Nitrate Leaching Potential for Drip Irrigated Cauliflower (*Brassica oleracea var. Botrytis*) Grown on a Sandy Loam Soil

F. Cassel S.[1], Josue Samano Monroy[1], and D. Goorahoo[1]

[1] Plant Science Department, California State University, Fresno, USA.

E-mail: fcasselss@csufresno.edu

Abstract

Nitrate contamination in drinking water continues to be a significant unresolved environmental issue worldwide, and in agricultural regions of California. This study focused on comparing the effects of different fertilizer types and rates on biomass, yield and nitrate leaching potential for drip irrigated cauliflower grown on a sandy loam soil. Overall, application rates of 200 kg N/ha intensified the potential to leach nitrates below the root zone. For the sandy loam soil used in this study it is recommended that N application rates for cauliflower should not exceed 134 kg N/ha, regardless if it is being applied as an organic soybean meal or UAN32 synthetic fertilizer.

Keywords: Nitrate, Leaching, Drip Irrigation

1. Background

Nitrate contamination in drinking water continues to be a significant unresolved environmental issue worldwide, and in agricultural regions of California ((Harter & Lund, 2012). Cauliflower (*Brassica oleracea var. Botrytis*) is a shallow rooted crop with high demand for Nitrogen (N), thereby providing a challenge to optimizing yield while minimizing the potential for nitrate leaching. Hence, this study focused on comparing the effects of different fertilizer types and rates on biomass, yield and nitrate leaching potential for drip irrigated cauliflower grown on a sandy loam soil.

2. Experimental Approach

The experimental layout was a two factor randomized complete block design, with organic soybean meal (ORG) and conventional UAN32 applied at rates of 0, 67, 134 and 200 kgNha. Plant biomass, soil samples and soil solution samples were collected and analyzed as described by Hartz (2006).

3. Results

In the study, UAN32 and the ORG fertilizers increased the biomass production by 61% and 30%, respectively, at the two highest application rates. Marketable yields were higher in response to 134 and 200 kg N/ha compared to the 0 and 67 kg N/ha, regardless of the fertilizer type. Post-harvest soil nitrate levels within the top 120 cm increased with application rates for both UAN32 and ORG.

3. Conclusion

Overall, application rates of 200 kg N/ha intensified the potential to leach nitrates below the root zone, with an insignificant economic return from adding extra nitrogen. Hence, for the sandy loam soil used in this study it is recommended that N application rates for cauliflower should not exceed 134 kg N/ha, regardless if it is being applied as an organic soybean meal or UAN32 synthetic fertilizer. Soil nitrate contents in response to fertilizer type showed a higher NO_3-N content as compared to Control plots with no fertilizer addition. However, there was no significant difference between organic and conventional fertilizers, which suggest that the nitrate leaching might occur in either case with the use of nitrogen fertilizer into the soil.

4. Acknowledgements

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5. References

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