Uptake the sulfate abc transporter complex encoded by

Uptake of Se (VI) in E. Coliis via the sulfate ABC transporter complex encoded by the cysAWTPoperon (Sirko et al.

, 1990; Turner etal., 1998). The complex is composed of two CysA ATP-binding proteins, twotransmembrane proteins, CysT and CysW, and a periplasmic sulfate bindingprotein, CysP. Selenite, is transported by the sulfate permease in E.

coli, althoughas substantial uptakeremains after repression of that ABC transporter, indicating at least one moreuptake system for selenite (Turner et al., 1998). In S.

cerevisiae sulfatetransport mutants in Sul1p and Sul2p were selected by resistance to selenate, indicating that selenate is accumulated by this fungal sulfate permease (Cherest et al., 1997). After uptake, selenium oxyanions, in microbesmay undergo reduction assimilatory reduction, dissimilatory reduction or cytoplasmicreduction (glutathione-mediated reduction) which is associated withdetoxification of these oxyanions. To detoxify selenium from thesoil, 3 pathways for Se detoxification is involve i. e. assimilatory reduction, dissimilatory reduction and glutathione mediated reduction. Assimilatoryreduction is the uptake and reduction of Se oxyanions by both aerobes and anaerobesfor the synthesis of Se containing amino acids namely, selenocysteine(SeCys) and selenomethionine (SeMet).

Selenate is transported into thecell of many microorganisms by SeO4-2 permeases, whileSeO3-2 is transported by distinct permeases (Brown andShrift, 1980; Hudman and Glenn, 1984; Bryant and Laishley, 1988). Well studiedexample of assimilatory Se reduction is Escherichia coli which reduce

of SeO4-2andSeO3-2 into selenoaminoacid which further form theselenoprotein (Turner et al., 1998). Inselenoproteins, selenium has structural and enzymatic roles, being an effectiveantioxidant (Rayman 2000; Lucian 2017).

But it appears that assimilatoryreduction would be of little use for bioremediationas microbes will only assimilate enough Se to make all necessary proteins.