

FORMULATION DESIGN OF COMPLEX FLUIDS BASED PRODUCTS THROUGH DIFFUSING WAVE SPECTROSCOPY (DWS)

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Complex fluids and soft matter systems are ubiquitous in consumer and cosmetic products and also in products found across many other industrial sectors encompassing foods, paints, coatings, biopharmaceutiucals etc. A critical aspect in the formulation design and optimization of these complex fluids based products is the maintenance of stability and enhancement of the sensory and functional performance. This requires establishing and optimizing the microstructure-property-performance linkages in these complex fluids. Since complex fluids are structured on multiple length scales and undergo dynamics over a wide range of timescales, the establishment of such linkages requires experimental tools that allow access to these length and time scales.

Diffusing Wave Spectroscopy has emerged as a versatile experimental technique that allows unique insights into the microstructure/dynamics/rheology of complex fluid based products, allowing the design and optimization of formulations for enhanced performance benefits. This talk reviews a number of different examples and applications of DWS that are relevant for formulation design. This will include sizing, rheology and stability monitoring in emulsions, rheology of polymers to understand short time dynamics and monitoring the effect active/drug release has on the evolution of a micellar system.

1. M. Reufer *Journal OF Pharmaceutical Sciences* 103:3902–3913, 2014
2. D. Gaudino et al., *PCCP*, 19, 2017, 782.
3. LS Instruments Application Notes