Pattern formation from dried drops can be used to identify adulterated medicines YOJANA CARREON1, Instituto de Investigaciones en Materiales, Universidad Nacional Autonoma de Mexico, IVAN CIPRIANO-URBANO, Universidad Autonoma de Coahuila, FRANCISCO SOLORIO-ORDAZ, JORGE GONZLEZ-GUTIRREZ, Facultad de Ingenieria, Universidad Nacional Autonoma de Mexico, ROBERTO ZENIT, Instituto de Investigaciones en Materiales, Universidad Nacional Autonoma de Mexico — It is estimated that in Europe, from 2009 to 2012, 12.8 million of patients were exposed to counterfeit medicines. In Mexico, it is suspected that, between 2006 and 2013, many children suffering from cancer received distilled water instead of chemotherapeutic drugs. Fluid mechanics can be used to prevent such vile acts. Here we propose a simple method to detect the authenticity of medical substances, considering the patterns formed by dried drops. The method is based on the structural analysis of patterns generated after the solvent of a drop of liquid medicine has evaporated over a solid substrate. We exploit the capillary flux and the ionic interactions as a natural aggregation mechanism to form patterns, which reveals unique structures for each active ingredient or drug. We demonstrate that the first-order statistics (FOS) and gray level co-occurrence matrix (GLCM) are sufficient metrics to distinguish among deposits generated by pure and adulterated drugs with an accuracy greater than 90%.

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