

Abstract

Fresh water supply is the most limiting factor in agri-food production in arid regions such as the Sultanate of Oman. More than 80% of available fresh water supplies is used in crop production. In response to declining fresh water availability, particularly due to seawater intrusion into underground aquifers, some farmers have turned to aquaculture as an additional source of livelihood and income. The use of nutrient-enriched effluent water from aquaculture for irrigated crop production has considerable potential for integrated and sustainable food production in such arid areas. The aim of this study was to investigate the effects of tilapia pond effluent on cabbage production in an arid environment. Analysis of cabbage head after harvest showed that treating crop with tilapia wastewater depressed cabbage head size and increased the incidence of preharvest splitting. Head firmness and greenness (chlorophyll content, SPAD units) were also lower in crop grown with tilapia wastewater. Microbial quality analysis showed that there were no significant differences in water activity (a_w), number of lactic acid bacteria and total plate count. Overall, this study showed that tilapia pond effluent could be used for vegetable crop production. The reduction in crop yield observed in this study could be improved by diluting the effluent with fresh water prior to application. Future studies will examine the effects of different effluent concentrations on crop performance and the economic benefits of reduced fresh water use on the overall agricultural and aquaculture production system.