Replenish™ 0-17-0-12 Organic Dryland PAC

Part 1 of the Replenish™ Keep It Simple Series

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Replenish™ is a nutritional soil amendment containing rock phosphate (RP), elemental sulphur (ES) and a proprietary activated compost (PAC) that provides plant essential phosphorus (P) and sulphur (S) biologically throughout a crop’s growing cycle.

The application of Replenish™ creates billions of micro-sized biological RP fertilizer production factories in the soil. The accelerated oxidation of ES (conversion of ES to crop available SO₄ -S, initially as H₂SO₄), facilitated by PAC, creates a halo of acidity around each ES/RP particle that releases crop available P, S and other nutrients from both the Replenish™ and the soil.

P and S Uptake Balance is Absolutely Critical

As an industry, we have mined soil P and S (also K and micronutrients) for decades to the point where action is desperately needed. Based on total nutrient uptake requirements, different crops require a specific P:S uptake ratio to optimize yield and quality (generally between 0.6 to 1.8).

For oilseeds (mustard, flax) the ratio is roughly 0.6 which means for every 1 lb of S the crop requires it also requires 0.6 lbs of P (or 1.4 lbs of P₂O₅). For spring wheat the P:S ratio is 1.4, while corn is 1.7.

Why is P Essential?

- Energy transfer
- Photosynthesis
- DNA integrity and genetic transfer
- Nutrient transport
- Maturation

Why is S Essential?

- Formation of chlorophyll and ultimately photosynthetic efficiency
- Efficient amino acid and protein production
- Oil synthesis
- Enzyme activation
- Plant stress relief
- Enhanced utilization of all other nutrients

Approved input under the Canadian Organic Standards and the USDA National Organic Program

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Why is Replenish™ such a unique product?

The biological release of P and S from Replenish™ provides the necessary P:S balance for all crops, enhancing soil health in a natural, low saline manner.


Evaluated the effectiveness of beta Replenish™ products on the growth of canola and HRS wheat. Soil deficient in P (4 ppm P₁) and S (3 ppm SO₄⁻₂S) was utilized (Cooking Lake series) with five treatments replicated three times. All other significant nutrients (N, K, B) were balanced.

<table>
<thead>
<tr>
<th>Treatment Parameters</th>
<th>Details</th>
<th>Wheat Yield (g/pot)</th>
<th>Wheat Yield % Increase</th>
<th>Canola Yield (g/pot)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Check</td>
<td>P and S Deficient Soil</td>
<td>2.43</td>
<td></td>
<td>0.03</td>
</tr>
<tr>
<td>Rock P</td>
<td>200 ppm P₂O₅</td>
<td>3.61</td>
<td>49</td>
<td>0.08</td>
</tr>
<tr>
<td>11-52-0</td>
<td>50 ppm P₂O₅</td>
<td>3.42</td>
<td>41</td>
<td>0.06</td>
</tr>
<tr>
<td>Replenish 70:30 blend (70% RP, 21% ES, 9% PAC)</td>
<td>200 ppm P₂O₅, 60 ppm S</td>
<td>4.21</td>
<td>73</td>
<td>5.46</td>
</tr>
<tr>
<td>Replenish 80:20 granules (70% RP, 14% ES, 16% PAC)</td>
<td>200 ppm P₂O₅, 35 ppm S</td>
<td>3.91</td>
<td>61</td>
<td>7.22</td>
</tr>
</tbody>
</table>

Wheat showed highest yields with the Replenish™ treatments.

Nutrient Removal

Crop nutrient removal contributes to substantial nutrient loss over one growing season. Continuous soil nutrient depletion will reach a critical point where quality and ultimately crop yield diminish without a nutrient replacement program.

<table>
<thead>
<tr>
<th>Crop</th>
<th>N</th>
<th>P₂O₅</th>
<th>K₂O</th>
<th>S</th>
</tr>
</thead>
<tbody>
<tr>
<td>Peas (30 Bushels)</td>
<td>100</td>
<td>26</td>
<td>82</td>
<td>10</td>
</tr>
<tr>
<td>Wheat (30 Bushels)</td>
<td>78</td>
<td>24</td>
<td>60</td>
<td>8</td>
</tr>
<tr>
<td>Mustard (25 Bushels)</td>
<td>70</td>
<td>27</td>
<td>79</td>
<td>9</td>
</tr>
<tr>
<td>Oats (60 Bushels)</td>
<td>88</td>
<td>38</td>
<td>64</td>
<td>8</td>
</tr>
</tbody>
</table>

Application of Replenish™ on an annual basis can help replace P and S removed by the crop while building soil nutrients to acceptable levels for optimum plant growth.