Life Sciences

Application Note

USD 3042

High-Viscosity Mixing with a LevMixer® System

Mixing system: LevMixer system

Mixing biocontainer: 200 L Mixer biocontainer

Application mixing type: Liquid-liquid

The LevMixer system is a compact and non-invasive single-use mixing system. The heart of this system is a mixing biocontainer incorporating a bottom-mounted levitating impeller designed for powder-liquid and liquid-liquid mixing applications. The impeller is frictionless and generates no particles.

Introduction

High-viscosity materials can present a formidable mixing challenge, yet they also serve to illustrate the relative strengths and weaknesses of different mixing technologies. In this experiment, a LevMixer system was used to perform liquid-liquid mixing in a highly viscous matrix – high fructose corn syrup 90% at a viscosity of 1200 centipoise.

Experimental

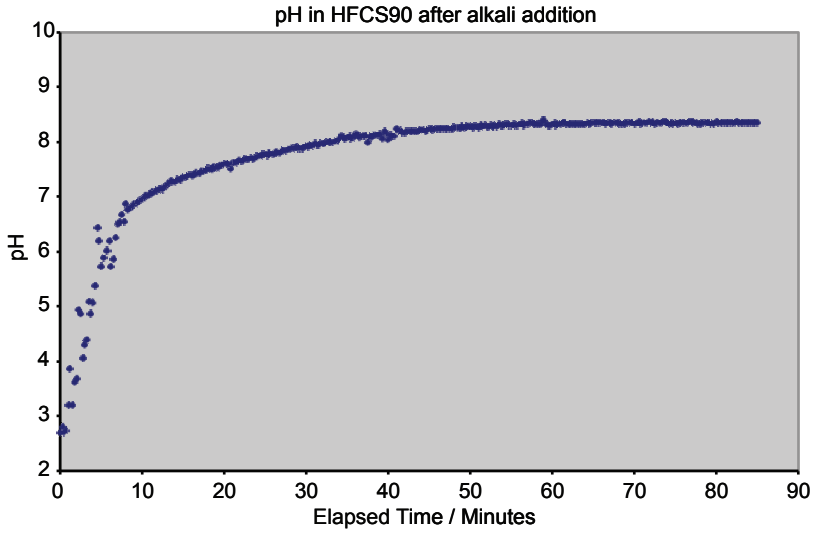
A 200 L LevMixer mixing biocontainer with centrally-mounted large 16.13 cm (6.35 inch) impeller was filled with 200 L of ADM Cornsweet◆ 90 high fructose corn syrup (HFCS90), and mixing speed was set to 180 rpm. A 60 mL aliquot of dilute sodium hydroxide solution (8M NaOH) was then added, via a top-mounted inoculation port, to the surface of the HFCS90. Solution homogeneity was monitored via a pH sensor mounted in the top of the biocontainer.

Results

Figure 1 shows solution homogeneity in the biocontainer during mixing. After the NaOH addition, mixing was found to be complete within approximately 75 minutes. During mixing, it was observed that the added NaOH solution tended to accumulate on top of the HFCS90, immediately above the mixing impeller, with only a narrow “string” of NaOH being drawn down into the impeller (see accompanying image), whereas normally a more significant vortex would be expected. This behavior was attributed to the unusually high density of the HFCS90, which inhibited vortex formation and thus caused the relatively buoyant NaOH to remain stratified on the surface for an extended period of time.

Figure 1

Solution homogeneity in the biocontainer during mixing



Conclusions

The LevMixer system can perform effectively at viscosity up to 1200 cP. However, while a 75 minute mixing time is respectable, other Pall mixing technologies are capable of faster mixing in such applications, and should be considered if high-viscosity liquid-liquid mixing is the primary intended purpose. Please refer to the Pall website (www.pall.com/mixing) for further details of the full range of Pall mixing technologies.

PALL Life Sciences

Corporate Headquarters
Port Washington, NY, USA
+1.800.717.7255 toll free (USA)
+1.516.484.5400 phone
biopharm@pall.com e-mail

European Headquarters
Fribourg, Switzerland
+41 (0)26 350 53 00 phone
LifeSciences.EU@pall.com e-mail

Asia-Pacific Headquarters
Singapore
+65 6389 6500 phone
sgcustomerservice@pall.com e-mail

Filtration. Separation. Solution.SM

Visit us on the Web at www.pall.com/mixing

E-mail us at allegro@pall.com

International Offices
Pall Corporation has offices and plants throughout the world in locations such as: Argentina, Australia, Austria, Belgium, Brazil, Canada, China, France, Germany, India, Indonesia, Ireland, Italy, Japan, Korea, Malaysia, Mexico, the Netherlands, New Zealand, Norway, Poland, Puerto Rico, Russia, Singapore, South Africa, Spain, Sweden, Switzerland, Taiwan, Thailand, the United Kingdom, the United States, and Venezuela. Distributors in all major industrial areas of the world. To locate the Pall office or distributor nearest you, visit **www.pall.com/contact**.

7/15, PDF, GN15.6193 USD3042