LSFM (OPFOS, SPIM, mSPIM, MuViSPIM) capillary techniques for CGE / CZE

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In modern systems for high-performance separation and quantification of nucleic acids, such as Fragment Analyzer, as well as in most DNA sequencing instruments using capillary electrophoresis, capillaries are available for visual observation inside the box. Hence, the front profiles can be visualized by the built-in devices or additional control and measurement systems of sensors embedded into the box or the external circuit for experimental and research purposes [1-7]. There are known differences in the front profile during laminar and electroosmotic flow, which makes possible to perform a real time parametric verification of the process in addition to the target analytical procedure. The advantage of capillary electrophoresis in the nucleic acid separation and sequencing is the path length of the detected radiation which is only n*10 μm (usually up to 50 μm). Therefore, a direct *in situ* observation and mapping of the sequence source by microscopic methods is possible. Working with capillary microscopy is most optimally implemented by the LSFM technique, which includes a number of branches, such as OPFOS, SPIM, mSPIM, MuViSPIM, which differ geometrically in the location and number of lenses and the possibility of relative rotation of the sample - capillary (or a turret of micro lenses around it). The presence of open protocols such as OpenSPIM and the built-in design of SPIM-like systems in standard boxes make it possible to produce separation with a small number of capillary channels using the appropriate number of SPIM heads or moving one SPIM head in space. In this case, both scanning along the entire capillary and monitoring of its specific section are possible.

1. Brumley Jr, R. L., & Luckey, J. A. (1996). Improved high-throughput DNA fragment analyzer employing horizontal ultrathin gel electrophoresis. *Proc. SPIE, 2680*, 349-361.
2. Noble, D. (1999). Short-fragment savvy-NucleoScan 2000 (TM) DNA fragment analyzer brings flexibility to real-time digital gel imaging. *Scientist*, *13*(9), 17-17.
3. Kinoshita, S. (2003). Amendment of Guideline for Administration of Forensic DNA-Typing Introduction of A New Short Tandem Repeat DNA Typing Method by means of A DNA Fragment Analyzer. *Journal of Police Science*, *56*(9), 35-50.
4. 배철효,& 황영구.(2006).DNA 형 감정의 운용에 관한 지침의 개정에 관한 고찰-Fragment Analyzer 를 사용한 신단쇄 DNA 형 검사법의 도입. *한국치안행정논집*, *3*(1), 59-72.
5. Lakha, W., Panteleeva, I., Squazzo, S., Saxena, R., Kroonen, J., Siembieda, S., Tilmes, M. and Hagopian, J. (2016). DNA fragmentation and quality control analysis using diagenode shearing systems and fragment analyzer. *Nature Methods*, *13*(10), III-IV.

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Abstract

In modern systems for high-performance separation and quantification of nucleic acids, such as Fragment Analyzer, as well as in most DNA sequencing instruments using capillary electrophoresis, capillaries are available for visual observation inside the box. Hence, the front profiles can be visualized by the built-in devices or additional control …

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