

Staining techniques with Toluidine Blue, a general stain

Toluidine blue is used to differentially stain primary and secondary cell walls.

Primary cell walls stain pinkish-purple and secondary cell walls stain blue or blue-green. If you are staining a section with vascular tissue, toluidine blue can help distinguish between phloem and xylem cells since cells found in phloem have primary cell walls only while cells found in xylem have both primary and secondary cell walls.

Instructions for preparing a wet mount using toluidine blue:

1. Place plant tissue section in a drop of water on slide.
2. Add 1-2 drops toluidine blue and let sit for about 30 seconds to 1 minute.
3. Use a tissue to absorb the toluidine blue by soaking up from edge of liquid.
4. Rinse the sample by adding 1-2 drops of water and then soaking up the liquid again.
5. Add 1-2 drops water and then apply cover slip.

Staining with a general stain like toluidine blue makes it much easier to observe different plant organelles such as:

1. cell walls – primary and secondary
2. nuclei
3. plastids (membrane bound organelles including chloroplasts, chromoplasts, leucoplasts)
4. vacuoles

Additional materials for wet mounts staining with toluidine blue:

Onion (*Allium*) section - peel thin section 1-2 cells thick (look for organelles)

Tradescantia stamen hair (cytosis/cytoplasmic streaming and anthocyanin pigments)

Tomato (*Lycopersicon*) or Carrot (*Daucus*) pulp (chromoplasts)

Epidermal peel of leaf with trichomes (hairs) (*Ficus rubiginosa*)

Celery (collenchyma, a primary cell wall type stains purple and the xylem, or secondary cell wall should stain bright blue)