Programme	: Bachelor of Science (Third Year)
Subject	: Microbiology (HONS.)
Paper Code	: MIC106
Paper Title	: Industrial Microbiology
Title of Unit	: Components of a typical bioreactor
Module Name	:Air Lift Bioreactor
Module Number	: 21
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Air Lift Fermenter

-Airlift fermenters are specially designed for the cultivation of aerobic culture but lacks an agitating device.

-When filtered air under high pressure is passed through the sparger placed at the reactor bottom, the medium is raised along with the airstream which agitate the medium enough. Besides, it also provides adequate aeration.

-An airlift reactor is divided into three parts: the air-riser (ascending column), downcomer (descending column) and disengagement zone.

-The air riser is the region into which bubbles are sparged.

- The riser is located inside or outside of the draft tube. The latter design is preferred in large scale fermenters as it provides better heat trasfer efficiencies.

-The bubbles rising in the air-riser cause the liquid to flow in vertical direction.

-To counteract these upward forces through the ascending column, when the liquid is driven up due to the presence of air, the raising pressure is reduced gradually.

-When the liquid reaches the disengagement zone, it is free from pressure and flow in down direction in the downcomer.

-This leads to liquid circulation and improved mixing effficiencies.

-The enhanced liquid circulation causes bubbles to maneuver in uniform direction at relatively uniform velocity.

-This bubble flow pattern reduced bubble coalesence and thus results in higher kLa value.

-The functions of the disengagement zone are to:

i.Add volume to the reactor

ii.Reduce foaming and minimize recirculation of bubbles through the downcomer.

-In external draft rube reactors, only single ascending and descending column is present, so the flow of fluid is in cyclic manner.