Programmable System that Mixes Large Numbers of Small Volume, High-Viscosity, Fluid Samples Simultaneously

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OTHER INFORMATION

KEYWORDS

Sample mixing,

programmable mixer,

COVID-19 diagnostic

testing, high-viscosity

fluids, pathogen testing

CATEGORIZED AS

▶ **Computer**

  ▶ Software

▶ **Medical**

  ▶ Diagnostics

  ▶ Other

  ▶ Research Tools

  ▶ Screening

▶ **Research Tools**

  ▶ Other

▶ **Engineering**

ABSTRACT

Researchers at the University of California, Davis have developed a programmable machine that shakes and repeatedly inverts large numbers of small containers - such as vials and flasks – in order to mix high-viscosity fluids.

FULL DESCRIPTION

Many medical applications require the thorough mixing of fluids before those samples undergo further testing or processing. For example, many diagnostic tests used to detect the SARS-CoV-2 virus or other pathogens require shaking and inverting samples before they are processed. Such procedures are often performed manually, which can lead to inconsistent mixing and could affect the accuracy of test results. Manual processing is also time consuming - and can become a rate-limiting step during large testing operations. For high-viscosity fluids, it is particularly important to shake and invert samples to ensure their thorough mixing. However, this critical function is not present currently in most commercially available equipment designed for high-throughput applications. Thus, new equipment capable of mixing large numbers of small-volume samples simultaneously would improve the efficiency of many processes associated with the medical, pharmaceutical, and chemical industries.

Researchers at the University of California, Davis have developed a machine that can automate the thorough mixing of samples using a programmable sequence of steps. Many samples can be loaded onto trays and inserted into the machine. In one configuration, each tray can hold up to 96 samples, and the machine can hold up to eight trays. Because the machine is programmable, its operating characteristics can be customized to the specific fluid(s) being mixed. Parameters such as shaking duration, inversion frequency and length can be set using a microcontroller. The amplitude can be adjusted manually. The machine can also be modified to hold other types of containers such as cans or sealed flasks. This technology can facilitate the processing of high volumes of COVID-19 diagnostic samples, as well as samples collected for a variety of other clinical, R&D, or industrial applications.

APPLICATIONS

▶ Rapid mixing of small volume, high-throughput, samples of high viscosity liquids

▶ Mixing large numbers of saliva samples prior to testing. This technology is thus applicable to processing SARS-CoV-2/COVID-19 or other diagnostic samples

FEATURES/BENEFITS

▶ Mixing equipment can be programmed and customized to the desired characteristics of a variety of fluids

▶ Pre-programmed sequence will automatically execute the desired mixing protocol – with no human intervention required during sample mixing

PATENT STATUS

Country	Type	Number	Dated	Case
United States Of America	Published Application	20240149231	05/09/2024	2021-900
Patent Cooperation Treaty	Published Application	WO 2022/261242	12/15/2022	2021-900

ADDITIONAL TECHNOLOGIES BY THESE INVENTORS

▶ Crop Transportation Robot

▶ Software Of Predictive Scheduling For Crop-Transport Robots Acting As Harvest-Aids During Manual Harvesting