Additional file

for the article

Nano- and Pheroid-technologies for development of foliar iron fertilizers and iron biofortification of soybean grown in South Africa

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Table S1. Average nutrient composition of upper fully developed leaves at the initial flowering stage (BBCH growth stage 69). The leaf sample was taken from a representative area outside the experimental area on the same day as application spray 1. The sufficiency range is taken from Small and Ohlrogge [1].

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| **Nutrient** | **Measured****(g kg-1)** | **Sufficiency range****(g kg-1)** |
| N | 47.9 | 46.2 – 55.0 |
| P | 4.2 | 2.6 – 5.0 |
| K | 32.0 | 17.1 – 25.0 |
| Ca | 15.2 | 3.6 – 20.0 |
| Mg | 5.4 | 2.6 – 10.0 |
| **Nutrient** | **Measured****(mg kg-1)** | **Sufficiency range****(mg kg-1)** |
| Na | 272 | - |
| Mn | 150 | 21 – 100 |
| Fe | 94 | 51 – 350 |
| Cu | 11 | 10 – 30 |
| Zn | 40 | 21 – 50 |
| B | 70 | 21 – 55 |
| S | 2.9 | - |



Figure S1. Absorbance FTIR spectra of the various applied foliar treatments T1-T8. Peak assignment for Pheroid compounds (T2, T4, and T6): A (2924 cm-1): C-H methylene asym str; B (2853 cm-1): C-H methylene sym str; C (1736 cm-1): C=O ester str; D (1462 cm-1): CH2 methylene sci; E (1373 cm-1): C-H methyl sym bend; F (1229 cm-1): C-O ester str; G (1178 cm-1): C-O ester str; H (1096 cm-1): C-O-C ether str (overlaps with SO42-). Peak assignment for non-Pheroid compounds: H (1096 cm-1): SO42- (overlaps with C-O-C ether); J (~900-1100 cm-1): PO43-. Peaks from water can be found around ~2800-3700 cm-1 and around ~1630 cm-1. Reference values were taken from Stuart [2].

# References

1. Small HGJ, Ohlrogge AJ. Plant analysis as an aid in fertilizing soybeans and peanuts. In: Walsh LM, Beaton JD, editors. Soil Testing and Plant Analysis. Revised ed. Madison, WI: Soil Science Society of America, Inc.; 1973. p. 315-27.

2. Stuart BH. Infrared spectroscopy: fundamentals and applications: John Wiley & Sons, Ltd; 2004.