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Protocol for the Visualisation of Axial Temperature Gradients in Ultra High Performance Liquid Chromatography using Infrared Cameras.

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Abstract.

A protocol was developed for the visualisation of axial temperature gradients on a Kinetex column (1.3 μm C18 100 Å 50×2.1 mm) operated at near maximum pressure of the system (P_{max}) using an infrared camera. Real time viscous frictional heating effects across the entire column length was observed, and showed that with increasing flow rate there was an increase in the maximum temperature of the column, and the difference between the inlet and outlet temperatures. Temperature profile data over the entire length of the column revealed the dynamics of heat exchange processes along different parts of the column, and raises the question on potential heating effects on eluents. The axial temperature gradients of eluents such as pure methanol, isopropyl alcohol and acetonitrile near P_{max} were compared; finding that acetonitrile which had the highest flow velocity at P_{max} gave the highest overall temperature increase for these eluents.

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