

Mortar and Pestle:

- Just give the cells a good old grinding. This does not have to be in suspension and is often done with plant samples frozen in liquid nitrogen. When the material has been disrupted, metabolites can be extracted by adding solvents.

Chemicals:

- ❧ Organic solvents like alcohols, ether or chloroform can disrupt the cell wall **by permeabilizing cell** walls and membranes. They are especially handy if you want to extract hydrophobic molecules (like plant pigments) because they will be collected in the solvent. Often used on plants in combination with shearing forces.