



COLORADO ENVIRONMENTAL PESTICIDE EDUCATION PROGRAM

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CHEMIGATION

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This fact sheet covers advantages and disadvantages of chemigation, laws and regulations, and chemigation management practices.

<http://www.cepep.colostate.edu>

Chemigation

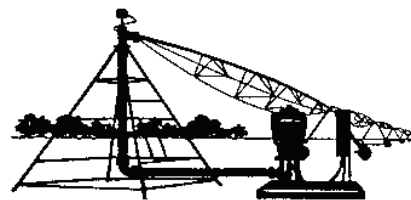
Chemigation is an agricultural practice that uses irrigation water as a transport mechanism for the application of chemicals to soils and crops. Agricultural chemicals chemigated include fertilizers, insecticides, herbicides, fungicides, nematicides, and growth regulators.

Irrigation systems

- Sprinkler systems such as center-pivot and self propelled linear systems are the most commonly used and best suited for chemigation.
- Surface systems cannot be used for foliar applications. They generally provide poor uniformity of distribution since they may not sufficiently wet the soil on ridge tops or on hill or bed planted crops.
- Drip or trickle systems are commonly used for applications of fertilizers and soil incorporated herbicides. They are not suitable for foliar applications.

Advantages of chemigation are:

- Uniformity of chemical application
- Reduced application costs
- Timeliness of application
- Ease of chemical incorporation and activation
- Reduced soil compaction
- Reduced mechanical damage to the crop
- Possible reduced operator hazards
- Possible reduced chemical requirements
- Improved canopy penetration



Disadvantages of chemigation are:

- Potential contamination of irrigation water supply
 - Pesticides can backflow into groundwater when irrigation pump is shut down from mechanical or electrical failure while the injection pump continues to operate
 - Water can backflow through the chemical supply tank and overflow onto the ground if injection pump is stopped and irrigation pump

- continues to run
- Excess watering near the pivot and at the end gun can lead to overapplication, deep leaching and runoff of pesticides
- Chemigating when the soil profile is full may result in runoff of pesticides into nearby water sources
- Windy conditions may result in serious non-uniformity across the field, especially with solid set and periodic move sprinkler systems
- Sprinkler drift due to wind speeds in excess of 15 mph can result in the application of pesticides to adjacent crops and noncrop areas
- Windy conditions may also result in non-uniformity on the side of the bed facing the wind or on hill planted crops

Chemigation Laws and Regulations

The Colorado Department of Agriculture (CDA) regulates chemigation through the Colorado Chemigation Act (<http://www.ag.state.co.us/DPI/Chemigation/ChemAct.pdf>). The CDA provides user permits and conducts inspections of systems to assure proper installation and maintenance of equipment (see Pesticide Fact Sheet [Chemigation Laws](#)).

A chemigation user permit application form and details on safety equipment requirements are available from the [Colorado Department of Agriculture, Division of Plant Industry](#), 700 Kipling St., Suite 4000, Lakewood, CO 80215. (303) 239-4149.

Chemigation Management Practices

- Inspect safety and antipollution equipment before each use. Inspect all components of the chemigation and irrigation system before each use.
- Read and comply with the label. Make sure the agricultural chemical explicitly states on the label that the chemical can be chemigated.
- Monitor both the irrigation system and the chemical injection equipment periodically.
- Monitor the filling of the supply tank and the mixing of the agricultural chemicals.
- Keep the chemigation site uncontaminated.
- Accurately calibrate! Periodically recheck the calibration setting of the injection device.
- Empty the chemigation supply tank and triple rinse it.
- Flush the chemigation injection device, hoses, and check valve with clean water after each use.
- Flush the irrigation system as long as necessary to rid the system of chemicals.
- Report any spills (<http://www.cdphe.state.co.us/hm/spillsandreleases.htm>) to the Colorado Department of Public Health at (303) 756-4455.

References and Resources

Bausch, W.C. 1992. *Chemigation: Recommended Safety Devices*. Service in Action 2.801. Colorado State University Cooperative Extension. Fort Collins, CO.

Hay, D.R., Vitzhum, E.F., Witkowski, J.F., and Nelson, E.W. 1988. *Using Chemigation Safely and Effectively*. University of Nebraska-Lincoln, NE.

Peairs, F.B. and Pilcher, S.D. 1998. *Applying Pesticides With Center-Pivot Irrigation*. No. 4.713. Colorado State University Cooperative Extension. Fort Collins, CO.

Wright, J., Bergsrud, F. and Peckham, J. 1993. *Chemigation Safety Measures*. University of Minnesota Extension Service, St. Paul, MN.

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