CLAIMS:

1. A reactor and sparger system for injecting bubbles into a liquid comprising:

a reactor;

a support plate;

a plurality of annular shrouds engaged with the support plate; and

a plurality of spargers positioned within the annular shrouds to define a gap between an interior surface of the annular shroud and an exterior surface of the corresponding sparger:

a plurality of headers engaged with the plurality of spargers wherein the plurality of spargers are configured to receive a gas supply from the plurality of headers and the plurality of headers further comprise at least one baffle to disperse a fluid comprising the liquid and the bubbles; and

wherein the support plate, the annular shrouds, and the spargers are positioned within the interior of the reactor.

2. The system of claim 1, wherein the support plate and the annular shrouds are integrated into a single component.

3. The system of claim 1, wherein two or more spargers are positioned within a single annular shroud.

4. The system of claim 1, wherein a length of the spargers is at least 10 cm.

5. The system of claim 1, wherein the gap is from about 1 mm to about 20 mm.

6. The system of claim 1, wherein the support plate, the annular shrouds, and the spargers are positioned at a top portion or at a bottom portion of the reactor.

7. The system of claim 1, wherein the liquid is at least partially recirculated liquid.

8. The system of claim 1, wherein the support plate further comprises a plurality of perforations.

9. The system of claim 1, wherein the annular shrouds are positioned within about 20 degrees of a vertical axis of the reactor.

10. The system of claim 1, further comprising at least one additional support plate positioned to form multiple vertical layers within the interior of the reactor, and the at least one additional support plate engaging the plurality of annular shrouds.

11. The system of claim 1, wherein the reactor is a bioreactor.

12. The system of claim 1, wherein the reactor is a bioreactor comprising:

a liquid growth medium;

a substrate comprising at least one C1 carbon source, wherein the plurality of spargers are configured to inject substrate bubbles into the liquid growth medium; and

a culture of at least one microorganism in the liquid growth medium, wherein the culture of at least one microorganism anaerobically ferments the substrate to produce at least one fermentation product.