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## Silage Gas Can Be Dangerous

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# Extension Extra

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COLLEGE OF AGRICULTURE & BIOLOGICAL SCIENCES / SOUTH DAKOTA STATE UNIVERSITY / USDA

## SILAGE GAS CAN BE DANGEROUS

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A danger associated with newly filled silos is due to accumulation of nitrogen dioxide. An individual may experience an immediate detrimental reaction to the presence of silo gas. Additionally, an individual may experience reactionary symptoms, sometimes called "Silo filler's disease", due to extended exposure to silage dust or gas.

Nitrogen dioxide is considered dangerous at concentrations of only 15 to 20 parts per million. At this level it is not identifiable by odor or sight. Accumulations of over 100 parts per million can often be found at the bottom of silo chutes.

Nitrogen dioxide is produced by bacteria working in the acidic conditions that exist in the silage during the reduction of nitrates to nitrites. Nitrites are converted to nitrous acid which then breaks down to form nitric acid and this in turn converts to nitrogen dioxide when it comes into contact with air. Nitrogen dioxide can form within two hours after the first silage is placed, to as long as one year later.

The danger of nitrogen dioxide is increased when silage is made from immature plants from fields that have received heavy applications of nitrogen fertilizer, or from silage grown during an exceptionally dry summer.

Symptoms of nitrogen dioxide poisoning may be delayed. Immediately after the gas has been inhaled, victims may be aware of only a slight irritation of the nose and throat. A little later there may be a shortness of breath, a choking sensation, and coughing which brings up brown or bloody sputum. During the

first week, there is a fever and a general weakness much like symptoms caused by various other lung troubles. Medical treatment should be obtained if these symptoms occur and the doctor should be advised that the patient was exposed to silage fumes.

To prevent this hazard, the following precautions should be taken:

- Keep out of the silo during filling.
- Keep doors open down to the silage level if the silo is not completely full.
- Check fresh silage on steps in chute. Stains indicate the presence of nitrogen dioxide. Look for yellow or brown fumes in or near the silo.
- Don't let anyone enter the silo unless the blower has been operated first, for 10 to 15 minutes, especially during the first 10 days after filling.
- To go into a silo if gas is present, wear self-contained, breathing apparatus.
- Provide extra ventilation to silo rooms and at the bottom of the chute when silos are connected to a barn.
- Fence off the area around the base of the silo, to keep children and animals out of the area, from the beginning of silo-filling and until at least 10 days after filling.

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