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# Influence of magnetised irrigation water on the fertigation process and potato productivity

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**Abstract:** An experiment was conducted for two seasons on a farm in the Mit Kenana village, Qalyobia, Egypt. The aim was to study the influence of a magnetised water technology on the fertilisers during irrigation (fertigation) and its impact on the water, soil as well as the yield and yield components for potatoes. The experiment included: Normal water (NM), magnetic water (MW), adding fertiliser before (FMW) and after magnetism (MWF). The results indicated that irrigation with magnetised water and then adding fertiliser (MWF) had a positive significant effect on the water and soil properties, the tuber engineering parameters improved and the potato productivity increased by 40.5% higher than the NM method.

The fertigation unit has to be installed after the magnetic device because the direct magnetisation of the water with the fertilisers contributes to the cracking and increases the solubility of the fertilisers that may lead to the possibility of leaching some of them away from the roots, which implies losing some of them and, therefore, decreasing the effectiveness of the fertilisers.

**Keywords:** magnetisation technology; fertilisers; soil properties; plant production

Efficient water use allows for the use of more arable land and to produce agricultural crops. Therefore, the adoption of modern methods and means of irrigation with high efficiencies is very important and necessary to increase the production and provide adequate food. Fertilisation with irrigation is an important means to rationalise the fertilisers usage because they are characterised by a high overall efficiency and a lack of fertiliser and water losses (Mostafa, Derbala 2013; Mostafa 2014).

The agrarian water input per unit area should be diminished in light of water shortage at the moment, expanding rivalry from different sectors of water use and other ecological concerns (Mostafa, Thormann 2013; Surendran et al. 2016a).

Magnetised water is understood as water flowing through magnets and, hence, the degree of the water treatment magnetically depends on three factors (Ahmed 2009): the quantity of the fluid

within the magnetic tool, the strength of the magnet used for this purpose and the duration of the treatment. A magnetic water treatment works by positively controlling the negative-negative charges to strengthen the water properties which is useful in improving the industrial cooling and the performance of power generation (Wang et al. 2018). When water molecules are positioned during a magnetic flux, the hydrogen bonds between the molecules either change or disintegrate and reduce the adhesion angle to only 105 ° (Hilal et al. 2002; Ghernaout 2018), which decreases the union range between the molecules and, thus, absorbs the energy. Among them, the electrolysis increases the susceptibility and affects the crystal decomposition. Magnetised water results in large crystals being broken down into small crystals, easily passing through the roots of the pores of plants and soils (Chibowski 2018; Hachicha et al. 2018). Therefore,