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Magnesium and organic biostimulant integrative application induces physiological and biochemical changes in sunflower plants and its harvested progeny on sandy soil

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1 **Magnesium and organic biostimulant integrative application induces physiological**
2 **and biochemical changes in sunflower plants and its harvested progeny on sandy**
3 **soil**

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10 **Abstract**

11 Magnesium (Mg) often leaches down in sandy soils due to high mobility and its foliar
12 application proves to be beneficial. Organic biostimulants also prove to be helpful to
13 affect plant physio-biochemistry and antioxidative defense system. The present study
14 evaluated the beneficial effects of seed soaking in maize grain extract (MGE; 3%) in
15 integration with or without foliar Mg (1 mM) in comparison to control (no treatment) on
16 growth, yield performance, seed oil and fatty acid profile including physiological and
17 biochemical basis of Hysun-336 sunflower hybrid grown on a sandy soil under
18 greenhouse conditions. The integrative treatment (seed soaking in MGE + foliar spray
19 with Mg) elevated growth traits, plant water status and membrane stability index, and
20 reduced electrolyte leakage. Improved leaf contents of chlorophylls, carotenoids, total
21 soluble sugars and proline, activities of non-enzymatic and enzymatic antioxidants were
22 also observed. In addition, enhanced uptake of N, P, K including Mg and endogenous
23 levels of plant hormones IAA, GA₃ and zeatin were recorded with the integrative

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