Acceleration of Germination and Growth of Wheat and Barley Using Ferro-fluids

Ranganathan, Prashaant

Influence of three different aqueous ferro-fluids (containing iron oxide nano-particles in different templates), on the rate of germination and growth of wheat and barley was investigated and significant enhancement observed. Ploy vinly alcohol, bovine serum albumin and citric acid were used as the matrices. Among the three ferro-fluids used in the experiments, the fluid which contained poly vinyl alcohol as the matrix (called FFA) was the most effective in accelerating germination and enhancing the growth rate of plants. At a concentration level of 100 mg/litre of solution, FFA enhanced the germination rate of wheat by about 40%. At a concentration level of 70 mg/litre, the increase in germination rate was about 22%. In the case of barley, the increase in rate of germination was 53% and 40%, respectively, at these two concentrations. The shoot length increased by 50% and 62%, respectively, when wheat plants were treated with FFA of concentration 100 mg/litre and 70 mg/litre, respectively. In the case of barley, the shoot length increased by 25% when treated with FFA of 100 mg/litre, concentration. It was found that plants treated with ferro-fluids had about 100-150% more mass compared to the “control” groups, after 15 days of growth. The increase in mass was close to 150% in the case of barley. The grain yield of barley, of 15 plants each in “control” and FFA, after 120 days of growth was measured. The mass of grains in control group was 5.592 g whereas that in FFA was 9.025 g. The results show that ferro-fluids can be effectively used for accelerating the germination rate and the growth of these two crops and can be exploited on a large scale also.

Awards Won: