**Fig. S1** Dose-response curve of LEH reduction by external ACC in the presence (grey) and absence (black) of 1mM AIB.
Fig. S2 A, Norbornadiene (Bicyclo[2.2.1]hepta-2,5-diene, NBD) (100ppm) does not block the isoxaben-induced reduction in LEH. B, The effect of ethephon (200µM) on root elongation is not due to its hydrolysis products, hydrochloric acid and phosphoric acid (each at 200µM). All treatments in B were buffered with 0.6mM HEPES-KOH pH 6.5
Fig. S3 Elongation of etiolated hypocotyls in the *ein3-1 eil1-1* mutant is insensitive to ACC. Figure shows 3d old seedlings germinated on plates containing ½ MS salts and 0.2% sucrose, with or without added 10µM ACC. Scale bar 1cm.
**Fig. S4** Histochemical assay showing GUS expression in root tips of proACS[1…11]::GUS seedlings. Seedlings were stained 3 hours after transfer onto ½ MS, 0.2% sucrose plates with or without 150nM isoxaben.
Fig. S5 LEH response to isoxaben treatment in auxin transport or signalling mutants and in the *fei1 fei2* mutant.
Fig. S6 The auxin response inhibitor PEO-IAA, but not its inactive 5-methyl derivative, restores elongation in the presence of ACC.