

Urbanization's impact on pollution extends to climate change as well. The heightened concentration of buildings and infrastructure in urban areas amplifies energy demands, leading to increased greenhouse gas emissions from burning fossil fuels for electricity and heating. When water enters through the cracks, it activates the bacteria, which then produce limestone to fill the gaps and heal the concrete. Activation of

Bacteria: Spores of *Bacillus subtilis* + Moisture and oxygen → Activated *Bacillus subtilis*

Bacterial Growth: Activated *Bacillus subtilis* + Nutrients → Growth and Metabolism

Lactic Acid Production: Calcium Lactate + Enzymatic Action by *Bacillus subtilis* → Lactic Acid + Calcium Carbonate

Calcium Carbonate Precipitation: Lactic Acid + Calcium ions from concrete + Carbonate ions from concrete →

Calcium Carbonate Precipitation

Sample Collection: Obtain a sample suspected to contain *Bacillus subtilis*. As urbanization continues to expand, its role in exacerbating climate change through pollution and the use of carbon-intensive building materials becomes increasingly apparent. *Bacillus subtilis*. Moreover, urban sprawl encroaches on natural habitats, reducing carbon sinks like forests and wetlands. Building materials, particularly those reliant on energy-intensive manufacturing processes like

concrete and steel, contribute significantly to carbon emissions. These bacteria remain dormant in the concrete until cracks occur. This could be soil, water, or any other environmental sample where *Bacillus subtilis* is expected to be present.

Preparation of Growth Media: Prepare suitable growth media for

*Bacillus subtilis*.