Newmix®- Levtech® Application note

Mixing of High Powder Loads Using a LevMixer™

Mixing system: Newmix®- Levtech® LevMixer™
Mixing bag: 200L L-Mix bag
Mixing type: Powder-liquid

The Newmix-Levtech LevMixer is a compact and non-invasive single-use mixing system. The heart of this system is a mixing bag incorporating a bottom-mounted levitating impeller designed for powder-liquid and liquid-liquid mixing applications. The impeller is frictionless and generates no particles. All product-contacting surfaces are 100% disposable.

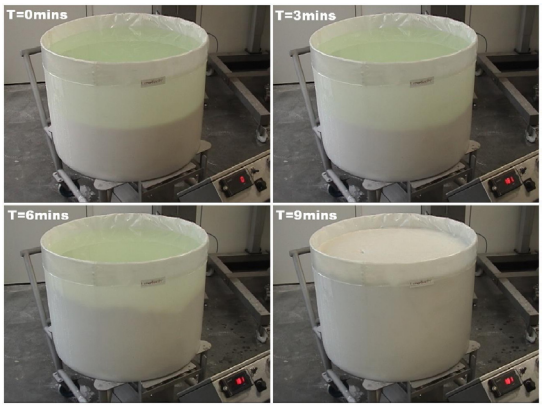
Introduction

Powder-liquid mixing is a common requirement in biopharma processing. In order to maximize mixing efficiency for powder-liquid applications, the LevMixer is available with a large (6.35") impeller.

In this experiment, the LevMixer system's ability to resist stalling when buried by compacted solid was tested. The powder chosen was diatomaceous earth, a fine, inert and insoluble, powdered filter medium that is light and fluffy when it is dry, yet forms a dense mud when mixed with water.

Experimental

A 200L LevMixer mixing bag was filled with ~160L of water, and mixing speed was set to 180rpm. Diatomaceous earth powder (d=0.22kg/L) was then added until a total weight of 37kg was reached. The LevMixer provided sufficient agitation to maintain the diatomaceous earth powder in suspension. The mixer was then shut off, and the suspended powder was allowed to settle into a dense, compacted mud at the bottom of the mixing bag. After the powder had settled, mixing was restarted, and the impeller's ability to resume mixing was observed.



Results

The 37kg powder load was sufficient to completely bury the LevMixer impeller in a dense sedimentary mud. Despite being less strongly coupled to the drive unit than other ATMI mixing impellers (such as those on the Magnetic Mixer or Pad-Drive systems), the levitated impeller was able to smoothly and immediately resume mixing without becoming decoupled or otherwise stalling.

Despite its ability to resist stalling, the upper speed limit of the levitated impeller (180rpm) meant that the LevMixer's mixing action was noticeably less vigorous than with some other ATMI mixers. Even 2 hours after mixing had resumed, some residual powder (approximately 1% of the total powder load) was found still adhering on the bottom of the mixing bag.

Video of this experiment is available upon request.

Conclusions

The Newmix-Levtech LevMixer system is well suited to powder-liquid mixing applications, even when very high powder loads are anticipated. However, if re-suspension of dense powder is a requirement, then alternative ATMI mixers (such as the Magnetic Mixer or Pad-Drive) are recommended as more efficient choices.

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