



GOC Technologies

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How QuikSoil® 2300 Works.

1. **QuikSoil® 2300** is a combination of amino acids, proteins, nucleic acids, intermediate metabolism products, complex glycosides, other organic acids, and selected minerals. **2300** is utilized instead of 2600 in situations where high nitrogen levels (above 2.2%) occur in the feedstock. Typically, sewage bio-solids, poultry manure, and certain types of food waste would utilize **2300** rather than 2600. **2300** immediately lowers the overall pH of the mass. This increases the availability of the mass to more strains of bacteria, and allows for increased growth rates and reproduction rates. **2300** also provides sulfur reducing anaerobes with a preferential replacement for sulfates as a source of oxygen. When the nitrates in **2300** are reduced, nitrogen is formed instead of sulfides and mercaptans. As this nitrogen makes its way to the surface of the mass, nitrogen fixing bacteria have the opportunity to oxidize it back into nitrate, creating an additional singlet oxygen source, keeping the nutrient nitrogen in the mass, and limiting odorous volatilization. Aerobic and micro-aerophilic activity dominates the upper parts of the mass, acting as a filtration and finishing system for gases moving outward from the interior.
2. **QuikSoil® 2300** decreases ammonia, amines, indole, and other nitrogenous odours by decreasing overall pH, improving conversion rates to nitrate and increasing biomass (protein) production, and decreasing the need for aeration and the associated volatilizations. (Stable temperatures increase nitrogen fixation bacteria levels.) As previously stated, **2300** decreases sulfide and mercaptan production by supplying the reducing bacteria with an alternative compound oxygen source. Additionally, sulfur is tied up in sulf-oxide bonds and proteins produced in biomass increases. Other odors, which are typically the products of incomplete oxidation, such as aldehydes and ketones, are further oxidized and degraded as they are maintained in the mass longer, rather than prematurely exhausted.

3. **QuikSoil® 2300** increases facultative activity to levels allowing decomposition times consistent with the needs of most facilities. Because less CO₂ and VOC's are generated and emitted, more weight (density) and more carbon remain in the
4. finished product and fewer greenhouse gases are exhausted. Because more ammonia and other free nitrogen compounds are fixed rather than exhausted from the pile, and because sulfates are not reduced to sulfides, nutrient values in **2300** treated compost tend to be higher, and the nutrients are often attached in complex organic compounds providing long term nourishment to plants and soil microbes.
5. The addition of the **QuikSoil®** technology to **2300** increases the speed of stabilization as evidenced by lower CO₂ production, lower ammonia formation, and higher levels of humic acids and humins in shorter periods of time. The **QuikSoil®** technology utilizes current primary carbohydrate chain research or Sequential and Simultaneous Carbohydrate Availability Response (SSCAR) to maximize diversity and growth rates. SSCAR works by using extremely complex carbohydrates which typically decompose in a specific order to less and less complicated compounds. The order of availability of new carbohydrates and waste compounds, in conjunction with a select set of corresponding enzymes, facilitates the development of specific strains of bacteria in a predictable order. The bacteria encouraged are selected for their ability to digest complicated organic compounds in rapid fashion. Since the introduction of **QuikSoil®** technology in conjunction with **2300**, Solvita test levels of 6 have been achieved in as few as 8 weeks (average 11 weeks over 56 tests). Test levels of 7 have been achieved in as few as 16 weeks (average 21 weeks).

QuikSoil® 2300 represents a significant means of odor control, emission control, fuel consumption control, and increases compost's potential as a method of carbon sequestration by bringing true stabilization into economically feasible time frames.

6. Limiting the amount of mechanical aeration facilitates even temperatures and degradation rates. Mechanical aeration, much like fanning a fire, causes temporary temperature spikes and dramatic changes in biological population. Because much of this temperature increase may not be biological, the mass may reach temperature levels toxic to desirable microbes. Thus, heavily aerated materials kept at high temperatures break down as much from chemical (thermal) decomposition as from biological decomposition. Additionally, during aeration activities anaerobically produced compounds are exhausted before they are fully decomposed, **producing many odor problems.**

7. **QuikSoil® 2300** requires specific management practices in conjunction with its application to be most effective. These practices typically save the operator labour, maintenance, and fuel costs as they decrease the amount of external handling and processing the material receives.

Protocol for Composting Operations

Application.

QuikSoil® 2300 is mixed with water in any quantity desired. (Water acts only as the carrier.) **2300** should be added when the feedstock's are mixed, or – the case of biosolids – when the sludge leaves the press or is loaded into a truck or container . The **2300** should be as thoroughly mixed into the material as is possible. A minimum of 3 ounces of **2300** concentrate are required per wet ton of material treated.

Operations.

After mixing and initial turning, the material is allowed to remain undisturbed for 6 to 8 weeks so long as temperatures are sufficient, with 6 weeks as an average. Typically, the operator determines the correct time for turning by noting a steady decline in temperatures throughout the mass for a minimum of 3 consecutive days. After this turning, the material is allowed to sit another 2 to 4 weeks determined again by temperature. Then it is turned again. In another 2 to 3 weeks the material is ready for screening.

Protocol for Drying Operations

Application.

QuikSoil® 2300 is added with sufficient water to facilitate mixing. The dose rate of **2300** concentrate should be a minimum of 3 ounces per wet ton of feedstock. (A maximum of up to 12 ounces of concentrate may be utilized when economic or other

factors justify increased results.) The **2300** should be mixed into the feedstock as thoroughly as possible.

Operations.

After mixing and row formation, the mass should be allowed to achieve sufficient temperatures for pathogen reduction. This may require turning. After this, turning is only implemented each time the temperature climbs above 140° F. Turning is implemented with the temperature rising rather than declining to maximize moisture loss as steam and to maintain preferable temperature conditions for nitrifying bacteria (a maximum of 145° F). Processing time is determined by final moisture level desired and available processing space.