

## Algae Control Using Barley Straw

I recently went to Rural Water Association In-Service Conference in Nashville, Tennessee and attended class on using Barley Straw for Algae Control on Lagoon Systems, presented by Terrel Dunn, from the Utah Rural Water Association. I found the idea of using barley straw to control algae a fascinating idea.

Mr. Paul Krauth, an engineer with the Division of Water Quality in Utah, started searching the web for something that may help with TSS And BOD problems in discharging lagoons that were having problems meeting their discharge permits.

What he found was an Ohio State University School of Natural Resource Fact Sheet. These fact sheets contained articles from other schools, Extension Specialists and Botanists. It seems with looking at these fact sheets, credit needs to be given to the English, who started using barley straw in the early 1990's where it is widely used in many bodies of water.

Mr. Krauth and Terrel Dunn have been very involved with the use of barley straw. Unsure, how the barley straw works, they believe the theory is that when you put barley straw in the lagoons it starts to decompose. During this decomposition process, the chemicals released inhibit the growth of algae.

Algae production in a lagoon is usually in the top 18 to 24 inches, so the barley straw must be located in that portion of the lagoon. The decomposition occurs faster in warmer water than colder water. When the temperature is 50 degrees Fahrenheit, it takes approximately 6 to 8 weeks for the decomposing straw to produce enough growth-inhibiting chemical to effectively control algae. If the water temperature is 68 degrees Fahrenheit it will only take 1 to 2 weeks. Once the straw has started to release the chemical it will remain active until it has almost completely decomposed.

The duration varies not only with the temperature, but also with the form, which the straw is applied. When the straw is placed in water, the soluble components of the straw are washed out, causing the water to turn a brown color. It is thought that fungi decompose the barley in the water, which causes a chemical release that prevents the growth of algae. The specific chemical(s) has not been identified (oxidized polyphenolics and hydrogen peroxide are two decomposition products suggested. The activity of barley straw is usually described as being algistatic, which means that it prevents new algae, rather than algicidal, which kills already existing algae).

From looking at the different ways to apply the barley straw, it became evident that a faster, more efficient way of applying the straw was needed. What Krauth and Dunn came up with was the use of a 100 foot roll of plastic snow fence, one gallon milk jugs (if the system want to collect them) or 2 ½ gallon jugs purchased commercially, one tube of silicon to seal the lids, a jumbo bag of zip ties and rope enough to reach the barley boom to a tie off point on each side of the lagoon.

The barley straw will start to decompose almost immediately and will be almost gone in about 5 to 6 weeks. They found no harmful effects to fish, waterfowl or humans. The chemicals produced, during this process are natural occurring and are produced by the decomposition of any plant material in water. This system was first tried in Mt. Green, Utah located between Ogden and Morgan, Utah.

#### COSTS:

• Three forty-pound bales of barley straw	@ \$1.00
• One 100 foot roll of plastic snow fence	@ \$30.00
• Two rolls 350 lb. test polyethylene rope	@ \$10.00
• Two fence post	@ \$1.89
Total	\$42.89

#### APPLICATION METHOD:

- Application: 1 ounce/yard squared (303 lbs/acre)
- Floatation: 2 ½ gallon jugs 6 feet apart
- Sealant: Silicon to seal caps
- Configuration: Barley straw boom
- Location: Diagonally, upwind, in mixing pattern
- Anchor: Double strands of poly rope tied to post

#### HOW/WHERE TO APPLY

- Floating Barley Straw Booms
- Allow for wind and wave mixing
- Away from structures (aerators)
- Upwind of outfall
- Effectiveness is proportional to quantity therefore, replace regularly
- Buy ahead of the need – keep some on hand
- Surface area, not volume is the main factor
- You need 175 to 350 pounds per acre

Mt Green's effluent TSS went from a spread of 185 to 280 mg/l, down to under 45mg/l during the test period of 5/19/04 to 9/1/04.

Since Mt. Green test during the summer of 2004, other lagoon systems that have needed to reduce TSS and BOD or have just wanted to discharge cleaner water have implemented this process.

This is a very simple and easy procedure to go through and has produced some really great results, with the added bonus of being very inexpensive.

However, Dunn was very clear in stating, if you call barley straw an herbicide or say it “controls algae” this makes it a pesticide from a legal standpoint according to USEPA. Federal Insecticide, Fungicide and Rodenticide Act (FIFRA) may apply if sold, used, applied or advertised as a pesticide. Barley is NOT to be promoted as an algaecide. The intent is to get clearer, cleaner water and luckily for us, experimentation privately is allowed under FIFRA.

It seems virtually unimaginable; something so simple and inexpensive can be so effective. The thought of using resources readily available to rural Nebraska seems almost too easy.

*Sources: Terral Dunn, Wastewater Technician for Rural Water Association of Utah*