

Geometric mathematical analysis of the images: the fractal dimension in the shape of Sensitive Crystallisation

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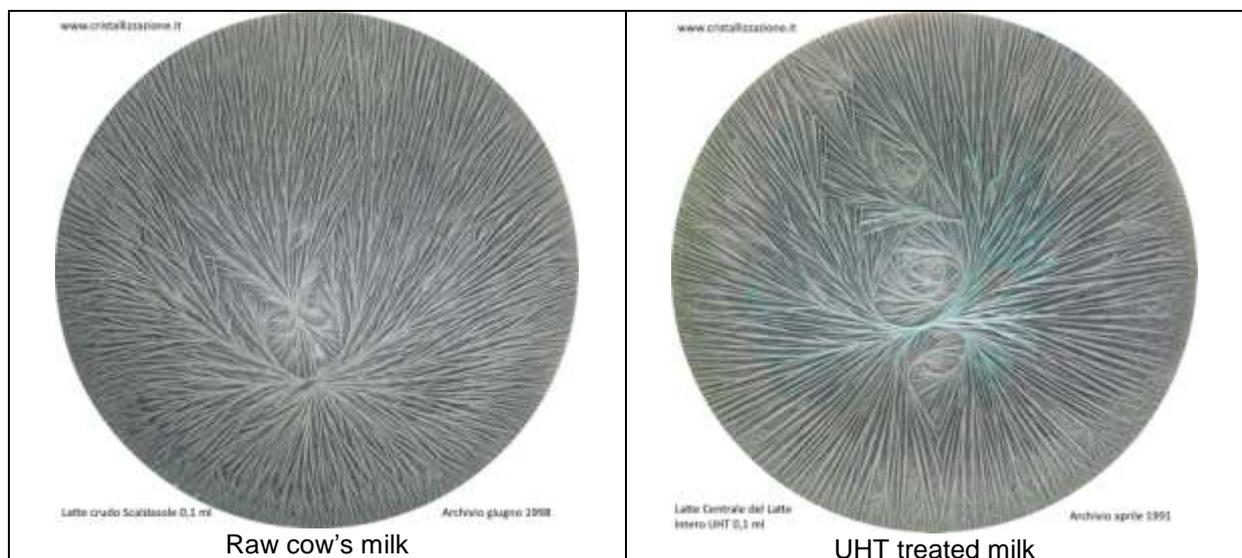
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Keywords

Sensitive Crystallisation, fractal dimension, Capillary Dynamolysis, morphogenetic field.

Abstract

Often the experience of the researchers in the field of Sensitive Crystallisation is that the differences between the images are very clear and easy to point out. It's easy to show - and to understand - to an open-minded attendance the different structure of the images like those obtained - for example - from raw cow's milk compared with those resulting from the milk treated with the system UHT (Ultra High Temperature).



- The view-sensorial obviousness, however, is denied by Institution and by the "leading scientific paradigm" that charging with an "subjectivite" approach and estimation and with the absence of any "numerical" data, that could be entitled to "objectify" and then "attest" the results.

- For this reason, for several years, we have studied throughly a method that would allow the "measurement" of particular elements into the images, that could be point out and compare with mathematical - statistical criteria.

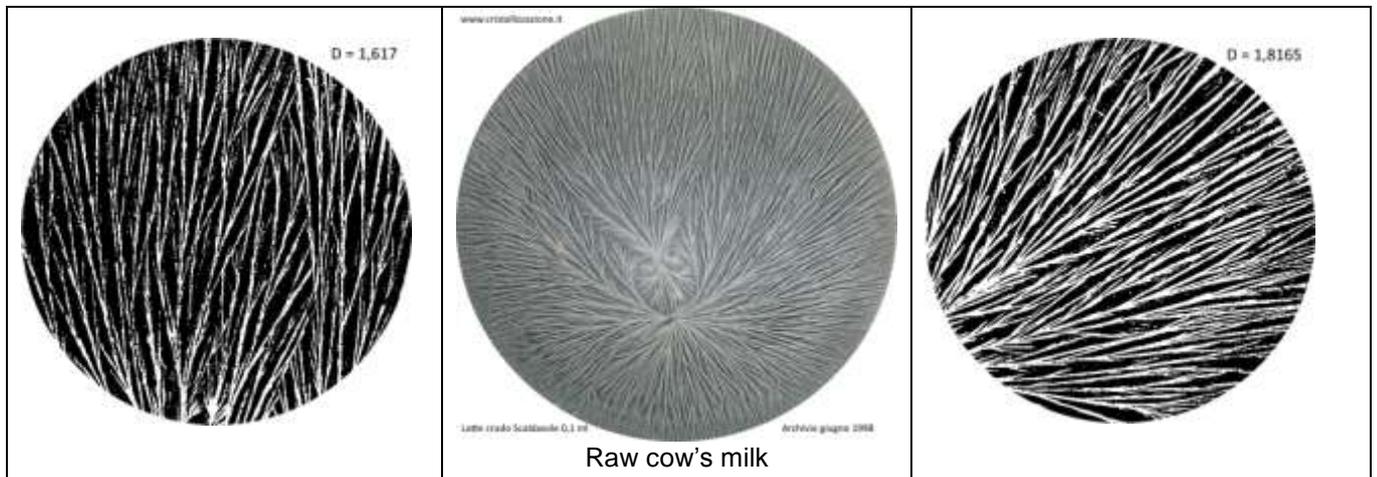
- We apply the nowadays technology to upload and analyser the sensitive cristallisation images. "The pattern" selected for the mathematic value and for the "shape" of the sensitive cristallization is the "fractal dimension".

- One of the most obvious differences and feature in the two distinct milks of the sensitive cristallisation (looks at the milk cristallization below) is the the "number" of main and secondary branches, that result with the raw milk are with no-doubt increased.

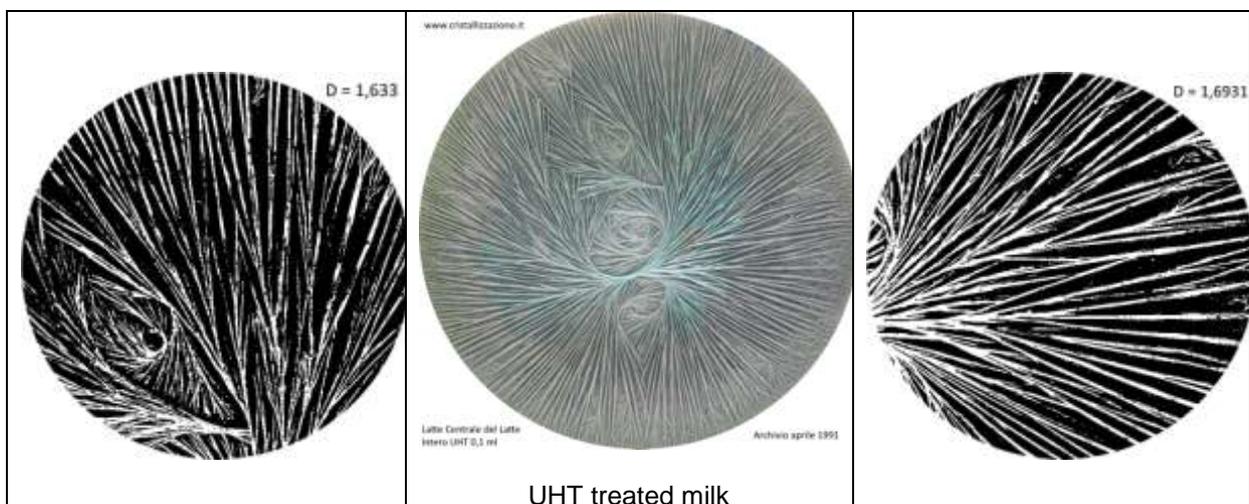
- The increase of fractal dimesion, is directly matching with the major number and propagation of the crystals, that will trend to come closer to "D=2".

1 | MEASURE:

- To measure and compare this potential greater propagation of the crystal in the crystallization plate, we have created and photographed (Canon Power Shot A590 - macro option) 16 tests of sensitive cristallisation with raw cow's milk and 16 tests of sensitive cristallisation with milk treated UHT, according to Pfeiffer method that we use as a standard in our lab:
- Plain glass plate diam. 9 cm - 0.17 g $\text{CuCl}_2 \cdot 2\text{H}_2\text{O}$
- Raw milk / UHT milk 0.10 ml - total 6.00 ml aqueous solution by repetition - 5 repetitions per sample
- $T = 30^\circ \text{C}$ - U. Rel. = 60% - crystallization controlled environment for immobility and horizontality of the shelves.
- For each image, we practice the following analysis protocol: with the help of the Paint-net program: great circle cutout - resize: 100 - text
- then trimming a circle with a diameter 600 (two zones) ---> Settings: Black and white ---> View: zoom + twice ---> Brightness -30 --- +100 contrast ---> Save
- Thanks to the software "Imagej1.42" with the protocol Open (choose picture)
- > Process --> Binary --> Make binary -----> Analyze --> Tools --> Fractal box count (only box number 2,3,4,6,8,12) --> OK.



In this way we get from 64 cristal images a series of values of the fractal dimension ("D") that we subjected to "F" test according to the following formula (see the attach table)
As shown the result is very significative, above 99%



2 | CONCLUSION:

The mathematical-geometric data processing demonstrate on one side that there is a clear difference in the conformation and in the crystals's number that the Sensitive Cristallization makes in the presence of different quality milks and, on the other side, that this difference can be quantified and measured through an appropriate equipment and application of information technology and mathematical algorithms.