

Table 1. Staining methods to localise microorganisms in soil in epi-fluorescence or confocal microscopy.

Target	Stains		References
Nucleic acids	Acridine orange, SYBR Green I, DAPI, Europium chelate		Postma and Altemüller (1990); Juyal et al. (2019); Schlüter et al. (2019)
Proteins	FITC	Epi-fluorescence	Chen et al. (2007)
Polysaccharides	Phenol aniline blue, Phenolic tryptophan blue, DTAF, Calcofluor White		Morgan et al. (1991); Nunan et al. (2001); Chen et al. (2007)

Table 2. Imagery methods to characterise the activity of microorganisms in soil.

Activity	Sought informations	Methods	Acquisition methods	References
Physiological state	Dead microorganisms with altered membranes	Staining with Propidium iodide (PI)	Epi-fluorescence or confocal microscopy	Maraha et al. (2004)
	Active microorganisms	Staining with INT, CTC, FDA, BONCAT labeling		Maraha et al. (2004); Busse et al. (2009); Hatzenpichler et al. (2014)
	Dormant microorganisms	Staining Total – (Active + Dead microorganisms)		Maraha et al. (2004)
Assimilation	Metabolically active microorganisms	Autoradiography	Light and electron microscopy	Lee et al. (1999); Ouverney and Fuhrman (1999); Holz et al. (2019); Becker and Holz (2021)
		TOF (Time of flight)-SIMS, NanoSIMS	Scan with mass spectrometer	Cliff et al. (2002); Herrmann et al. (2007a); Vidal et al. (2018)
Enzymatic activities	Metabolically active microorganisms	Zymography	Gel applied on the soil sample surface	Spohn and Kuzyakov (2013); Spohn et al. (2013); Razavi et al. (2016); Sanaullah et al. (2016); Liu et al. (2017); Heitkötter and Marschner (2018)