1.5 g cm-3 [8–11]. This value is correct for *dry* cell wall density, but not for *swollen* cell wall density (1 g cm-3, discussed above). In certain studies, it may be crucial to use the appropriate cell wall material density.

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**Figure 1. Bar graph representing estimated density of swollen cell wall material across 69 studied species.** Each bar corresponds to one species and the bars are ordered from the lowest (left side) to the highest density (right side). Values calculated for three replicates per species (with five exceptions mentioned in ‘Materials and methods’ section. Whiskers indicate standard deviation. Red line corresponds to the density of 1 g cm-3, which is approximately the density of swollen cell wall material measured by Kellogg and Wangaard (1969). \* species from the tropical woodland, \*\* species from the temperate forest.

