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## Fertilizer properties of DCHA/Fe<sup>3+</sup>

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### Abstract

**Aims** The suitability of the non-symmetrical chelating agent DCHA (2-{2-[(2-hydroxybenzyl)amino]ethylamino}-2-{2-hydroxyphenyl}acetic) to improve Fe nutrition in plants is investigated in order to confirm the good results deriving from its chemical reactivity in agronomic systems achieved by analytical and modeling studies. Moreover, the factors affecting the efficacy of this new Fe chelate, that it is predicted to combine a good stability in nutrient solution and calcareous soils, are explored.

**Methods** The role of DCHA/Fe<sup>3+</sup> as substrate for the Fe chelate reductase (FCR) activity in cucumber

(*Cucumis sativus* L. cv. Ashley) plants and its efficacy to provide Fe to chlorotic soybean (*Glycine max* L. cv. Stine 0408) plants in both hydroponic and soil culture were determined.

**Results** The chelate DCHA/Fe<sup>3+</sup> presented an intermediate behavior between o,oEDDHA/Fe<sup>3+</sup> and o,pEDDHA/Fe<sup>3+</sup> as substrate of the FCR. In the hydroponic experiment, nutritional indexes indicated a faster and higher re-greening of the plants treated with DCHA/Fe<sup>3+</sup> and o,pEDDHA/Fe<sup>3+</sup> than with o,oEDDHA/Fe<sup>3+</sup>. In the soil experiment, plants treated with o,oEDDHA/<sup>57</sup>Fe<sup>3+</sup> showed the highest <sup>57</sup>Fe concentration in leaves and no differences were observed between o,pEDDHA/<sup>57</sup>Fe<sup>3+</sup> and DCHA/<sup>57</sup>Fe<sup>3+</sup>.

**Conclusions** The chelate DCHA/Fe<sup>3+</sup> has adequate fertilizer properties since it is able to correct the Fe chlorosis and to maintain good nutritional status of plants over time both in hydroponic and soil cultures. This is related to its ability to serve as substrate for the FCR and its good stability in solution and in soil conditions observed in this and previous studies.

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### Abbreviations

BPDS	Bathophenanthroline disulfonic acid
DAT	Days after first treatment
DCHA	2-{2-[(2-hydroxybenzyl)amino]ethylamino}-2-(2-hydroxyphenyl)acetic acid
DTPA	Diethylenetriaminepentaacetic acid