Purple Sulphur Bacteria (PSB) are a group of bacteria generally found in stagnant waters (including wastewater treatment lagoons) or where there are high concentrations of hydrogen sulphide. PSB can be quite easy to identify under the microscope due to their particular grid-like shape resembling a waffle.

PSB are photoautotrophic meaning that they use carbon dioxide as their main carbon source and light as their main energy source. They are also micro-aerophilic, meaning they require oxygen to survive but in lower amounts than is present in the atmosphere, i.e. anoxic conditions. A low oxygen environment is also an important element for photosynthesis.

They do not use water in respiration so they do not produce oxygen like algae; instead they use hydrogen sulphide, which is oxidised to produce sulphur granules of elemental sulphur.

PSB are thought to have been important early in the planet’s history as one of the bacteria responsible for removing sulphur from the toxic sulphate filled oceans; which allowed complex life (i.e. animals and plants) to slowly develop.

In high numbers, PSB give the waters they inhabit a light pink or purple colour. The utility of PSB in wastewater treatment depends on the type of process they are found in.

Due to their ability to reduce hydrogen sulphide, they can be a welcome presence in anaerobic treatment processes such as dairy effluent lagoons where ‘rotten egg’ gas is a problem. PSB are also a good indicator of septicity and are used in the pulp and paper industry to identify septic zones in treatment processes.

But outside of these applications PSB are generally a nuisance bacteria as they do not degrade BOD well. In severe cases, large numbers of dispersed PSB can cause high effluent suspended solids. PSB also tend to bloom in the summer months due to higher temperatures.

PSB can be controlled by maintaining good dissolved oxygen conditions in the system or by the addition of oxidising agents such as hydrogen peroxide or nitrate salts.

Quick fact: There are ten times more bacterial cells in your body than human cells!