

Original article

Remnants of Material: The Structural Study of High-Diluted Compounds

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Abstract

Background In recent centuries, high-diluted (HD or UHD) compounds have shown some effects, that have always been doubted. Most papers have shown various effects of UHDs on living organisms (humans, plants, animals, and bacteria). But so far until now no chemicals or physically visible different substances from the placebo have been found. This research, unlike other published articles, is not about the effects of UHDs but it is about the nature and structure of UHDs themselves. This research shows structural differences between UHDs and placebo. It presents different, new, and perplexing chemical results in the structure of UHDs. **Methods** To prepare eleven selected samples, commercial UHDs from various plant, animal, mineral, chemical, and nosode resources were used in a dilution of 1,000,000X (1000cH or 1M). The experiments (90) were designed using the Design Expert 7.0.0 based on the Central Composite Design (CCD) statistical algorithm. The designed experiments related to four quantitative factors of time (A), dilution, amount of UHDs (B) light intensity (C) and temperature (D), and a qualitative factor of UHDs type (E). The formed visual residues were selected, imagined, and morphologically studied using Scanning Electronic Microscopy (SEM). **Results** The substances which gradually start taking shape appear in the solutions, that we've called these substances Essential Original Matter (EOM). EOMs formed some residues in different sizes and shapes, and suspended in water are observable by the naked eye. They are in tubular and layered forms which are solidified and strong with some curvatures and bending. They have an individual structural feature that is distinct and repeatable. **Conclusion** The production of some residues in UHD's solution (we called in EOMs) is reported for the first time. Results prove that UHDs are distinct from placebo in addition to the effects shown in the previous papers. These materials have different and unique structure. According to the current laws of chemistry, no traces of the above materials are expected to be seen in these types of solutions, but the presence of nanomaterials and nano-associates has been reported in the last few years. Our results are by these findings.

Keywords: High dilutions, EOM, image production, electronic microscope.

Introduction

In the present study, instead of observing various effects and properties of highly diluted substances (HDs or UHDs) compared to water, the difference between the nature of UHDs and water is discussed. According to research on ultra-high diluted (UHD) compounds, UHD solutions expect to contain molecules beyond Avogadro number (each mole equals 6.02×10^{23} molecules). So based on what was



expected in chemistry, they should contain no molecules. In contrast, many reports show UHDs different properties and effects compared to water [1,2].

The application of high dilutions in the field of plants

As UHDs were shown to be effective in agricultural processes [3]. For example, in a study on *Pisum sativum* L, it was found that the length of the stem treated with UHD (*Calcarea carbonica*-30X) for 14 days after planting caused a significant elongation and strength of the stem [4]. Applying *Arsenicum*-45X has increased the germination rate as well as the viability of wheat seedlings under drought and salinity stress [5]. Marotti et al., studied the rate of germination and growth controlling gene expression in *Triticum aestivum* L., under ultraviolet-visible radiation [6].

Stress brought on by these waves significantly lowers the expression of germination and growth genes. They discovered that the expression of these genes and tolerance to UV and visible radiation significantly increased in seeds treated with arsenicum-30X. Even at low dilutions, silver nitrate has been one of the most mutagenic and growth-reducing substances for *Triticum aestivum* coleoptiles since 1926 [3]. A study by Scherer-Pongratz et al., found that UHD silver nitrate at 30 X dilution reduced the plant germination and growth, and significantly increased seedling length (up to 40%) and strength. Moreover, the study on *Sclerotinia sclerotiorum* fungal infection on *Phaseolus vulgaris* L., showed that UHD application of *Calcarea carbonica* (at 12X and 30X dilutions) application led to plant resistance to the fungus. Also the application of *Phosphorus*-12X, 30X stopped fungal mycelial growth in infected plants [7].

Another study on controlling the population of *Meloidogyne incognita* in *Solanum lycopersicum* L found that *Thuja occidentalis*-30X, 50X, and 200X increased the activity of plant defense enzymes, such as peroxidase, polyphenol oxidase, and phenylalanine ammonia-lyase. It also played an effective role to control and reduce the number of pests [8]. A different study on *Solanum lycopersicum* L., found that *Arsenicum* - 80X, *Nitricum Acidicum* - 80X, 100X, and *Staphysagria* - 30X, 60X stopped the growth and removal of *Alternaria solani* mycelium [9]. Studies by Endler et al., on the effects of Gibberellin UHD at 30X dilution on germination and physiological properties of Capo variety - *Triticum aestivum* showed that UHD has a great effect on the stem length and increases the plant resistance to cold and drought [10].

In Brazil, ultra-high dilutions have made inroads into the agricultural sector. The majority of clients are farms producing commodities such as coffee, soybean, citrus, livestock, and dairy. The contribution of ultra-high dilutions mainly *Arnica Montana*, *Belladonna*, *Carbo vegetabilis*, *Staphysagria*, *Nux vomica*, *Sulphur*, and *Calcarea carbonica* in re-establishing the vitality of these systems is particularly effective owing to their poor state of health before treatment [11].

The effects of high dilutions on microorganisms

Other studies showed [12–15] that UHDs affect cells and microorganisms. It was reported that *Rhus toxicodendron*, *Atropa belladonna*, and *Arnica montana* (each at X30 dilution) can affect gene activity against invasive bacteria and reduce their platelet count by approximately 24, 16, and 25%, respectively. Arsenic trioxide (at X35 dilution) significantly inhibits spore germination rate (up to 60%) and helps reduce dark spots caused by *A. brassicicola* in cabbage by about 40% [14].

A study on the effect of ultra-high diluted silver nitrate compounds on *Escherichia coli* and *Staphylococcus aureus* compared to silver nanoparticles showed that the growth profiles and volatile metabolites have significantly changed [15].

Influences of high dilutions on eukaryote cells

Some UHDs have led to cell cycle delay and apoptosis in two breast cancer cell lines; i.e., (MCF-7 and MDA-MB-231) [16]. UHD prepared from breast cancer tissues, *Phytolacca Americana*, *Conium*

maculatum and *Thuja occidentalis* were able to reduce the survival of human breast adenocarcinoma cells by about 20-30% in MCF-7, MDA-MB-231, and HMLE.

Non-biological (chemical/physical) studies on high dilutions

Various non-biological empirical studies show that UHDs have different physicochemical properties from their aqueous solution [17–24]. These differences were investigated and published in the field of pH [22], density [24], electrical conductivity [22,25,26], ultraviolet spectroscopy [19], Scanning Electron Microscopy [27,28], and calorimetric properties [25]. Some believe that the variations in these properties are in terms of a change in the structure of the solvent during the preparation techniques. Recent studies show that some physicochemical properties of UHDs change over time and/or in different storage containers [29], which are difficult to explain with classical pharmacological principles [19].

Hypothesis and goals of this research

As mentioned earlier, recently, many studies were conducted on the effects of UHDs, and the results grabbed scientist's interest [30–35]. But yet still there is a great, constant question about a missing puzzle. If the proof of the UHDs effect of the matter was repeatedly presented on various living organisms, why do they have no different pattern compared to water in microscopic and macroscopic observations?

The published results on using UHDs cannot be denied. Therefore, we choose this question; “what is the essence and exists in UHDs that represents their biological effects?”. In this matter, UHDs from eleven different sources, including chemical compounds, certain plant extracts, animal products, and nosodes were combined with ultra-pure water for the first time and their essences were studied. The residues are observed in the liquid media that are suspended, visible, and reproducible. Furthermore, these samples have microscopically and even macroscopically different residues from the pure water pattern.

For a valid and reproducible study, a statistical method to observe these residues in UHDs solutions was designed and implemented. The scanning electron microscopy (SEM) imaging method was used to monitor these observable residues more accurately. The mechanism of electron microscopes is similar to that of light microscopes, except that instead of light, electron beams are applied, and magnetic lenses are used instead of optical lenses. The images using this method have much better resolution compared to light microscopes. The magnification of about 5 to 1,000,000 times and the ability to observe details more clearly. The unique features of SEM made it possible for us to image these residues. Observing these results led us to ask the following questions:

- Is it possible to observe some residues in ultra-high diluted liquids?
- What is in the ultra-high dilutions?
- Is it possible to observe anything besides water in ultra-high dilutions?
- Do the compounds still have observable effects after dilution?
- Can water contaminants play some role in UHDs?
- Can more detailed studies lead us to deeper conclusions?

Materials and methods

The compounds diluted at 1,000,000X (1000cH or 1M) dilution, approved by Food and Drug Administration (FDA) were purchased from Boiron Co. (USA), including metal elements: Mercury (Me) and Platinum (Pl), and non-metallic elements: *Sulfur* (Su) and *Phosphorus* (Ph), chemical compounds: *nitric acid* (NA), plant extracts: *Ignatia amara* (IA) and *Delphinium staphisagria* (DS), animal products: the inner layer of *Calcareo carbonicum* shell (CC) and the venom of *Lachesis muta* (LM) and nosode: scabies of *Psorinum*-Ps and *Carcinosin*-Ca breast cancer cells. At all stages, ultra-

pure water of Spectrometric grade of Merck Co., (Germany) is used. The initial solutions of UHDs were far from magnetic fields and X-rays and kept in the dark and at a certain temperature before the study. All preparation stages were performed under standard conditions free of dust and volatiles. Moreover, nitrile gloves without powder and washed and sterile containers were used at all laboratory stages.

Sample preparation

Prototyping is done in glass containers. The dishes were first washed with hydrochloric acid (1 M) and then sterilized with non-sulfated detergent solutions (for 20 min at 121° C and 1/1 bar). Before preparing the samples, the bottles were washed with distilled water and then ultra-pure water (free from organic and inorganic compounds and sterile, does not have any UV absorbance, <0.01 micro Siemens conductivity, filtered with a 0.1-micrometer filter and dialyzed using 1 kDa bag to remove any organic debris) and dried at 35-40 °C in a dust-free medium. Pure water droplets were used as control and empirical controls. Other environmental conditions, including temperature and light, were studied in the optimization process.

Statistical design of experiments and optimization of sample preparation

Design Expert 7.0.1 software, Central Composite Design (CCD), or Methodology Response Surface (RSM) algorithms were used to survey and determine the best conditions for preparing and studying UHDs. Among the above 11 UHDs, three samples i.e., *Calcareo carbonicum* (CC), *Lachesis muta* (LM.) and *Ignatia amara* (IA) was selected to optimize the preparation conditions. After optimizing the sample preparation conditions, the other eight UHDs were prepared and studied under optimal conditions.

As shown in Table 1, we have used four quantitative factors (each at 5 levels) are selected, including A: the mixing time, B: the number of droplets of UHDs mixed with water, C: the light intensity, and D: the temperature, and a qualitative factor (at three levels); E: the types of UHDs were studied. A total of 90 tests, including 24 non-centralized tests and 6 centralized tests to evaluate standard deviation and modeling error, for each, we had three qualitative factors designed (Table 2). Quantitative factors of temperature, light, and range were selected according to the study of other references and warnings announced by other scientists and researchers about the vulnerability of UHDs (Table 1).

Table 1): Factors together with their notations and levels for the central composite design. ($\alpha : 2$)

Factor names	Units	Levels of factors				
		- α	-1	0	+1	+ α
A: Interaction time	min	1	10	20	30	40
B: Number of UHD droplets	a.u.	1	10	20	30	40
C: Light intensity	K lux	1	5	15	25	35
D: Temperature	°C	15	25	40	50	60
E: Type of UHDs	<i>Calcareo carbonicum</i> (CC)	<i>Lachesis muta</i> (LM)	<i>Ignatia amara</i> (IA)			

The duration (minutes) of observing the first Essential Original Matter (EOM) visible to the naked eye, was recorded in each of the experiments and considered as the response (Table 2). The optimum production conditions of EOMs were analyzed after analysis of variances (ANOVA) by software

(Table 3). The best preparation conditions were selected in such a way that observable EOMs were produced in the shortest time (Video No. 1).

Table 2 - Experiment designed based on factors using central composite design (CCD).

In this table Ran., states the randomizations of experiments, A: Interaction time (min), B: Number of UHD droplets, C: Light intensity (K lux), D: Temperature (°C), and E: Type of UHDs and the Response is the duration (min) of visible EOM production.

Ran.	Run	A	B	C	D	E	Response	Ran.	Run	A	B	C	D	E	Response
74	1	30	10	25	50	IA	17	38	31	30	30	25	25	LM	17
26	2	20	20	15	40	CC	17	43	32	10	10	25	50	LM	17
70	3	30	10	5	50	IA	20	77	33	1	20	15	40	IA	50
68	4	30	30	25	25	IA	25	88	34	20	20	15	40	IA	13
5	5	10	10	25	25	CC	50	4	35	30	30	5	25	CC	8
36	6	30	10	25	25	LM	14	87	36	20	20	15	40	IA	13
29	7	20	20	15	40	CC	50	11	37	10	30	5	50	CC	20
81	8	20	20	1	40	IA	13	60	38	20	20	15	40	LM	17
73	9	10	10	25	50	IA	25	21	39	20	20	1	40	CC	8
46	10	30	30	25	50	LM	13	51	40	20	20	1	40	LM	10
55	11	20	20	15	40	LM	14	40	41	30	10	5	50	LM	14
72	12	30	30	5	50	IA	4	34	42	30	30	5	25	LM	6
23	13	20	20	15	15	CC	17	33	43	10	30	5	25	LM	10
66	14	30	10	25	25	IA	17	7	44	10	30	25	25	CC	17
31	15	10	10	5	25	LM	4	16	45	30	30	25	50	CC	10
30	16	20	20	15	40	CC	25	44	46	30	10	25	50	LM	17
12	17	30	30	5	50	CC	13	59	47	20	20	15	40	LM	25
67	18	10	30	25	25	IA	25	58	48	20	20	15	40	LM	50
6	19	30	10	25	25	CC	14	47	49	1	20	15	40	LM	50
82	20	20	20	35	40	IA	3	50	50	20	40	15	40	LM	14
24	21	20	20	15	60	CC	17	1	51	10	10	5	25	CC	8
35	22	10	10	25	25	LM	17	13	52	10	10	25	50	CC	8
37	23	10	30	25	25	LM	25	48	53	40	20	15	40	LM	50
10	24	30	10	5	50	CC	14	49	54	20	1	15	40	LM	50
80	25	20	40	15	40	IA	13	79	55	20	1	15	40	IA	25
42	26	30	30	5	50	LM	20	71	56	10	30	5	50	IA	13
89	27	20	20	15	40	IA	50	69	57	10	10	5	50	IA	5
39	28	10	10	5	50	LM	18	32	58	30	10	5	25	LM	14
54	29	20	20	15	60	LM	14	63	59	10	30	5	25	IA	8
90	30	20	20	15	40	IA	14	41	60	10	30	5	50	LM	17
78	61	40	20	15	40	IA	13	19	76	20	1	15	40	CC	50
75	62	10	30	25	50	IA	50	8	77	30	30	25	25	CC	25
2	63	30	10	5	25	CC	14	65	78	10	10	25	25	IA	14
22	64	20	20	35	40	CC	10	9	79	10	10	5	50	CC	10
83	65	20	20	15	15	IA	14	62	80	30	10	5	25	IA	3

18	66	40	20	15	40	CC	25	85	81	20	20	15	40	IA	14
53	67	20	20	15	15	LM	17	86	82	20	20	15	40	IA	17
3	68	10	30	5	25	CC	8	15	83	10	30	25	50	CC	17
17	69	1	20	15	40	CC	17	76	84	30	30	25	50	IA	17
14	70	30	10	25	50	CC	14	25	85	20	20	15	40	CC	17
27	71	20	20	15	40	CC	50	57	86	20	20	15	40	LM	14
84	72	20	20	15	60	IA	17	45	87	10	30	25	50	LM	12
64	73	30	30	5	25	IA	8	20	88	20	40	15	40	CC	17
56	74	20	20	15	40	LM	17	61	89	10	10	5	25	IA	8
52	75	20	20	35	40	LM	8	28	90	20	20	15	40	CC	25

Instrumental method of studying EOMs under optimum conditions

In an optimum condition, the produced visual EOMs were picked up using a micropipette (Eppendorf Co., USA). The separated EOMs fixed on clear and sterile glass lamellae. The lamellae were dried in a dark and dust-free medium at a temperature of 30-40 °C. The surface of the produced lamellas was coated with gold or carbon up to 10 nm thick before being mounted on Hitachi SEM plates. After that, the samples were examined using a scanning electron microscope (SEM SU3500, Hitachi Co., Japan). Three replications of sampling and imaging were carried out for every sample. At this stage, the lamellae with no matter and the lamellae of pure water as a layer were used as the control.

Results

What is the suspended and unknown matter in UHDs? The most common ambiguity about the essence of UHDs is that they are much diluter than the molar number of the Avogadro hypothesis and should not contain any matter [36].

Statistical optimization and analysis of EOMs preparation

The latest observations show unique EOMs in UHDs. It was studied how environmental conditions affect the emergence of EOMs and the fastest conditions and their observation are introduced. Among the various parameters affecting the sample preparation; temperature (D), the ambient light of the experiments (C), the number of UHDs droplets (B) of the re-dissolved in ultra-pure water, and the time (A) of their combination with ultra-pure water (detailed in Tables 1 and 2) are investigated for eleven selected UHDs. Table 2 shows the designed experiments and the results of each experiment in detail. For better observation of readers, a video (without interruption or time-lapse) of the moment UHDs are poured into water, the production of EOMs, and finally their separation from water is provided for further studies (Supplementary No. 1).

Analysis of variance (ANOVA) is an analysis tool used in statistics that splits an observed aggregate variability found inside a data set into two parts: systematic factors and random factors. The systematic factors have a statistical influence on the given data set, while the random factors do not. Analysts use the ANOVA test to determine the influence that independent variables have on the dependent variable in a regression study. The statistical effect of the selected conditions was analyzed (Tables 3, Figures 1 and 2). The value of F in this table is the ratio of the mean square error of each treatment to the result obtained from repeating the experiment at the design center point. The F value is used in the analysis of variance (ANOVA). It is calculated by dividing two mean squares. This calculation determines the ratio of explained variance to unexplained variance. The F distribution is theoretical. According to the statistical study (with an accuracy of 0.5 at 99%), single factors of interaction duration (A), several UHD droplets combined with water (B), and ambient light intensity (C) affected EOMs formation. Among the interactive factors, the duration of interaction with each of the factors of the number of UHD droplets combined with water (AB), the ambient light

intensity (AC) and UHDs type (AE), as well as the interaction between the ambient light and the temperature (CD) affect the rate of EOM formation (Table 3).

Table 3 - Analysis of variances (ANOVA) for the study of strands production of UHDs.

Source	Some of Squares	df	Mean Square	F Value	P Value prob>F	
Model	21.33525	24	0.888969	1.782688	0.0343	significant
A-Interaction time	0.472059	1	0.472059	0.94664	0.3342 *	
B-Number of globules in water	0.45371	1	0.45371	0.909844	0.3437 *	
C-Light intensity	2.365846	1	2.365846	4.744335	0.0330 *	
D-Temperature	0.229255	1	0.229255	0.459735	0.5002	
E-Type of UHD	0.197583	2	0.098791	0.198111	0.8208	
AB	0.39958	1	0.39958	0.801295	0.3740 *	
AC	0.397854	1	0.397854	0.797835	0.3750 *	
AD	0.012373	1	0.012373	0.024812	0.8753	
AE	0.97603	2	0.488015	0.978638	0.3813 *	
BC	0.039519	1	0.039519	0.079249	0.7792	
BD	0.030429	1	0.030429	0.061021	0.8057	
BE	0.462115	2	0.231057	0.46335	0.6312	
CD	1.865362	1	1.865362	3.740692	0.0575 *	
CE	0.534724	2	0.267362	0.536153	0.5876	
DE	0.502224	2	0.251112	0.503566	0.6067	
A ²	1.647461	1	1.647461	3.303725	0.0737	
B ²	0.286611	1	0.286611	0.574755	0.4511	
C ²	8.818683	1	8.818683	17.68449	< 0.0001	
D ²	0.66868	1	0.66868	1.340934	0.2511	
Residual	32.4134	65	0.498668			
Lack of Fit	16.28165	50	0.325633	0.302788	0.9992	not significant
Std. Dev.	0.706164					

Details: The model is significant and the Values of "Prob > F" less than 0.5000 indicate model terms are significant. In this case, A, B, C, AB, AC, AE, and CD are significant model terms. This model can be used to navigate the design space.

$$\begin{aligned} \text{(Time of strand production)}^{0.39} = & 3.164089344 - 0.087040973 \times A - 0.081106387 \times B + 0.286568165 \\ & \times C + 0.049605939 \times D + 0.039753038 \times E[1] + 0.034763876 \times E[2] - 0.091239124 \times AB - 0.091041919 \times AC - 0.015953122 \times AD \\ & + 0.082463191 \times AE[1] + 0.083548258 \times AE[2] + 0.028693469 \times BC - 0.025017975 \times BD - 0.061179957 \times BE[1] - \\ & 0.05295237 \times BE[2] - 0.196235122 \times CD - 0.018566062 \times CE[1] - 0.099910423 \times CE[2] - 0.119630987 \times DE[1] \\ & + 0.042622402 \times DE[2] + 0.145814673 \times A^2 + 0.060819167 \times B^2 - 0.398387947 \times C^2 - 0.108305108 \times D^2 \end{aligned}$$

The interaction among these factors at the entire selected interval can be seen in Figure 1. The AB factor has an increasing or decreasing effect on the speed of thread formation. On the other hand, CD and AC factors initially increase the formation speed and then decrease it, or vice versa. While the CD factor has a distinct influencing peak, the AC factor has a wider influencing range.

As shown, the speed of EOMs formation increased with the increments of the number of UHD droplets combined with water up to 20-25 min, but then, the rate of formation reduced (Figure 1a, b, and c).

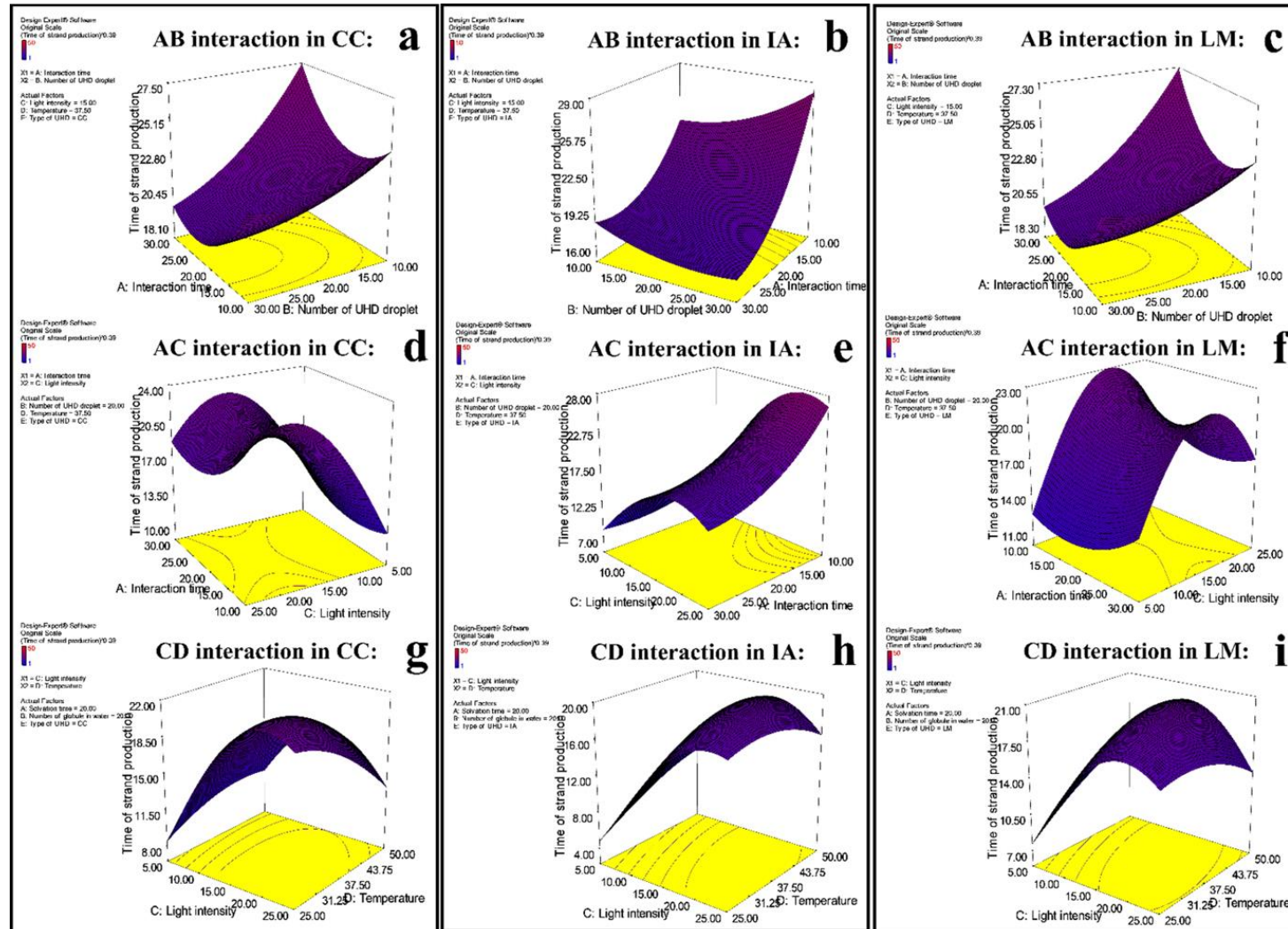


Figure 1 – Three-dimensional response surface of interactions of (a,b,c): Interaction time and number of UHD droplet-AB, (d,e,f): Interaction time and the light intensity-AC and (g,h, i): Temperature and the light intensity-CD in three different UHDs of **CC: *Calcarea carbonicum***, **IA: *Ignatia amara*** and **LM: *Lachesis muta***.

Figures 1d, e, and f show that for all three selected UHDs, the rate of EOM formation increases as the ambient light intensity reduces. It is observed that by increasing temperature, first, the rate of EOM formation reduces and then it increases (Figure 1g, h and i).

According to statistical studies and results, suitable conditions for the shortest time production [28] of EOMs were predicted. Observable EOMs will undoubtedly emerge when mixing 20 to 30 drops of UHD at 25 °C and 5 K lux for 25 minutes, according to software findings.

Structural study of EOMs

In the previously published electron microscopy studies [27,28], the results showed the presence of substances in UHDs, but these results did not include evidence of the exclusive characteristics of any type of UHDs and did not have the ability to distinguish them from each other. Under these projected circumstances, samples from eleven kinds of UHD were collected and the individual formed pattern (EOMs) are imaged. EOMs formed under optimum circumstances were isolated and imaged using SEM as stated before (Figure 2-12). In general, EOMs are visually observable tubular and layered forms with an integrated and strong curvature texture. They have some unique detailed surface morphological and structural properties (Table 4). Many physical and chemical studies reported on the molecular properties variations in water at different laboratory conditions [17,19,22–25,37–40]. Other researchers have attributed the unique properties of HD and UHD compounds to the clusters and arrangements of water molecules. In this research, the chemical nature of these compounds has not been discussed and it is suggested to be further investigated in the continuation of this research.

Table 4 - Morphological description of EOMs imaged from eleven sources

Figure No.	EOM	Superficial and structural morphological description
2A	<i>Calcarea carbonicum</i> - CC	Rough surfaces, irregular and sometimes scattered protrusions, discrete parts, longitudinal growths, with 2-3 micrometer longitudinal grooves
2B	<i>Lachesis muta</i> - LM	Multi-branched, curved, layered with small and large protrusions
2C	<i>Ignatia amara</i> - IA	Thin, needle-shaped, spiral, at the end with several petals, tubular end
2D	Mercury-Me	Plate structured, superficial, and strung disintegration, longitudinal fracture, and curvature
2E	Platinum-Pl	Plate structured, integrated with the least surface roughness, surface thin layered and stringed, longitudinal curvature, stacked at the end and sharpened
2F	Sulfur-Su	Polished and broken surfaces, needle ends, surface and twisted roughness
2G	Phosphorus-Ph	Smooth flat layers with low density, surface cavities of 1 to 2 micrometers, with curvature and longitudinal layers
2H	Nitric acid-NA	Narrow strings, the proliferation of strings in short and long sizes with a central mass
2I	<i>Delphinium staphisagria</i> -DS	Piece (non-string), polished and stacked layers, with detachment effects, stepped fractures
2J	Psorinum-Ps	Not integrated and rigid strings, having a broad structure with longitudinal torsional disintegration, rope-shaped with compression and asymmetric longitudinal depression
2K	Carcinosin -Ca	Stacked and uneven layers, spreading growth, longitudinal fractures and grooves, surface protrusions, and ridges of 2 to 20 μm

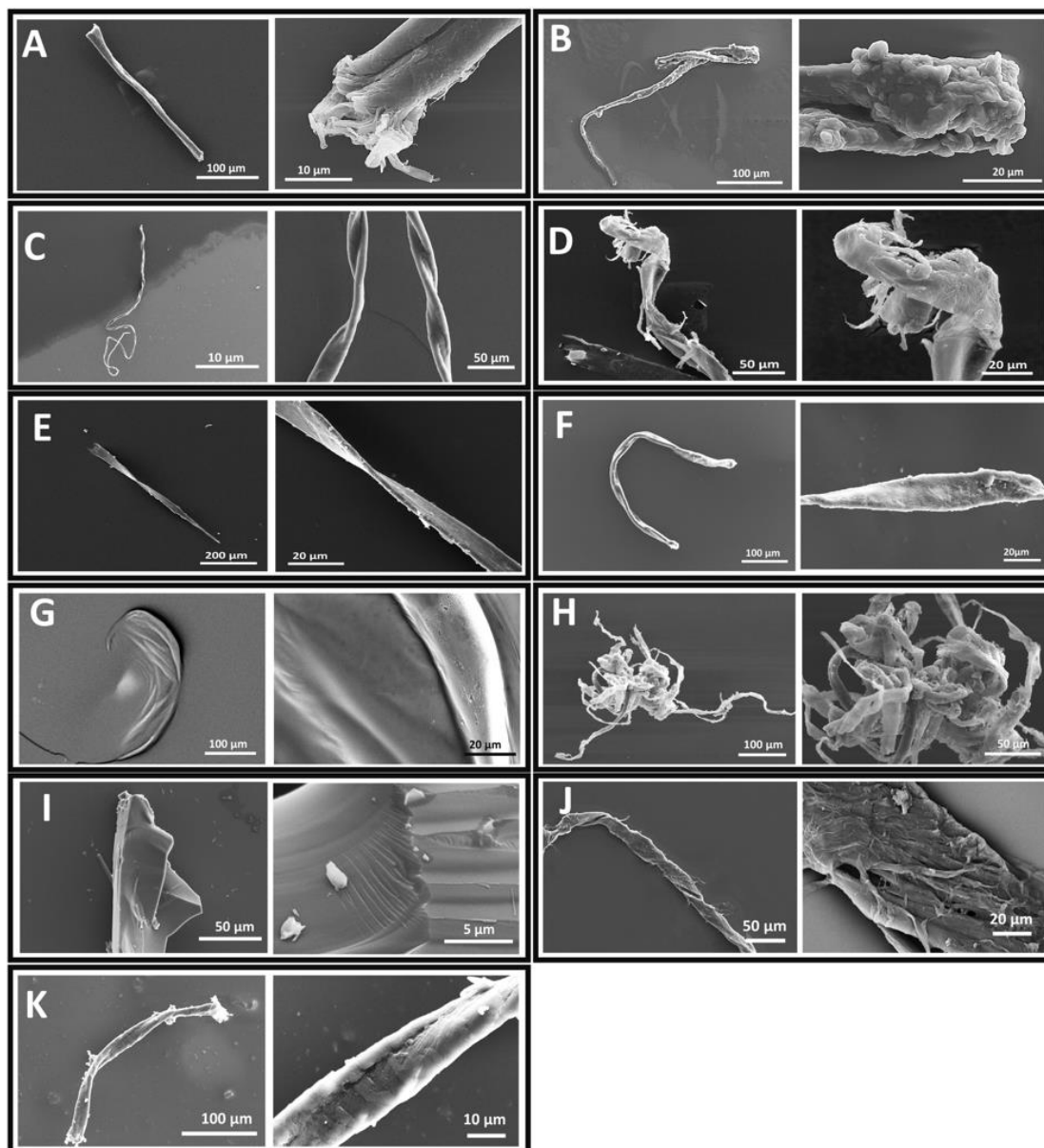


Figure 2 - Essential Original Matter (EMO) at a dilution of 10^6X . of **A:** *Calcareo carbonicum* (CC.), **B:** *Lachesis muta* (LM.), **C:** *Ignatia amara* (IA.), **D:** *Mercury* (Me.), **E:** *Platinum* (Pl.), **F:** *Sulfur* (Su.), **G:** *Phosphorus* (Ph.), **H:** *Nitric acid* (NA.), **I:** *Delphinium staphisagria* (DS.), **J:** *Psorinum* (Ps.) and **K:** *Carcinosin* (Ca.).

Discussions

According to the results, if the proposed cases are approved, then the continuation of such a study seems much more necessary. What comes to mind from the results obtained at this stage raises many questions, including:

- What is the chemical nature of EOMs?



- How or where are EOMs hidden before reaching an ultra-high diluted stage in higher potencies?
- Can we say that the essence of the matter remains in ultra-high dilutions?
- What other hypotheses can be expressed from the observation of EOMs?
- Is the biological effect of UHDs due to EOMs?

While defined properties for living residues, include having genetic content, metabolic capacity, reproduction, development and growth, mutation and repair, ability to sense environmental signals and respond to them, and finally Interdependency, which of the following properties do EMOs have?

Conclusions

Considering what is available in scientific reports and publications and what is discussed in this research, it can be concluded that:

- A. In addition to their different effects on water, highly diluted compounds are even macroscopically and microscopically varied.
- B. UHDs from different resources, are still visible, or in other words, it can be said that EOMs can be produced from any matter based on the highly diluted production process.
- C. EOMs have general similarities but also individual differences that make them unique.

Conflicts of interests

The authors declare that they have no known competing financial interests or personal relationships that could have appeared to influence the work reported in this paper.

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