

## Rapid and Sensitive LC-MS/MS Determination of PGD<sub>2</sub>, PGE<sub>2</sub>, and PGF<sub>2</sub>α in Plasma and Application

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**SUMMARY.** Prostaglandin D<sub>2</sub> (PGD<sub>2</sub>), prostaglandin E<sub>2</sub> (PGE<sub>2</sub>), and prostaglandin F<sub>2</sub>α (PGF<sub>2</sub>α) are important metabolites of arachidonic acid involved in inflammatory responses within the body. This study introduces a sensitive ultra-performance liquid chromatography-tandem mass spectrometry (UPLC-MS/MS) method for simultaneous quantification of prostaglandin PGD<sub>2</sub>, PGE<sub>2</sub>, and PGF<sub>2</sub>α in DQ poisoning patients. The chromatographic separation of PGD<sub>2</sub>, PGE<sub>2</sub>, and PGF<sub>2</sub>α was achieved on a BEH C18 column with gradient elution, determined by using electrospray ionization in negative mode and multiple reaction monitoring (MRM). Method validation confirmed high precision and accuracy across quality control samples at 5, 25, and 100 ng/mL. The established method was applied to the determination of poisoned and infected populations. The results showed that after extraction with ethyl acetate, PGD<sub>2</sub>, PGE<sub>2</sub>, and PGF<sub>2</sub>α exhibited good linearity both in bovine serum albumin and human serum. The precision and accuracy of the method had RSD values of less than 15%. Applying this method to measure the serum of patients poisoned with diquat or infection revealed that the plasma levels of PGD<sub>2</sub>, PGE<sub>2</sub>, and PGF<sub>2</sub>α were 0.18 ± 0.07 ng/mL, 0.64 ± 0.38 ng/mL, and 1.04 ± 0.82 ng/mL, respectively. Notably, there was a high positive correlation between the levels of PGF<sub>2</sub>α and the plasma concentrations of DQ. In conclusion, UPLC-MS/MS can serve as a reliable tool for the quantification of PGF<sub>2</sub>α, PGE<sub>2</sub>, and PGD<sub>2</sub> in clinical settings.

**RESUMEN.** La prostaglandina D<sub>2</sub> (PGD<sub>2</sub>), la prostaglandina E<sub>2</sub> (PGE<sub>2</sub>) y la prostaglandina F<sub>2</sub>α (PGF<sub>2</sub>α) son metabolitos importantes del ácido araquidónico que participan en las respuestas inflamatorias del organismo. Este estudio presenta un método sensible de cromatografía líquida de ultraeficacia-espectrometría de masas en tándem (UPLC-MS/MS) para la cuantificación simultánea de las prostaglandinas PGD<sub>2</sub>, PGE<sub>2</sub> y PGF<sub>2</sub>α en pacientes con intoxicación por DQ. La separación cromatográfica de PGD<sub>2</sub>, PGE<sub>2</sub> y PGF<sub>2</sub>α se logró en una columna BEH C18 con elución en gradiente, determinada mediante ionización por electrospray en modo negativo y monitoreo de reacción múltiple (MRM). La validación del método confirmó una alta precisión y exactitud en las muestras de control de calidad a 5, 25 y 100 ng/mL. El método establecido se aplicó a la determinación de poblaciones envenenadas e infectadas. Los resultados mostraron que después de la extracción con acetato de etilo, PGD<sub>2</sub>, PGE<sub>2</sub> y PGF<sub>2</sub>α exhibieron una buena linealidad tanto en la albúmina sérica bovina como en el suero humano. La precisión y exactitud del método tuvieron valores RSD de menos del 15%. La aplicación de este método para medir el suero de pacientes intoxicados con diquat o infectados reveló que los niveles plasmáticos de PGD<sub>2</sub>, PGE<sub>2</sub> y PGF<sub>2</sub>α fueron 0,18 ± 0,07 ng/mL, 0,64 ± 0,38 ng/mL y 1,04 ± 0,82 ng/mL, respectivamente. Cabe destacar que hubo una alta correlación positiva entre los niveles de PGF<sub>2</sub>α y las concentraciones plasmáticas de DQ. En conclusión, UPLC-MS/MS puede servir como una herramienta confiable para la cuantificación de PGF<sub>2</sub>α, PGE<sub>2</sub> y PGD<sub>2</sub> en entornos clínicos.

**KEYWORDS:** PG, determination, patient, UPLC-MS/MS, plasma

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