

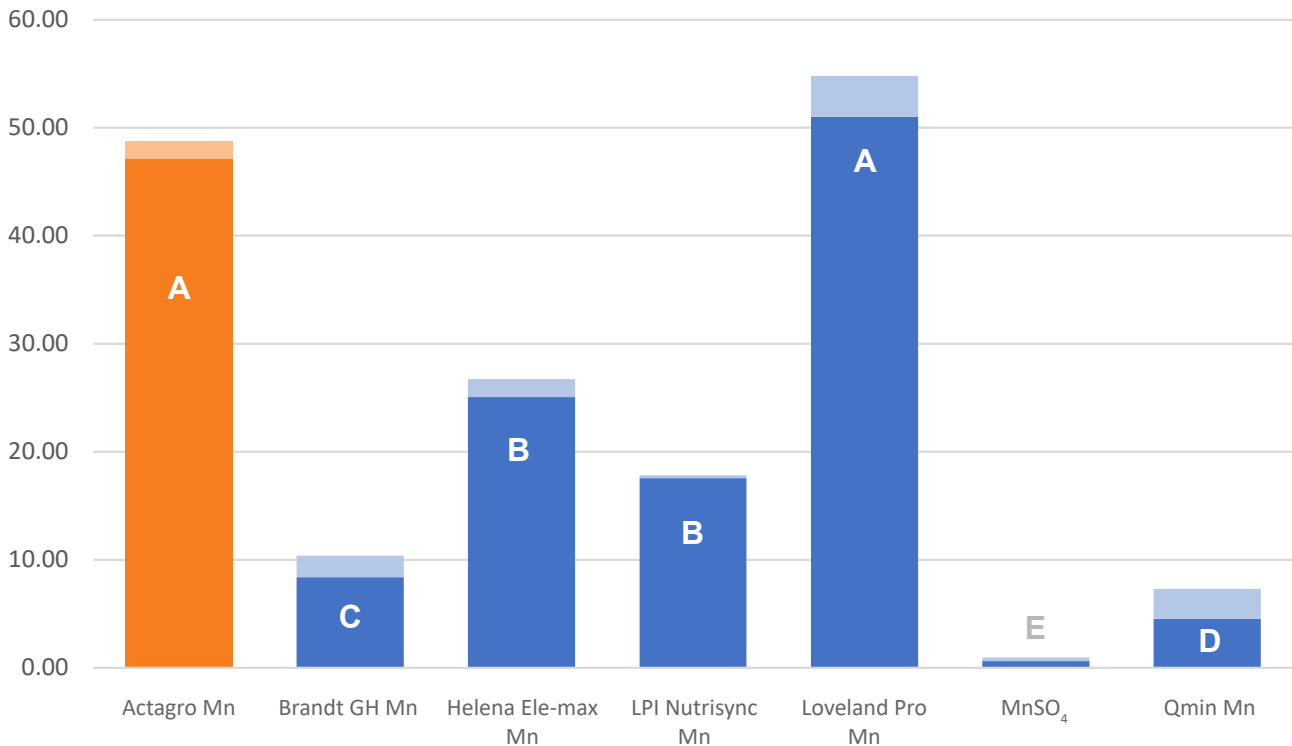
# 4% Manganese

## Superior Membrane Permeability

Actagro Manganese 4% is a highly available form of liquid manganese (Mn) made with Reacted Carbon Technology™. Using an in vitro system, our scientists have compared Actagro Manganese with other leading manganese products and found significantly better leaf penetration. All products were applied at an equal Mn concentration, with the percentage of solution (% Transport) that has passed the membrane measured at the end of the incubation.

Product Name	Formulation	Log Pe	% Transport
Actagro Mn	MnSO <sub>4</sub> , RCT, Citric acid	-4.55±0.01	47.98±0.83
Brandt GH Mn	MnSO <sub>4</sub> , Glucoheptonates	-5.37±0.05	9.39±1.01
Helena Ele-max Mn	EDTA Chelated	-4.89±0.02	25.90±0.83
LPI Nutrisync Mn		-5.08±0.02	17.69±0.13
Loveland Pro Mn	MnSO <sub>4</sub> , 6%N, Citric acid	-4.49±0.02	52.91±1.88
MnSO <sub>4</sub>	MnSO <sub>4</sub>	-6.48±0.09	0.79±0.15
Qmin Mn	Manganese Polysaccharide	-5.59±0.11	5.94±1.39

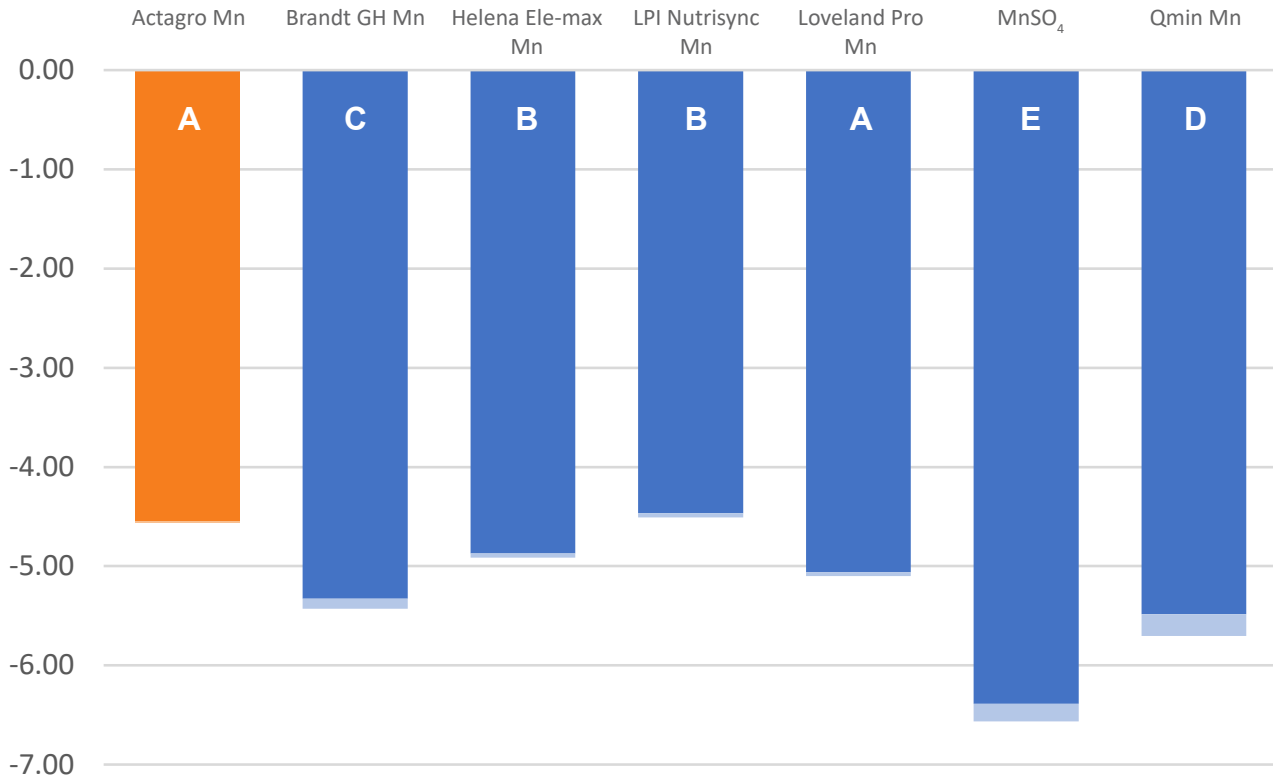
### Percentage of Transport



Mn penetration through a simulated leaf membrane in vitro with 4 replicates per treatment. Mn penetration was measured after 2 hours. Letters show significant differences by ANOVA at p < 0.05.

## Permeability

Log Pe is the rate of permeability over time, where Pe is “effective permeability”. The negative aspect means that the smaller the bar, the less time needed for the solution to penetrate the leaf membrane.



Mn penetration through a simulated leaf membrane in vitro with 4 replicates per treatment. Mn penetration was measured after 2 hours. Letters show significant differences by ANOVA at  $p < 0.05$ .

### Actagro Nutrients are Better – Proven by Science

Foliar absorption occurs when plant nutrients pass through the waxy cuticular membrane and/or the stomata. Various methods are employed to improve foliar absorption, but Actagro’s approach is different. Our products allow better penetration into the leaf by transporting more ions across the leaf surface and into the leaf. For leaves, rapid penetration is important because when the spray dries on the leaf, penetration cannot proceed.