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Title:	Salt crystal growth in interacting drops of a complex biopolymer: Statistical characterization using FESEM images
Authors:	Choudhury, M.D. (/jspui/browse?type=author&value=Choudhury%2C+M.D.)
Keywords:	Drop-drying Pattern formation Crystal growth Interacting drops
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Abstract:	<p>A simple colloidal drop generally forms ring like patterns after drying. The deposition morphology of the dried drop changes significantly when such a drop dries in the vicinity of another similar drop. Here we present an observational study and statistical analysis of the patterns formed inside an isolated as well as interacting drops of gelatin containing sodium sulfate (Na₂SO₄). In all the cases, multiple concentric regions of solute particles combined with the polymer gel appear as the drops dry up. Needle crystals of sulfur and coacervates of salt and gelatin are visible in some regions. The outer region becomes non-uniform, so does the size distribution of the needle crystals and coacervates. The non-uniformity increases with proximity of the drops. Here we propose a novel mechanism of growing patterns inside the single drop during drying and correlate that with the results obtained for interacting drops. This study and the proposed mechanism provide insights into the future studies of drying drops under different physical conditions. Further we explore the statistical characteristics of the single and interacting drops using the field emission scanning electron microscopy (FESEM) images. Next, we report fractal and image texture analyses along with object shape statistics of the drop FESEM images, under various experimental conditions. Several statistical hypothesis tests have been carried out to identify the most significant features.</p>
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