

**ORC TECHNICAL BULLETIN # 2 . 3 . 3**

## Oxygen Release Compound, ORC<sup>®</sup>

### Study with Dow Chemical on Soil Remediation Applications (Biopiles)

Regenesis conducted a biopile study with Dow Chemical which compared ORC, a time release form of magnesium peroxide, to Permeox, a commercial form of calcium peroxide. Soil piles were constructed with a TPH level of 1000 - 2000 ppm. Levels of .25% and .5% ORC were tested; .38% Permeox had the equivalent oxygen to .5% ORC. The use of higher levels of Permeox, such as a 2X application of .76%, was deemed to be potentially toxic due to pH effects. The Table below presents the data after two weeks.

### Comparative Study in Biopile Remediation between ORC and Permeox and Projections made from the Derived Rate Constants

Remediation Time to 100 ppm TPH From:

Treatment	% Reduction	Rate Constant	1000 ppm	2500 ppm	5000 ppm
Control	12	0.0935	25 weeks	34 weeks	42 weeks
.38% CaCO <sub>2</sub>	54	0.3669	6 weeks	9 weeks	11 weeks
.25% MgO <sub>2</sub>	69	0.5885	4 weeks	5 weeks	7 weeks
.5% MgO <sub>2</sub>	74	0.6735	3 weeks	4 weeks	6 weeks

The treatment cells consisted of 5 cu. yds. of soil and straw with a fertilizer mixture. Data was taken after two weeks. It should be noted that the study also included a 2.5 cu. yd. tilled control which responded essentially the same as the untilled control (9% vs. 12% reduction)

The conclusion of the study was that the ORC was more efficient on both a lower and an equal oxygen basis, compared to Permeox. While Permeox has about 30% more oxygen on a weight basis, it is not used as efficiently because, without intercalation, it is released about ten times faster than ORC. It also has a tendency to "lock-up" as calcium hydroxide by-products seal off the surface of the Permeox particles. This is not as severe a problem with magnesium hydroxide and the "lock-up" effect is disrupted by the patented intercalation process that provides longevity to ORC particles.

Intercalation also provides stability to small particles (-325 mesh, 44 microns and below) that distribute more effectively in soil piles. Permeox is a coarser material. Finally, the pH level of Permeox (calcium peroxide converting to calcium hydroxide) is 11-13, which is about two orders of magnitude higher than ORC (9-10). This severely limits the dosage of Permeox and allows the maximal amount of oxygen to be delivered by ORC even though it has less oxygen per unit weight.

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