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"Global food security and food safety:
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Prompting Oil Yield and Reducing Fertiliser Pollution by Using Honey Bee Colonies in Sunflower Culture

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Abstract

Iran is one of the countries that import the highest amount of cooking oil in the world. The cultivation of sunflowers, as an oilseed-producing plant, can increase self-sufficiency and can supply high quality oil with high unsaturated fatty acids. One of the ways to improve the yield of sunflower yield is to use bee colonies. The use of pollinators, especially bees, can increase the production, especially in allogamous plant, and can stabilise the production. Also, the use of nitrogen fertilisers should be adapted to decrease an environmental contamination. Thus, in the short term sustainability in production could be ensured through the increase in yield and the production of honey as a by-product, and in the long term through the reduction of contamination such as water pollution and soil degradation. This study examined the effect of using bee colonies on increasing yield by reducing hollow pods, as well as reducing the use of nitrogen fertiliser. The results showed that the use of 10 colonies of honey bees significantly increased the performance in comparison to 5 colonies and control, and decreased the percentage of hollow grain to 5 %. Sunflower grain yield was 3.21 t ha^{-1} with 10 bee colonies and 2.42 and 1.93 t ha^{-1} with 5 and 0 bee colonies respectively. It further was shown that N fertiliser could be reduced up to 17 and 12 % for the 10 and 5 colonies, resectively. Also, 5.6 and 6.2 kg of honey could be harvested in each bee colony for the 10 and 5 colonies respectively. This is an effective step towards sustainable production, soil conservation, and ultimately food security.

Keywords: Fertiliser pollution, honey bee, pollination, sunflower

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