Magnetic bead fluorescent immunoassay for the rapid detection of the novel inflammation marker YKL40 at the point-of-care.

Pneumonia is one of the leading causes of death worldwide. We present a magnetic bead fluorescent sandwich immunoassay that allows rapid serum measurement of the novel inflammation marker YKL40 (CHI3L1) at the point of care (POC) that could aid pneumonia diagnosis. The magnetic beads serve as the solid phase for separation of YKL40 from serum. The readout is performed using a small and robust fluorescence reader, which detects the turnover of a fluorescent substrate. The assay procedure, from sample addition to data retrieval, consists of three steps and is performed in less than 20 min. The presented assay has a linear range from 3 to 111 ng/mL, with a limit of detection of 2.9 ng/mL. The average recoveries were found between 101 and 111%. The developed method was applied in sera from healthy subjects \( n = 14 \); \( c(\text{YKL40}) = 50 \pm 49 \text{ ng/mL} \) and from pneumonia patients \( n = 14 \); \( c(\text{YKL40}) = 333.6 \pm 225 \text{ ng/mL} \). The elevated YKL40 concentrations in pneumonia-diseased patients are in good agreement with previously published data. The POC-ready device provides a simple immunoassay that could help to optimize pneumonia inflammation diagnostics in low-resource settings.