Arduino Based Double Helical Spiral Mixer

**Shashikant Dilip Jadhav, Dhananjay Sharad Malode, Samadhan Balasaheb Shinde,
Rohit Uttam Kharde, Dr. Datratraya D. Palande**

Matoshri College of Engineering and Research Centre, Eklahare, Nashik

Abstract: *This research paper explores recent advancements in mixer and blender designs, which have significantly contributed to the success of food companies by meeting their requirements for consistency, facilitating the development of new products, and reducing production costs. Traditional and specialized mixing technologies available to manufacturers are discussed, considering phase and viscosity as classification parameters. The paper also presents sample applications to highlight various processing challenges and the corresponding mixing technologies employed to overcome them. Conventional mixing machines typically feature stirrers that rotate in one direction, resulting in a specific flow pattern in fluids. However, this often leads to particle adhesion to the container walls due to centrifugal forces, resulting in inadequate mixing of paint and subsequently poor quality output. To achieve homogeneous mixing, it is essential to employ stirrer blades that rotate in opposite directions with spiral blade configurations, inducing a turbulent flow pattern. This approach ensures thorough mixing of the paint mixture, leading to the production of high-quality paint. Additionally, the integration of a pneumatic ram that dynamically moves the drive head of the mixer in an up and down direction further enhances the mixing process. To optimize the efficiency and streamline the mixing process, a closed-loop system can be implemented. This involves incorporating a pH sensor to measure the pH value of the phenyl solution, and based on the predetermined pH setpoint, automatically turning off the mixing motor once the desired pH is achieved. This closed-loop control ensures precise pH control and eliminates the need for manual intervention, making the mixing process more efficient and reliable. By leveraging these advancements in mixer and blender designs, food companies can attain superior mixing performance, improved product quality, and increased operational efficiency. The integration of specialized mixing technologies and closed-loop control systems can empower manufacturers to meet their production goals while minimizing costs and ensuring consistent results.*

Keywords: Arduino, Conventional mixing machine , Homogeneous mixture, Periphery spiral blades rotation, bidirectional motion, pneumatic ram.

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