Air Stirred Tank Reactor (Astr) for Production of Microorganisms and Cell Cultures

Title: Air Stirred Tank Reactor (ASTR) for Production of Microorganisms and Cell Cultures

**Invention:** This invention is a new approach to designing bioreactors that incorporate the use of gas sparging and lighting in a novel way. Specifically, it combines superior mixing and efficient gas transfer. In addition, the presence of light emitting diodes can also be incorporated within its design. This helps create an efficient way of cultivating photoautotrophic, heterotrophic and mixotrophic microorganisms and cell cultures.

**Background:** Proper delivery of gas within bioreactors is critical for effective microorganism and cell culture growth. However, current bioreactors fail to achieve uniform distribution of dissolved gas throughout the volume of a scalable bioreactor. The technology presented here aims to address these issues while having the potential to provide phototrophic microorganisms and cell cultures with efficient light transfer.

**Applications:**
- Bioreactors
- Pharmaceutical/Medical
- Food (algae is a potential food source that can be cultivated in a bioreactor)
- Energy (algae is also a potential biofuel that can be cultivated in a bioreactor)

**Advantages:**
- Superior liquid mixing
- Efficient gas mass transfer
- Well-mixed distribution of dissolved gas at desired level in the liquid medium
- Regulated or low-shear culture environment as desired
- Effective internal lighting within the bioreactor as desired
- Transparent or non-transparent reactor walls

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