

ART: **Info**

THEMA: Mixing Time of Test Tubes for homogenous Dilutions

ORT/ DATUM:

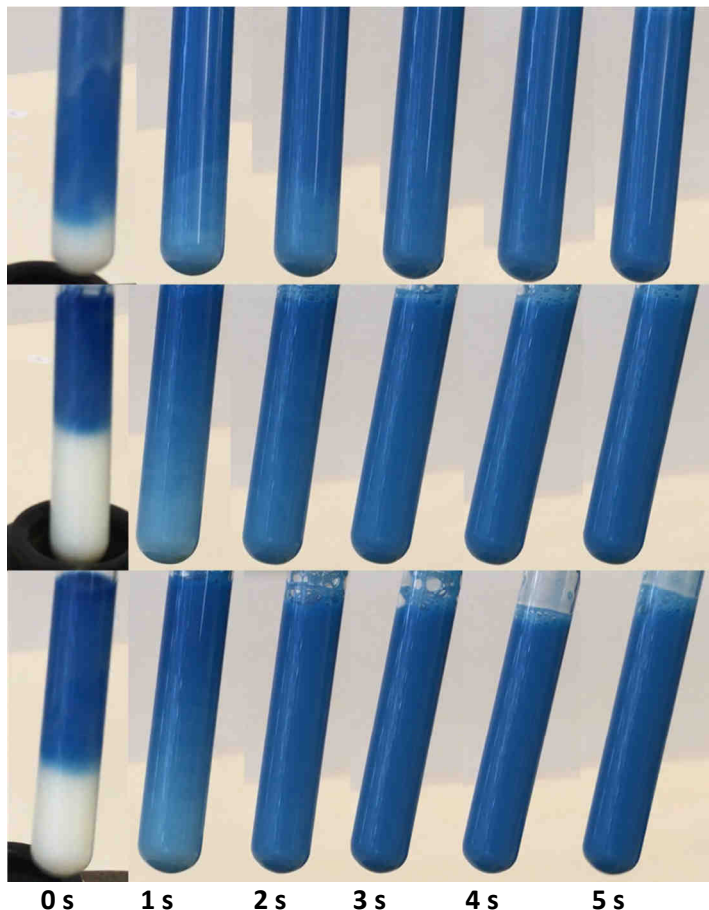
TEILNEHMER/AUTOR:

DOKUMENT NAME: 2018\_03\_28\_Mixing\_Time\_Vortexer\_E

---

### Starting Point

ISO Standard 6887-1 recommends a mixing time with a mechanical stirrer of 5 - 10 seconds for sample dilution in test tubes for microbiological examinations. In practice, mixing is usually done for much shorter to save working time and also because for many is manual vortexing unpleasant and stressful. Now what is the minimum mixing time for homogeneous sample dilutions?



**Fig. 1:** 1 ml of indigo carmine (1 mg / ml) in 9 ml of skimmed milk mixed for 0 s to 5 seconds with vortex mixer. Skim milk clouds in the test tubes clearly recognizable at 1 s and 2 s mixing time. At 3 s mixing time only very weakly recognizable colour inhomogeneity. No colour inhomogeneity visible at 4 s and 5 s mixing time.

### Results

A mixing time of  $\geq 4$  s with the mechanical stirrer produces visually homogeneous mixtures of indigo carmine with skimmed milk (Fig. 1). Minimum mixing time of 5 seconds recommended by ISO 6887-1 for reliable sample dilutions is thus confirmed. Shorter vortexing of the test tubes is very likely to reduce the accuracy and reliability of the findings.