Study shows hydroponic systems as a promising method for sustainable saffron production

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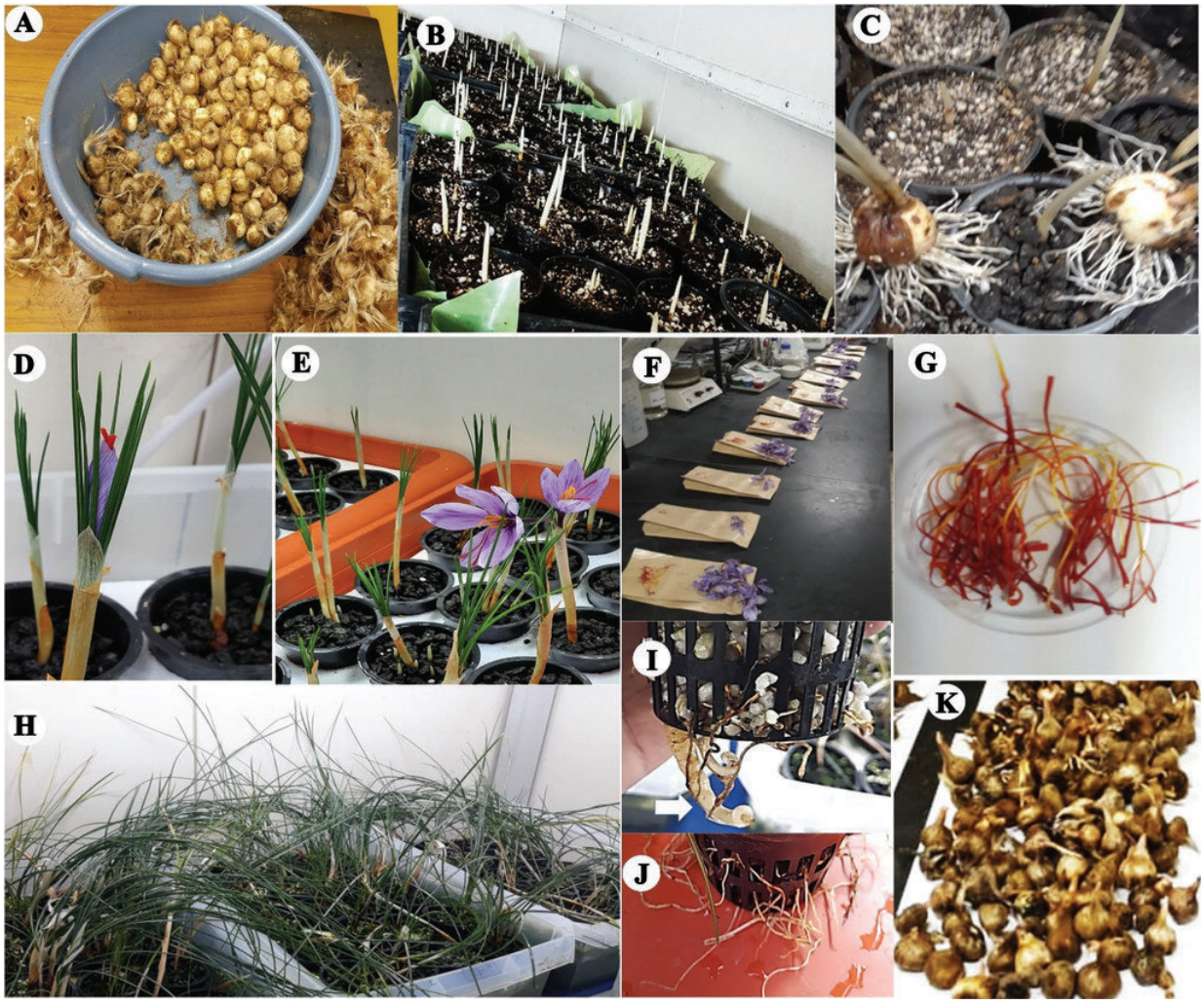

Flowering, growth and cormlets production of saffron [size 4 (3.2–3.5 cm diameter)] in the hydroponic culture system: (A) corm peeling and disinfection,

(B, C) sprouted corms and root emergence after 2 weeks of incubation at 14 °C for 1 week followed by 12 °C for a subsequent week in controlled growth chamber and dark conditions, (D, E) first flower emergence in the hydroponic system incubated at 8 ± 1 °C air temperature after 29 d of corm transplanting, (F, G) harvesting of flowers and stigmas, (H) plant growth after 20 weeks of transplanting in the hydroponics at 8 ± 1 °C air temperature and 80 µmol·m−2·s−1 photosynthetic photon flux density, (I) contractile roots of saffron plants grown in perlite based ebb-and-flow system, (J) fibrous roots of saffron grown in volcanic rock–based aerated continuous immersion system, and (K) cormlets produced after 24 weeks of growth in the hydroponics system; (1.8 × °C) + 32 = °F, 1 cm = 0.3937 inch. Credit: *HortTechnology* (2022). DOI: 10.21273/HORTTECH04980-21

Saffron (Crocus sativus) is a geophyte perennial plant from the family Iridaceae with underground soft corms. The stigmas of the saffron flower have been cultivated as a spice for at least 3,500 years. Conventional cultivation processes, such as planting, flower harvesting, and separation of the stigmas, are labor-intensive and time-consuming. The labor costs and low supply contribute to the high cost of saffron. Studies suggest that growing saffron hydroponically will lower production costs while at the same time increasing yields. Additionally, hydroponic growing systems have potential for sustainable production of saffron by providing pathogen-free stock corms.

Saffron cultivation performed under controlled conditions in plastic tunnels and hydroponic beds can be a convenient approach because plant growth and application of nutrition medium are both controlled, and it is possible to achieve a higher yield and a better quality. Few studies that include new growing techniques have been conducted, but a team of scientists from Saudi Arabia and Egypt has now completed a study that investigated the optimal conditions for hydroponic saffron production.

The work is published in the journal *HortTechnology*.

This study investigated the effects of the growing substrate, mode of nutrient supply, and corm size on flowering, growth, photosynthesis, and cormlet production of saffron in a hydroponic system under a controlled environment.

In this study, saffron corms were sprouted using a gradual decrease in air temperature, and they were cultivated hydroponically in either perlite or volcanic rock for 24 weeks and were supplied a nutrient solution via either an ebb-and-flow system or continuous immersion. Flowering was not influenced either by the growing substrate or the mode of nutrient supply; however, it was significantly influenced by corm size. The highest stigma yield, stigma length, stigma fresh and dry weight, and cormlet yield, average corm diameter, and fresh weight were obtained by using large mother corms grown hydroponically in the volcanic rock–based continuous immersion system.

More information: Yaser Hassan Dewir et al, Effects of Growing Substrate, Mode of Nutrient Supply, and Saffron Corm Size on Flowering, Growth, Photosynthetic Competence, and Cormlet Formation in Hydroponics, *HortTechnology* (2022). DOI: 10.21273/HORTTECH04980-21

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