Table 1 Suppl. Effects of fluoride on different plant species (AsA - ascorbic acid, Car - carotenoids, CAT - catalase, Chl - chlorophyll, EL - electrolyte leakage, POX - peroxidase, Pro -proline, RWC - relative water content, SOD - superoxide dismutase).

Family/type	Plant species	Growth parameters	Pigments	Photosynthesis	Biochemical and other indices	Osmolytes/antioxidants	References
Poaceae	*Oryza sativa*	reduced germination and growth, low vigour index	degradation of Chl *a*, Chl *b*, and Car	reduced photosynthetic efficiency	low RWC; decreased protein content; increased lipid peroxidation and root EL	increase in soluble sugars, Pro, phenols and CAT activity	Gupta *et al.* (2009); Chakrabarti and Patra (2015); Mondal (2017)
	Triticum aestivum	reduced shoot and root lengths	Chl damages	affected photosynthetic efficiency	low RWC	increase in soluble sugars, AsA, and Pro	Bhargava and Bhardwaj (2010); Mondal and Gupta (2015)
	Triticosecale	low sensitivity to fluoride	not studied	not studied	low total N content in roots	not studied	Szostek and Ciecko (2017)
	Zea mays	shoot biomass increased; root biomass decreased	not studied	not studied	low content protein N	not studied	Szostek and Ciecko (2017)
Fabaceae	*Vigna radiata*	low germination, growth abnormalities, low vigour index	degradation of Chl *a*, Chl *b* and Car	reduced photosynthetic efficiency	decrease in protein content, increased EL	increase in soluble sugar and Pro content	Gadi *et al.* (2012)
	Lens culinaris	not studied	decreased Chl content	Reduced photosynthetic efficiency	low RWC; decrease in protein content	minimal increase in soluble sugars, AsA, and Pro	Mondal and Gupta (2015)
	Lupinus luteus	increased shoot and root biomass	not studied	not studied	high total N content in shoot biomass	not studied	Szostek and Ciecko (2017)
	Lupinus angustifolius	reduced growth	not studied	not studied	high total N content in shoot biomass	not studied	Szostek and Ciecko (2017)
	Cicer arietinum	low germination percentage	not studied	not studied	percentage of toxicity**??** in roots and shoots increased	Pro and soluble sugar accumulation; increased activities of POX and AsA oxidase	Datta *et al.* (2012)
	Pisum sativum	not studied	no Chl damage	not studied	low RWC	increased content of soluble sugars and AsA	Mondal and Gupta (2015)
	Medicago sativa	slightly reduced growth	not studied	not studied	moderate increase in N content	not studied	Szostek and Ciecko (2017)
Brassicaceae	*Brassica oleracea*	not studied	decrease in Chl content	reduced photosynthetic efficiency	low RWC; decrease in protein content	increase in AsA content	Mondal and Gupta (2015)

	Brassica juncea	not studied	decrease in Chl content	reduced photosynthetic efficiency	low RWC	minimal increase in soluble sugars, AsA, and Pro; increased activities of SOD, POX, and CAT	Mondal and Gupta (2015)
	Brassica napus	increased shoot and root biomass	not studied	not studied	high total N content in roots	not studied	Szostek and Ciecko (2017)
	Raphanus sativus	decreased root and shoot lengths significantly	not studied	not studied	moderate increase in total N content	increased activities of SOD, POX and CAT	Szostek and Ciecko (2017); Gadi *et al.* (2016); Singh *et al.* (2013)
Amaryllidaceae	*Allium cepa*	not studied	decrease in Chl content	reduced photosynthetic efficiency	low RWC	decrease in sugar content; increase in AsA and Pro content	Mondal and Gupta (2015)
	Allium sativum	not studied	decrease in Chl content	reduced photosynthetic efficiency	low RWC	increase in soluble sugar and AsA content	Mondal and Gupta (2015)
Amaranthaceae	*Salicornia brachina*	growth arrest	Chl and Car degradation	reduced photosynthetic efficiency	not studied	increase in anthocyanin content	Reddy and Kaur (2008)
	Spinacia oleracea	not studied	decrease in Chl content	reduced photosynthetic efficiency	low RWC	increase in AsA and Pro content and activities of SOD, POX, and CAT	Mondal and Gupta (2015)
	Beta vulgaris	not studied	Chl damage	reduced photosynthetic efficiency	low RWC	low Pro content	Mondal and Gupta (2015)
Apiaceae	*Apium graveolens*	not studied	decrease in Chl content	reduced photosynthetic efficiency	low RWC	minimal increase in soluble sugars, AsA, and Pro content	Mondal and Gupta (2015)
	Daucus carota	not studied	Chl damage	reduced photosynthetic efficiency	low RWC	increased soluble sugar content	Mondal and Gupta (2015)
Cucurbitaceae	*Citrullus lanatus*	growth arrest and low vigour index	reduced Chl stability index	retarded photosynthesis	lower membrane stability	accumulation of soluble sugars and phenolics	Ram *et al.* (2014)
	Cucumis sativa	not studied	decrease in Chl content	reduced photosynthetic efficiency	low RWC	increased soluble sugar content	Mondal and Gupta (2015)
Boraginaceae	*Phacelia Juss.*	Low sensitivity to fluoride	Not studied	Not studied	High total N content (33.7 g N kg^{-1} DM) in aerial biomass	Not studied	Szostek and Ciecko (2017)
Malvaceae	*Abelmoschus esculentus*	reduced root and shoot lengths	decrease in Chl a and *b*	reduced photosynthetic efficiency	reduction in N and protein content	not studied	Iram and Khan (2016)

Trees	*Populus deltoides*	decreased plant biomass and leaf expansion	Chl degradation and reduced Chl fluorescence yield	reduced CO_2 assimilation, stomatal conductance, and activities of enzymes in the Calvin cycle	low harvest index	not studied	Singh and Verma (2013); Singh *et al.* (2013)
	Morus sp.	decreased growth	not studied	not studied	decrease in leaf protein content	not studied	Rao *et al.* (2013)

Table 2 Suppl. Fluoride bioaccumulation in edible plants is much higher than 1.5 mg kg^{-1}(d.m.) (World Health Organization safe limit).

Type	Plant	Fluoride conc. [mg dm^{-3}]	Duration of fluoride stress	Fluoride accumulation [mg kg^{-1}(d.m.)]	References
Crops	*Oryza sativa*	20	15 d	2000.0	Gupta *et al.* (2009)
		30	15 d	4000.0	
		4.8	4 months	17.4	Mondal and Gupta (2015)
	Brassica juncea	4.8	4 months	43.6	
	Triticum aestivum	4.8	4 months	28.4	
	Lens culinaris	4.8	4 months	25.2	
	Camellia sinensis	contaminated soil	full life cycle	214.0	Baunthiyal and Ranghar (2013)
Vegetables	*Abelmoschus esculentus*	50	20 d	9.3	Iram and Khan (2016)
	Spinacia oleracea	4.8	4 months	55.0	Mondal and Gupta (2015)
	Brassica oleracea	4.8	4 months	29.8	
	Apium graveolens	4.8	4 months	42.0	
	Cucumis sativa	4.8	4 months	18.6	
	Pisum sativum	4.8	4 months	27.0	
	Daucus carota	4.8	4 months	23.8	
	Beta vulgaris	4.8	4 months	20.6	
	Allium cepa	4.8	4 months	26.2	
	Allium sativum	4.8	4 months	27.4	

Table 3 Suppl. Characteristic features of candidate plants for fluoride phytoremediation.

Type	Species	Features	References
Soil phytoremediation: trees	*Prosopis juliflora*	found in semi-arid regions, removes fluoride from soil and groundwater, high fluoride accumulation in roots, translocation factor > 1, highly fluoride tolerant	Banthiyal and Sharma (2012); Saini *et al.* (2012)
	Olea europaea	accumulates 300 mg kg^{-1}(d.m.) fluoride without showing phytotoxicity	Mezghani *et al.* (2005)
	Morus sp.	fluoride tolerant, exhibited low inhibition of photosynthetic parameters	Kumar and Bhaskara (2008)
	Liriodendron tulipifer)	high fluoride accumulation in leaf tissues	Wang-Cahill (2007)
	Vitis vinifera	no metabolic inhibition, fluoride sequestered by increasing Ca content	Abdallah *et al.* (2006)
	Pteris vittata	cleaning up arsenic and fluoride contaminated groundwater	Zhao *et al.* (2015)
Soil phytoremediation: herbs	*Panicum maximum* *Chloris gayana*	tolerance to 15 mg (KF) dm^{-3} due to Ca-induced sequestration, no translocation *via* the phloem, no damage to photosynthetic organelles	Chaves *et al.* (2002)
Aquatic phytoremediation	*Camellia japonica* *Pittosporum tobira*	accumulated fluoride from contaminated water	Santos-Diaz and Zamora-Pedraza (2010)
	Saccharum officinarum	high capacity of fluoride removal from water, presence of a <u>fluoride detoxification system</u> **what is it**?	
	Chara fragilis	detoxifies aquatic fluoride by forming CaF_2 using $CaCO_3$	Baunthiyar and Ranghar (2013)
	Brassica rapa	remediation of boron and fluoride contaminated sediments	Asada *et al.* (2005)
	Spirodela polyrrhiza	efficient defluoridation of water	Shirke and Chandra (1991)
	Hydrilla verticillata		Sinha *et al.* (2000)
Fluoride bioindicators	*Eucalyptus rostrata*	3652 mg(KF) kg^{-1}(d.m.) was deposited in leaves of trees near Al smelters	Rodriguez *et al.* (2012)
	Populus hybridus	fluoride accumulation in leaves of tress near Al smelters	
	Pinus radiata	fluoride accumulation in the needles of tress near Al smelters	