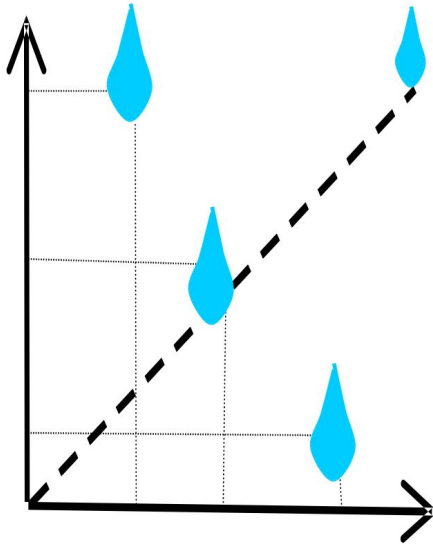


# HOMEOPATHY AND WATER

## Volume 1

### Experimental results on water treatment with high dilutions



Vicente Wagner Dias Casali  
Fernanda Maria Coutinho de Andrade

## **HOMEOPATHY AND WATER**

Volume 1

Experimental results on water treatment with high dilutions

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Fernanda Maria Coutinho de Andrade

**Viçosa – MG**  
**Brazil**  
**2012**

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## **HOMEOPATHY AND WATER**

### Volume 1

#### Experimental results on water treatment with high dilutions

Informative-discussive text with test results and interpretations of High Dilution phenomena based on the principles of Homeopathy.

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## **THANKS**

To God, present at all times. To Hahnemann,  
for the valuable science of Homeopathy. To the  
Agricultural Family, for their wisdom and simplicity.  
To the students of the Homeopathy course, for your  
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To family members for their love.

To friends, for the trust.

## **HONORABLE MENTION**

CNPq (National Council for Scientific and Technological Development).

CONAHOM (National Council of Homeopathy)

Grupo Entre Folhas (Group Entre Folhas Medicinal Plants)

## **DEDICATION**

To the Brazilian farming family.

To planet Earth.

The water.

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## INTRODUCTION

The purpose of this text is to disseminate experiences with highly diluted and succussioned preparations interpreted by the principles of Homeopathy aiming at basic knowledge about the responses of water.

This publication aims to stimulate research into technological applications of the Science of Homeopathy in water treatment. As a pioneering publication, it will contribute to the development and applicable, sustainable, natural, biological technologies that enable advances in water treatment in rural and urban areas.

Water, due to its simple constitution (in the chemical view), for its biological value, for the challenge to scientists or ethnoscience and for the significance of its physical structure, must be the center of attention of *Homo sapiens* intending to have descendants in time and space of this universe.

## CHAPTER 1

### EFFECT OF *ALUMINA* IN SOIL SOLUTION

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Keywords: Homeopathy, High Dilutions, Water treatment

#### Introduction

Water, with its physical-chemical characteristics, plays a fundamental role in the life of the soil. The soil is physically considered a porous mass, with part of the spaces occupied by the aqueous solution. Important reactions to plant development occur in the soil solution (MIRANDA et al., 2006). Among the main characteristics of Brazilian soils is high acidity, mainly due to high concentrations of iron, manganese and toxic aluminum in the soil solution.

#### The importance of studying water and soil solution

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It is related to the fact that plants absorb the nutrients that are present in this solution. The local acidity is analyzed in the soil solution (BRANDÃO & LIMA, 2002). The degree of soil acidity is expressed in pH units, which is related to the concentration of the H<sup>+</sup> ion in the soil solution. pH values increase as the H<sup>+</sup> concentration decreases.

The pH of the water and solution is an important indicator of the chemical conditions of the soil, as it interferes with the availability of several chemical elements essential to plant development, favoring or not their release (BRANDÃO & LIMA, 2002). The inadequate use and management of water, soil, fertilizers and pesticides, combined with the discharge of untreated effluents into rivers and lakes, have deteriorated the quality of surface waters and consequently the soil solution, causing damage to environmental quality and to plant development (QUIAN et al., 1994).

It is common practice in rural areas to reduce soil acidity with liming, which consists of adding limestone before planting. Limestone components (CaCO<sub>3</sub> and MgCO<sub>3</sub>) react with H<sup>+</sup> ions, increasing soil pH.

As an alternative to liming, homeopathic preparations are used, especially *Alumina*. This practice is quite common among farmers who adopt the principles of homeopathic science aiming to balance their agroecosystems (CNPq, 2007). Despite being part of the routine of agroecological farmers, the use of *Alumina*

aiming to correct soil pH has not been studied scientifically. There are few scientific studies confirming the hypothesis that *Alumina* promotes an increase in the pH of the soil solution. Homeopathy, understood as the science of high dilutions and therapy, provides resources aimed at

reaction of living systems promoting balance (CASALI et al., 2006).

In the science of Homeopathy, the choice of homeopathic preparation intended for the organism in imbalance is guided by the principle of similarity. The pathogenesis of the substance most similar to the imbalance determines the homeopathic procedure (LISBOA et al., 2005).

The basic preparation (mother tincture) of *Alumina* is obtained from aluminum oxide. Alumina is indicated in cases of acidity in living systems. It is recommended for organisms with slow metabolic processes, often associated with high levels of aluminum intoxication. Alumina promotes reaction and balance of these systems (CASALI et al., 2009).

The objective of the research was to evaluate the effect of five dynamizations of the homeopathic preparation *Alumina* in an acidified soil solution .

## **Materials and methods**

The experiment was conducted at the Soil and Water Homeopathy Laboratory, of the Department of Phytotechnics, at the Federal University of Viçosa, in 2011.

A completely randomized experimental design was adopted, with six treatments (3CH, 5CH, 7CH, 9CH and 11CH of *Alumina* and distilled water as control) and four replications, totaling 24 experimental plots. Homeopathic solutions were prepared in distilled water immediately before implementing the treatments.

When preparing the soil solution, the green clay sample was diluted in demineralized water. After 24 hours it was

the supernatant liquid was collected. This liquid had its pH adjusted to 4.0 with the addition of HCl, giving rise to an acidic soil solution.

In twenty-four 80 mL borosilicate bottles with 60 mL of the acidified soil solution, 5 drops of the treatments were applied, a single dose.

The pH was evaluated using the potentiometer, model DM-21. The pH was measured immediately after applying the treatments (pH-T1), 24 (pH-T2), 48 (pH-T3) and 96 hours (pH-T4) after implementing the treatments. The data were statistically processed by analysis of variance in the SAEG 9.1 program (2997). The means were interpreted using the Tukey test at 5% probability.

## Results and discussion

The soil solution was responsive to the treatments. The manifestation of the results was observed up to 96 hours after the application of the homeopathic preparations (Table 1).

Table 1- Summary of analysis of variance of pH data immediately after application of treatments (pHT-1), 24 hours (pH T-2), 48 hours (pH T-3) and 96 hours (pH T-4) after application of *Alumina* in the soil solution. Viçosa-MG. 2011.

FV GL		Medium Square			
		pH T-1	pH T-2	pH T-3	pH T-4
<b>Treat.</b>	5	0.0057*	0.044**	0.065**	0.231**
<b>Res.</b>	18	0.0015	0.0063	0.0080	0.0084
<b>CV (%)</b>		0.87	1.73	1.85	1.79

\*-significant at 5% by F test

\*\* - significant at 1% by F test

After 24 hours, a reduction in the pH of the solution was observed. However, after 72 hours and 96 hours after applying the treatments, all dynamizations caused significant increases in pH, statistically differing from the control.

Table 2- Average pH values immediately after application of treatments (pHT-1), 24 hours (pH T-2), 48 hours (pH T-3) and 96 hours (pH T-4) after application of *Alumina* in the soil solution. Viçosa-MG. 2011.

<b>Treatments</b>	<b>pH T-1</b>	<b>pH T-2</b>	<b>pH T-3</b>	<b>pH T-4</b>
Control	4.40B	4.72AB	4.065C	4.77C
<i>Alumina</i> 3CH	4.45AB	4.55BC	5.025A	5.35A
<i>Alumina</i> 5CH	4.45AB	4.50C	4.82ABC	5.05B
<i>Alumina</i> 7CH	4.47AB	4.75A	4.75BC	4.95BC
<i>Alumina</i> 9CH	4.50A	4.60ABC	4.90AB	5.32A
<i>Alumina</i> 11CH	4.50A	4.52C	4.85ABC	5.32A

Means followed by the same letter in the column do not differ from each other at 5% probability using the Tukey test.

The procedure of acidifying the soil solution was adopted with the aim of causing imbalance in the solution.

Thus, the results of the *Alumina* treatments were interpreted as a reaction of the equilibrium system, intrinsic to the soil solution.

According to Andrade (2004), the homeopathic preparation *Alumina*, when applied to acidic soil, promotes a reaction and increases the respiratory activity of microorganisms in the soil.

ground. Alumina *increases* the survival rate of corn seedlings grown in acidic conditions (ANDRADE et al., 2006). According to Casali et al. (2009), the pathogenesis of 30D *Alumina* in the soil was confirmed by the increase in the metabolic quotient and the accumulated microbial respiratory rate of the soil and a decrease in the electrical conductivity of the soil. The effect of the homeopathic preparation *Alumina* on the microbiological state of the soil favors the hypothesis that microorganisms, stimulated homeopathically, are related to soil rebalancing processes. Thus, microbial action may be related to the readjustment of the pH of the soil solution.

If the hypothesis of microbial action is excluded, hypotheses about the action of *Alumina* 11CH, for example, pose challenges to the physical and physicochemical interpretation of the soil acidity response. This interpretation goes beyond the understanding of Hahnemann and his followers regarding the effect of high dilutions on living systems.

Additional studies must be carried out to understand the mechanisms of action of *Alumina* on microorganisms and interference with soil acidity.

The soil is interpreted as a totality and understood as a living organism. Every living organism can suffer from illnesses when it is poorly treated, but every living organism also has within itself the potential for balance. Homeopathic preparations act on living organisms, such as soil, strengthening the reaction and the inherent potential to balance. A balanced organism must be well looked after, avoiding new imbalances, therefore requiring the cause of each disease to be known. When caring for the soil, management must be adopted that maintains health/balance, reflecting the production of healthy foods, which will contribute to the health of consumer organisms, including humans.

All organic or agroecological management practices that improve the physical, chemical and biological conditions of the soil are beneficial. For example, the incorporation of organic matter, such as crop residues, and practices that seek diversification or biodiversity. These are ways to recover the biological balance of the agroecosystem and which contribute to maintaining healthy soil.

According to Bignardi (1999), dead soil, due to the frequent use of pesticides, generates intoxicated plants, which will produce diseased food. The importance of living soil in the production of balanced foods free from chemical residues that can be used as nutraceuticals, in addition to adding value to agricultural products, is clear.

The health of humanity is closely associated with the health of agricultural soils. Research has already proven that human devitalization is the result of chronic intoxication and malnutrition of trace elements, consequently resulting from dead soil agriculture (BIGNARDI, 1999).

Bignardi (1999) also states that food generated in living soils reintegrates individuals into nature, establishing community activities that promote the recovery of collective and social consciousness, allowing the development of individuality.

The use of the homeopathic preparation *Alumina* to rebalance the pH of the soil solution contributes to restoring life to the soil, avoiding the use of liming. In overdose or frequent applications, liming can unbalance the soil-plant system, impairing the absorption of certain nutrients essential for plant growth.

Furthermore, the growing demand for limestone creates a major imbalance in the location where it is extracted. Another argument in favor of the use of *Alumina*, to the detriment of the use of



limestone, is the low cost. Homeopathic preparations are accessible to family farmers.

### **Conclusion**

The reaction of the acidified soil solution to *Alumina* dynamizations was manifested by an increase in pH, proving the corrective potential of the homeopathic preparation made from aluminum oxide, even in 11CH dynamization, which is at the limit of Avogadro's law.

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## CHAPTER 2

# **PATHOGENESIS OF *NATRUM MURIATICUM* IN SOIL SOLUTION**

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Keywords: Homeopathy, High Dilutions, Water treatment

### **Introduction**

The water of the soil organism indicates the salinity conditions that determine the possibilities of life and the evolutionary state of the soil. Through the water in the soil solution, the physical-chemical properties of each soil are known.

The use of homeopathic preparations in agriculture was initiated by the Austrian Rudolf Steiner, in Germany. In 1999, Homeopathy was made official in Brazilian organic farming, as a natural therapeutic system, which uses preparations aimed at stimulating the defense of organisms, having

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with a view to balance.

Pesticides reduce the vitality of the plant, damaging the quality of water, soil and even air.

Farmers in various parts of Brazil are applying homeopathy to plants, with positive results in resistance, flowering, breaking seed dormancy and producing healthy seedlings (CASALI et al., 2006).

Experimentation with homeopathic preparations on healthy organisms is considered a fundamental principle of the science of Homeopathy. The signs caused in the experimenter are called pathogenesis and primary action of the homeopathic preparation. These provoked signals arise according to the sensitivity of the experimenter and constitute the therapeutic potential of the homeopathic substance (VITHOULKAS, 1980; LISBOA et al., 2005). Pathogenesis is basic in the choice of the homeopathic substance, in each case of imbalance, in accordance with the principle of similarity.

Water, due to its physical-chemical characteristics, reveals the conditions conducive or not to life and the soil solution is the mediator of soils in the relationship with agriculture.

The soil solution constitutes the water phase of the soil. Most chemical reactions that occur in soil are mediated or occur in the soil solution. Thus, reactions that control the retention of substances by the solid phase of the soil take place in the soil solution, such as precipitation-dissolution, adsorption-desorption and ion exchange. It is these reactions that determine the profile of the various substances in the soil (ESSINGTON, 2004). The kinetics of the reactions and the rate of biological absorption control the concentration of ions in soil water (CAMARGO et al., 2001). The absorption of chemical elements and water by plant roots involves the solution

soil (RAIJ, 1991).

The chemical composition of soil water makes it possible to understand the chemical and physical changes resulting from soil management and this chemical composition directs the monitoring of various agricultural soil practices (CAMPBELL et al., 1989).

Human activities have affected water quality, especially surface waters, due to the discharge of effluents without any treatment. Inadequate management of fertilizers or pesticides has deteriorated the quality of surface waters and consequently the quality of the soil solution (MIRANDA et al., 2006).

Homeopathic preparations in contact with soil water alter biological and physicochemical characteristics of soils such as: microbial activity and efficiency, electrical conductivity, formation of aggregates and moisture retention capacity (ANDRADE, 2004), being a promising resource in management of healthy soil.

The objective of the work was to evaluate the response of two soil solution samples (solution 1 and solution 2) to *Natrum muriaticum* dynamizations.

## **Materials and methods**

Two experiments were conducted at the Soil and Water Homeopathy Laboratory, of the Department of Phytotechnics, at the Federal University of Viçosa, in April 2011.

In each experiment, a completely randomized experimental design was adopted, with seven treatments (2CH, 4CH, 6CH, 8CH, 10CH and 12CH from *Natrum muriaticum* and distilled water as control) and four

repetitions, totaling 28 experimental plots.

The experiments were differentiated according to the origin and weight of the clay used to prepare the soil solution. The weights were chosen in preliminary tests where the stability of the electrical conductivity of the solution over the days was adopted as a criterion.

In twenty-eight 80 mL borosilicate bottles, 3 g of green clay and 60 mL of demineralized water were placed. Another twenty-eight bottles received 0.3 g of white clay and 60 mL of demineralized water. A 24-hour clay decantation period was established.

After this period, a 40 ml aliquot of the supernatant solution was removed, and the solutions were ready: soil 1 (white clay) and soil 2 (green clay). Five drops of the treatments were applied to the soil solutions, a single dose. Homeopathic preparations were made in distilled water immediately before implementing the treatments.

Electrical conductivity (EC) was assessed using a conductivity meter, model DM-32. EC was measured immediately after applying the treatments (EC-T1), 24 (EC-T2), 48 (EC-T3) hours and 72 hours (EC-T4) after implementing the treatments. The data were statistically processed by analysis of variance in the SAEG 9.1 program (2007). The means were interpreted using the Tukey test at 5% probability.

## **Results and discussion**

According to Tables 1 and 2, the EC of soil solutions 1 (white clay) and 2 (green clay) was responsive to homeopathic preparations.

Table 1- Summary of the analysis of variance of electrical conductivity data immediately after application of treatments (CE T-1), 24 hours (CE T-2), 48 hours (CE T-3) and 72 hours (CE T- 4) after applying 6 dynamizations of *Natrum muriaticum* in soil solution 1 (white clay).

Viçosa/MG. 2011.

FV GL	Medium Square			
	CE T-1	CE T-2	CE T-3	CE T-4
<b>Treatments 6</b>	3.30ns	2.86ns	2.15	8.06*
<b>Residue</b> 21	2.09	1.63	0.82	2.44
<b>CV (%)</b>	2.21	1.98	1.38	2.39

ns - not significant at 5% probability by F test

\*-significant at 5% probability by F test

Table 2- Summary of the analysis of variance of electrical conductivity data immediately after application of treatments (C.ET-1), 24 hours (CE T-2), 48 hours (CE T-3) and 72 hours (C. ET-4) after the application of 6 dynamizations of *Natrum muriaticum* in soil solution 2 (green clay).

Viçosa/MG. 2011.

FV	GL	Medium Square			
		CE T-1	CE T-2	CE T-3	CE T-4



<b>Treatments</b>	6	237.24*	220.80ns	328.01*	414.77**
<b>Residue</b>	21	63.25	123.48	89.19	84.54
<b>CV (%)</b>		3.8	5.09	4.31	4.16

<sup>ns</sup> - not significant at 5% probability by F test

\*-significant at 5% probability by F test

\*\*-significant at 1% probability by F test

Soil solution 1, prepared with white clay, was more stable. Only *Natrum muriaticum* 4CH was effective in reducing EC 72 hours after application of treatments (Table 3). It is possible that white clay, being less dispersive, is less reactive.

Soil solution 2, prepared with green clay, was more responsive to EC immediately after applying the treatments. *Natrum muriaticum* 6CH reduced the EC of the soil solution and the response persisted 72 hours after treatment application (Table 4).

Homeopathic preparations up to 10CH are considered molecular. Therefore, the hypothesis of molecular interference in the EC of the samples is viable. Even in small quantities, these molecules could have influenced the variables (LISBOA, 2010). However, the activity of homeopathic preparations in higher dynamizations (12CH) is considered the physical-chemical action of dilutions as they exceed Avogadro's constant (LISBOA, 2010). In this experiment, there was a reduction in EC, denying the hypothesis of addition of molecules. In rural areas, 6CH dynamization is widely used, being indicated in the Homeopathy notebook (RESENDE, 2010).

The responses varied depending on the dynamism and time. The answers indicate the importance of researching pathogenesis in different dynamizations and the importance of

diversity of experimenters, as recommended in Organon (LISBOA et al., 2005).

Considering that the soil solutions are healthy experimenters, the results signify pathogenesis of *Natrum muriaticum*.

Table 3- Average electrical conductivity values ( $\mu\text{S}/\text{cm}$ ) immediately after application of treatments (CE T-1), 24 hours (CE T-2), 48 hours (CE T-3) and 72 hours (CE T- 4) after applying 6 dynamizations of *Natrum muriaticum* in soil solution 1 (white clay). Viçosa/MG. 2011.

<b>Treatments</b>	<b>CE T-1</b>	<b>CE T-2</b>	<b>CE T-3</b>	<b>CE T-4</b>
<i>Natrum muriaticum</i> 2CH	67.02 A	63.12A	64.82A	62.20AB
<i>Natrum muriaticum</i> 4CH	64.07A	63.32A	64.25A	63.10B
<i>Natrum muriaticum</i> 6CH	65.20A	63.10A	65.40A	64.20AB
<i>Natrum muriaticum</i> 8CH	65.42A	65.32A	65.60A	64.90AB
<i>Natrum muriaticum</i> 10CH	64.82A	64.25A	65.82A	64.90AB
<i>Natrum muriaticum</i> 12CH	65.32A	64.25A	66.30A	66.52AB
Control-Distilled water	65.82A	64.22A	66.17A	67.15A

Means followed by the same letter in the column do not differ from each other at 5% probability using the Tukey test.

Table 4- Average electrical conductivity values ( $\mu\text{S}/\text{cm}$ ) immediately after application of treatments (CE T-1), 24 hours (CE T-2), 48 hours (CE T-3) and 72 hours (CE T- 4) after applying 6 dynamizations of *Natrum muriaticum* in soil solution 2. (Green clay). Viçosa/MG. 2011.

<b>Treatments</b>	<b>CE T-1</b>	<b>CE T-2</b>	<b>CE T-3</b>	<b>CE T-4</b>
<i>Natrum muriaticum</i> 2CH	212.8AB	219.97A	219.92AB	221.67AB
<i>Natrum muriaticum</i> 4CH	217.02A	226.10A	227.95AB	227.92A
<i>Natrum muriaticum</i> 6CH	196.05B	203.55A	205.17B	203.42B
<i>Natrum muriaticum</i> 8CH	203.3AB	214.52A	210.90AB	202.20AB
<i>Natrum muriaticum</i> 10CH	210.92AB	223.07A	226.10AB	227.30A
<i>Natrum muriaticum</i> 12CH	202.52AB	217.92A	215.00AB	219.00AB
Control-Distilled water	214.95AB	221.37A	228.37A	233.02A

Means followed by the same letter in the column do not differ from each other at 5% probability using the Tukey test.

## **Conclusion**

The pathogenesis of *Natrum muriaticum* was the reduction in the electrical conductivity of soil solutions. The activity of the homeopathic preparation depends on the clay in the soil solution and dynamization.

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## CHAPTER 3

### TURBIDITY OF WATER TREATED WITH HOMEOPATHIC PREPARATIONS

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Keywords: High Dilutions, Homeopathy, Pathogenesis

#### Introduction

Water, a chemical substance composed of hydrogen and oxygen, is essential to all known forms of life. The structure is simple but scientific knowledge is still limited. The characteristics of the water are very specific. The physical-chemical activity of water is quite different from other substances with a similar chemical structure. It is considered a universal solvent and makes up 80% of the Earth's surface and

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70% of the mass of the human body (FIGUEIREDO, 2009).

The growing population increase implies a consequent increase in drinking water consumption (200L/inhabitant/day) and greater water expenditure in agriculture (irrigation) and livestock. There is a growing need for water to prioritize health and social well-being. The current model of technological development has caused pollution, degraded and contaminated natural resources, affecting water sources and the human organism. There was a need for treatment systems with minimum potability standards to meet current water requirements in quantity and quality (CORREIA et al., 2008).

Among the physical-chemical properties altered by water pollution is turbidity. Water turbidity is the change in light penetration caused by suspended solid particles (clay, silt, colloids, silica), organic matter, microorganisms, algae, calcium carbonate, among others (PINTO, 2004). Turbidity is measured with a turbidimeter that compares the scattering of the light beam when passing through the sample with the scattering of the beam of equal intensity when passing through a standard suspension. The greater the spread, the greater the turbidity. Values are expressed in Nephelometric Turbidity Unit (UNT). The color of the water negatively impacts the measurement of turbidity because of its ability to absorb light (CORREIA et al., 2008).

Turbidity is a quality parameter for public water supplies. The potability standard (Ordinance No. 1,469 of 2000), maximum 5.0 NTU, was determined by the WHO (World Health Organization) (PINTO, 2004). It is arousing greater interest in water quality control, because of the association with some pathogens. As a result of increased turbidity, there is a reduction in light penetration into the water with losses in photosynthesis of



algae and aquatic plants. The increase in temperature at the water surface is also caused by the absorption of heat from suspended particles close to the surface. Turbidity has not been measured in high dilution experiments (Homeopathy), however, aiming for sustainable water treatment by agricultural families, this physical-chemical variable must be considered (FIGUEIREDO, 2009).

In agriculture, water turbidity is related to total dissolved solids and suspended solids from runoff and earth movements. Conventional water treatment is not completely efficient.

Research has been carried out with homeopathic treatments and there are studies available, for example, demonstrating the effect on reducing water turbidity. According to Figueiredo (2009) and Gomes (2009), there are homeopathic preparations that modify the turbidity of water.

According to the experimentation protocol, homeopathic preparations must be researched. There must be diversity of experimenters aiming for the most complete pathogenesis. Pathogenesis is the set of signs caused in a healthy organism by homeopathic preparations in experimentation. Based on pathogenesis it is the choice of the homeopathic preparation for the organism in imbalance is made, in accordance with the Principle of Similitude.

This work aimed to evaluate the pathogenesis of homeopathic preparations in three water samples (mine water, lagoon water and mineral water), using the turbidity variable.

## **Materials and methods**

Three experiments were conducted in the Laboratory of Soil and Water Homeopathy, in the Department of Phytotechnics

from the Federal University of Viçosa, UFV, MG. Two waters originating from a natural and healthy source were researched: mine water from the UFV Campus and bottled mine water called “mineral water”. The polluted water of the UFV Campus lagoon was researched.

Experiment 1, with mine water, was conducted in September 2010. The water was collected directly from the mine on the Campus of the Federal University of Viçosa (UFV) in Viçosa-MG. The water from this mine has been used for direct consumption for decades. A randomized block experimental design was adopted.

Experiment 2 was conducted in July 2011. Mineral water purchased from a local market and called commercial mineral water was used, having the following physical-chemical characteristics: pH 5.6; water temperature at the source 19.0°C; electrical conductivity 27  $\mu\text{S}/\text{cm}$  and evaporation residue at 180°C, calculated 25.22 mg/L. A completely randomized experimental design was adopted.

Experiment 3, with pond water, was conducted in September 2010. The sample was collected in a pond located on the UFV campus. Various campus waste is disposed of in this lagoon. A randomized block experimental design was adopted.

The experiments consisted of five replications, 65 experimental plots, with thirteen treatments: Dynamic Water 7CH, *Natrum muriaticum* 7CH, *Alumina* 7CH, *Silicea* 7CH, *Carbo vegetabilis* 7CH, *Arnica montana* 7CH, *Nux vomica* 7CH, *Pyrogenium* 7CH, *Calcarea carbonica*

7CH, *Sulfur* 7CH, *Lycopodium clavatum* 7CH, 20% Ethanol and Control. In sixty-five 100 mL borosilicate bottles, with 80 mL of the respective water, 2 drops of the treatments were applied in a single dose, except in the case of

Control, in the “double-blind” procedure. The homeopathic preparations were purchased in a commercial laboratory and prepared in 20% Ethanol.

A 7CH homeopathic preparation was made of the respective waters used (mine, mineral and lagoon), called Dynamized Water, following described procedures (DÔRES et al., 2007).

Water turbidity (TURB) was assessed using a portable digital turbidimeter, Model DM TU, with a measurement range of 0 to 1000 NTU. Turbidity was measured 24 hours (TURB 1), 48 hours (TURB 2) and 72 hours (TURB 3) after applying the treatments. After each sample, the reading cell was washed with distilled water before the next sample.

The data were statistically processed by analysis of variance in the SAEG 9.1 program (2007) and the means compared using the Tukey test at 5% probability.

## **Results and discussion**

The results obtained in experiments 1 and 2 are considered pathogenesis. According to the principle of similarity and experimentation (pathogenesis), high dilution (homeopathic preparation) that increases turbidity can reduce the turbidity of unbalanced water (GOMES, 2009). Therefore, homeopathic preparations that increase turbidity have the potential to reduce turbidity in turbid waters.

Homeopathic preparations had an effect on the turbidity of mine water (Table 1). Homeopathic preparations have increased turbidity 24 hours after being

applied to water. Água de Mina 7CH and *Alumina* 7CH were statistically different from the controls (Table 2). The increase in turbidity caused by the homeopathic preparation Água de Mina 7CH is consistent with the results from Lisbon (2010). Água de Mina 7CH, made with the experiment's own water, was interpreted as isopathy (self nosode/ isotherapy) (LISBOA, 2010).

After 48 hours of applying the treatments, there was still a statistically significant effect of *Alumina* and *Sulphur*. In some homeopathic preparations the activity is slower (CASALI et al., 2006). After 72 hours of applying the treatments, there was no more homeopathic activity on the turbidity of the water.

Table 1- Summary of the analysis of variance of turbidity data 24 hours (TURB 1), 48 hours (TURB 2) and 72 hours (TURB 3) after applying the treatments to the mine water. Viçosa/MG. 2010.

FV	GL	Medium Square		
		TURB-1	TURB-2	TURB-3
<b>Treatment</b>	12	3,602**	0.96*	2.894ns
<b>Block</b>	4	0.9675	0.4636	2,362
<b>Residue</b>	48	0.989	0.4636	2,477
<b>CV (%)</b>	50.54	**significant at 1%	47.26	110.98

by F test

\*significant at 5% by F test

ns not significant

Table 2- Average turbidity values (NTU) 24 hours (TURB 1), 48 hours (TURB 2) and 72 hours (TURB 3) after applying the treatments to the mine water. Viçosa/MG. 2010.

<b>Treatments</b>	<b>TURB-1</b>	<b>TURB-2</b>	<b>TURB-3</b>
7CH Mine Water	2.66A	1.68AB	1.86A
<i>Natrum muriaticum</i> 7CH	1.99ABC	1.45AB	1.30A
<i>Alumina</i> 7CH	3.53A	1.93A	1.50A
<i>Silicea</i> 7CH	2.27ABC	1.75A	1.49A
<i>Carbo vegetabilis</i> 7CH	1.00BC	1.12AB	3.58A
<i>Arnica montana</i> 7CH	2.23ABC	1.12AB	0.90A
<i>Nux vomica</i> 7CH	2.34ABC	1.60AB	1.30A
<i>Pyrogenium</i> 7CH	1.70ABC	1.14AB	1.25A
<i>Calcarea carbonica</i> 7CH	2.38ABC	1.21AB	1.52A
<i>Sulfur</i> 7CH	2.14ABC	1.80A	1.05A
<i>Lycopodium</i> 7CH	2.22ABC	1.67AB	0.98A
Control-Ethanol 20%	0.95BC	1.37AB	1.59A
Control, without application	0.20C	0.25B	0.24A

Averages followed by at least one letter in the

column, do not differ from each other using the Tukey test at 5% probability.

In experiment 2, with mineral water, there was a difference significant turbidity after 48 hours and 72 hours (Table 3).

Table 3- Summary of the analysis of variance of turbidity data 24 hours (TURB 1), 48 hours (TURB 2) and 72 hours (TURB 3) after applying the treatments to mineral water. Viçosa/MG. 2011.

FV	GL	Medium Square		
		TURB-1	TURB-2	TURB-3
<b>Treatments</b>	12	0.46ns	1.69**	3.22**
<b>Residue</b>	52	0.30	0.33	0.52
<b>CV (%)</b>		114.7	51.90	53.69

\*\*significant at 1% probability by F test

ns - not significant

After 48 hours and 72 hours there was an effect of *Alumina* in increasing turbidity. Homeopathic preparations significantly increased the turbidity of mineral water, consistent with data from Figueiredo (2009).

Mine water is considered healthy, which is why it was used in this pathogenesis assay in accordance with reports by Figueiredo (2009). Due to several factors, such as type of rock, type of soil and climatic conditions, waters differ in

physicochemical and biological properties. Research with two waters (commercial mineral and mine) aimed at the diversity of healthy experimenters.

The time for manifestation of the response to the homeopathic preparation was different between the waters (mineral and mineral). In experiment 1, changes in the turbidity of mine water were detected 24 hours after treatment (Table 2). In experiment 2, the response of mineral water was 48 hours after applying the treatments (Table 4). The activity of the homeopathic preparations was variable depending on the experimenter. Mineral and mine waters are considered healthy. It is worth noting that the preparations *Alumina* and *Sulphur*, in both healthy waters, increased turbidity. The results confirm the importance of diversity of experimenters in pathogenesis assays.

Table 4- Average turbidity values immediately after application (TURB1), 24 hours (TURB2) and 48 hours (TURB3), after application of treatments in mineral water. Viçosa/MG. 2011.

Treatments	TURB-1	TURB-2	TURB-3
7CH Mineral Water	0.44A	0.91BCD	1.50ABCD
<i>Arnica montana</i> 7CH	0.20A	0.32D	0.28D
<i>Lycopodium clavatum</i> 7CH	0.95A	1.69ABC	1.89ABC
<i>Sulfur</i> 7CH	0.92A	1.90AB	2.80AB
<i>Alumina</i> 7CH	0.98A	2.40A	2.99A
<i>Silicea</i> 7CH	0.48A	0.98BCD	1.46ABCD
<i>Calcareo carbonica</i> 7CH	0.20A	0.57CD	0.59CD
<i>Nux vomica</i> 7CH	0.35A	0.91BCD	0.68CD

<i>Natrum muriaticum</i> 7CH	0.49A 0.88BCD 1.03CD
<i>Carbovegetabilis</i> 7CH	0.24A 0.88BCD 1.07CD
<i>Pyrogenium</i> 7CH	0.19A 0.77BCD 0.91CD
Control, no application	0.47A 0.82BCD 1.07CD
Control - 20% Ethanol	0.46A 1.43ABCD 1.22BCD

Means followed by at least the same letter in the column do not differ from each other using the Tukey test, at 5% probability.

In experiment 3, in lagoon water, using the F test, there was a significant effect at 24 and 72 hours (Table 5). The responses were statistically different 72 hours after application (Table 6). Lagoon water, with different residues, is more complex and unbalanced, justifying the variability between repetitions and the lack of significance of the average over 24 hours.

*Arnica montana*, *Calcarea carbonica* and *Sulfur* increased water turbidity (72 hours). 20% Ethanol, used as a solvent for homeopathic preparations, increased turbidity in relation to the control without application.

Pond water is considered unbalanced. Therefore, the results are interpreted as a reaction back to the equilibrium of the system. Studying the reaction of unbalanced water aims at the future development of water treatment technologies based on Homeopathy, the science of high dilutions.

Table 5- Summary of analysis of variance of 24-hour (TURB 1), 48-hour (TURB 2) and 72-hour turbidity data



(TURB 3) after applying treatments to lagoon water.  
Viçosa/MG. 2010.

FV	GL	Medium Square		
		TURB-1	TURB-2	TURB-3
<b>Treatments</b>	12	0.3162**	12.965ns	2.6199**
<b>Block</b>	4	0.1075	1.2088	0.5195
<b>Residue</b>	48	0.1159	7.7003	0.6394
<b>CV (%)</b>		30.34	91.80	31.76

\*\*significant at 1% probability by F test

ns not significant

Table 6- Average turbidity values (NTU) 24 hours (TURB 1), 48 hours (TURB 2) and 72 hours (TURB 3) after applying the treatments to the lagoon water. Viçosa/MG. 2010.

Treatments	TURB-1	TURB-2	TURB-3
7CH Lagoon Water	0.96A	1.98A	2.21AB
<i>Natrum muriaticum</i> 7CH	1.31A	2.43A	2.58AB
<i>Alumina</i> 7CH	1.00A	2.27A	2.27AB
<i>Silicea</i> 7CH	0.87A	2.33A	2.10AB
<i>Carbovegetabilis</i> 7CH	1.15A	2.28A	2.44AB
<i>Arnica montana</i> 7CH	0.97A	3.74A	3.67A
<i>Nux vomica</i> 7CH	1.06A	2.06A	2.60AB
<i>Pyrogenium</i> 7CH	1.14A	3.80A	2.52AB
<i>Calcarea carbonica</i> 7CH	1.30A	2.50A	2.92A
<i>Sulfur</i> 7CH	1.62A	3.16A	3.54A

<i>Lycopodium</i> 7CH	1.48A	2.71A 2.62AB
Control, 20% Ethanol	1.02A	2.27A 2.58AB
Control, without application	0.73A	0.68B

Means followed by the same letter in the column do not differ significantly from each other using the Tukey test at 5% probability.

The speed of response of living organisms to homeopathic preparations depends on the level of organic intoxication (LISBOA et al., 2005). Mine water and mineral water are considered healthy systems and responded more quickly. In the unbalanced lagoon water, the responses appeared after 72 hours of application of the treatments.

According to Lisboa (2010), the increase in water turbidity due to high dilutions (homeopathic preparations) was caused by changes in the structure of the water. During the experiments, there was a change in the visual appearance of the pond water. All plots, except the plots of the 20% Ethanol and Control treatments, had a gelatinous appearance. In the mine water experiment, the gelatinous appearance was structured and filamentous.

The results also indicate the activity of homeopathic preparations on the vitality of water, through microorganisms. According to Andrade (2004), homeopathic preparations increased microbial activity in soil solutions, because there is an increase in microbial respiration.

## Conclusion

Homeopathic preparations cause changes in water turbidity. The most effective were: Dynamized Water, *Sulphur*, *Silicea*, *Arnica montana*, *Alumina* and *Calcareo carbonica*, in 7CH dynamization. The increase in turbidity in source water (mineral and mine) was interpreted as pathogenesis. The pond water results were interpreted as a reaction.

The specific activity of homeopathic preparations and the time of appearance of signs (pathogenesis) depend on the initial conditions of the experimenter.

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## CHAPTER 4

### ***NATRUM MURIATICUM* AND CONDUCTIVITY ELECTRICAL OF GROUND SOLUTIONS EXPOSED TO LIGHT CONDITIONS**

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Keywords: Homeopathic Preparations, Water treatment, High Dilutions

#### **Introduction**

Water, through its participation in vital phenomena, is analyzed chemically, physically and biologically in the various situations it encounters, including the soil solution.

The soil solution constitutes the water phase of the soil. The soil solution contains several solutes that influence the growth and development of living organisms. According to Brady (1983), the soil solution is excessively changeable, varying in volume, proportion and quantity of soluble components. The soil solution depends on the soil type, clay, drainage conditions and moisture.

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Studies of soil electrical conductivity (EC) have highlighted its potential in quantifying clay content (WILLIAMS & HOEY, 1987). Knowledge of the electrical conductivity of the soil enables inferences about the availability of nutrients and toxic ions, and the osmotic potential of water in the soil.

According to Johnson et al. (2001), there is a significant correlation between the qualities and quantities of clay and the content of salts (soluble cations and anions) in the soil solution.

Clays can be differentiated by color. Clay coloring is related to the mineral composition that affects the electrical conductivity of the soil solution and the spectral profile of the soil. They exert an influence on spectral reflectance: the color of the clay, the concentration, the dimensions of the particles that make up the soil (DALMOLIM et al., 2005).

In agriculture, highly diluted and energized solutions (homeopathic preparations) are used to control diseases, benefiting the productivity and natural defense of plants, in addition to being used in the soil. *Arnica montana*, *Sulphur*, *Nux vomica*, *Natrum muriaticum*, *Phosphorus*, *Thuja occidentalis*, *Carbo vegetabilis*, *Calcarea carbonica*, *Medorrhinum*, *Staphysagria*, *Mercurius solubilis*, *Kalium iodatum* are highlighted for their excellent results (CAPA, 2004).

The science of Homeopathy is based on four basic principles: similarity, experimentation on a healthy organism, minimum doses, single substance (VITHOULKAS, 1997). Homeopathic preparations are scientifically researched on diverse and healthy experimenters. Pathogenesis is the name of the signals generated in the experimentation of homeopathic preparations (LISBOA et

al., 2005).

Based on the hypothesis that clay soil solutions of various colors are experimenters of homeopathic preparations, this research was developed. The study of the pathogenesis of homeopathic preparations in soil solutions generates information that potentially contributes to soil and irrigation water management technologies.

*Natrum muriaticum* is obtained from sodium chloride and is recommended for the saline balance of organisms (CASALI et al., 2009). *Natrum muriaticum* causes changes in electrical conductivity, as evidenced in soil by Andrade (2004) and in water by Lisbon (2010).

This work aimed to describe the pathogenesis of *Natrum muriaticum* in soil solutions in the absence of light and in bright light.

## **Materials and methods**

Two experiments were conducted at the Soil and Water Homeopathy Laboratory, of the Department of Phytotechnics, at the Federal University of Viçosa, in April 2011.

In each experiment, a completely randomized experimental design was adopted, with 5 replications, 20 experimental plots and four treatments: 1- soil solution with *Natrum muriaticum* 6CH, in the light, 2- soil solution with distilled water, in the light; 3- soil solution with *Natrum muriaticum* 6CH in the dark; 4- Soil solution with distilled water in the dark.

The experiments were differentiated according to the origin and weight of the clay used to prepare the soil solution. The weights of the clays were chosen in preliminary tests and the criterion was stability in the electrical conductivity value.



in time.

In twenty borosilicate bottles with a capacity of 80 mL, 3 g of green clay and 60 mL of demineralized water were placed. Twenty other bottles contained 0.3 g of white clay and 60 mL of demineralized water. The decantation of clay was within 24 hours. After 24 hours, a 40 ml aliquot of the supernatant solution was removed, called "soil solution 1" (white clay) and "soil solution 2" (green clay). The vials were covered with laminated paper (dark treatment). In the soil solutions, 5 drops of *Natrum muriaticum* 6CH were applied, a single dose.

*Natrum muriaticum* 6CH was prepared in distilled water immediately before application.

Electrical conductivity (EC) was measured using a Conductivity Meter, model DM-32. EC was measured immediately after application of treatments (EC-T1), 24 hours (EC-T2), 48 hours (EC-T3) and 72 hours (EC-T4) afterwards. The data were statistically processed by analysis of variance in the SAEG 9.1 program (2007). The means were interpreted using the Tukey test at 5% probability.

## Results and discussion

The soil solutions responded to light and *Natrum muriaticum* according to the statistically significant EC data during the experimental period (Tables 1 and 2). *Natrum muriaticum*, obtained from sodium chloride salt, affected the salt balance according to Casali et al. (2009), in light and dark.

In soil solution 1 (white clay), *Natrum muriaticum* 6CH reduced the EC immediately after application, the effect was persistent for up to 72 hours. There was no significant effect of light (Table 3).

In soil solution 2 (green clay), the EC of the solution with *Natrum muriaticum* 6CH under light conditions was significantly different from the control (distilled water). Under dark conditions, the clay's response to *Natrum muriaticum* was less evident (Table 4).

Table 1- Summary of the analysis of variance of electrical conductivity data, from soil solution 1 (white clay), immediately after application of treatments (C.E1), 24 hours (C.E2), 48 hours (C.E3) and 72 hours (C.E4) later.

Viçosa/MG. 2011.

FV	GL	Medium Square			
		C.E1	C.E2	C.E3	C.E4
<b>Treatments</b>	3	1.81*	1.14**	2.75**	4.14**
<b>Residue</b>	16	0.47	0.67	0.15	0.29
<b>CV (%)</b>		1.05	0.39	0.59	0.82

\*\*-significant at 1% probability by F test

\*-significant at 5% probability by F test

Table 2- Summary of analysis of variance of electrical conductivity data from soil solution 2 (green clay) immediately after application of treatments (C.E1), 24 hours (C.E2), 48 hours (CE 3) and 72 hours (C.E4) after.

Viçosa/MG. 2011.

FV	GL	Medium Square			
		C.E1	C.E2	C.E3	C.E4
<b>Treatments</b>	3	2540.43*	2740.66**	2874.84**	3342.27**
<b>Residue</b>	16	261.09	267.85	245.00	233.94

<b>CV (%)</b>	7.15	6.98	6.77	6.51
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\*\*-significant 1% probability by F test

Table 3- Average electrical conductivity values ( $\mu\text{S}/\text{cm}$ ) of soil solution 1 (white clay) after application of treatments (C.E1), 24 hours (C.E2), 48 hours (C.E3) and 72 hours (CE 4) after. Viçosa/MG. 2011.

<b>Treatments</b>	<b>C.E1</b>	<b>C.E2</b>	<b>C.E3</b>	<b>C.E4</b>
Dark: Clay + distilled water	66.28A	65.78A	68.14A	66.78A
Dark: Clay + <i>Natrum muriaticum</i> 6CH	65.08AB	65.12B	66.94B	65.34B
Light: Clay + distilled water	65.14AB	65.76A	67.68A	66.70A
Light: Clay + <i>Natrum muriaticum</i> 6CH	65.02B	64.82B	66.48B	65.02B

Means followed by the same letter in the column do not differ from each other at 5% probability using the Tukey test

Table 4- Average electrical conductivity values ( $\mu\text{S}/\text{cm}$ ) of soil solution 2 (green clay) after application of treatments (C.E1), 24 hours (C.E2), 48 hours (C.E3) and 72 hours (CE 4) after. Viçosa/MG. 2011.

<b>Treatments</b>	<b>C.E1</b>	<b>C.E2</b>	<b>C.E3</b>	<b>C.E4</b>
Dark: Clay + distilled water	247.0A	254.6A	254.7A	258.2A
Dark: Clay + <i>Natrum muriaticum</i> 6CH	223.9AB	233.7A	227.6AB	232.4A
Light: Clay + distilled water	237.2A	247.0A	243.1A	248.8A
Light: Clay + <i>Natrum muriaticum</i> 6CH	195.1B	201.6B	199.3B	199.3B

Averages followed by the same letter in the column do not differ from each other

## 5% probability using the Tukey test

According to BONATO (2004), homeopathic preparations behave like energy and in accordance with the physical laws of electromagnetic waves. Since light is electromagnetic energy, there is a different response to the homeopathic preparation, depending on the lighting conditions.

The solution prepared with white clay or green clay varied depending on the light. The light effect was not enough to change the EC. However, in the green clay treated with the homeopathic preparation, there was a change in the EC under light conditions.

It can be inferred that there is a correlation between the waves electromagnetic waves of *Natrum muriaticum* 6CH with the electromagnetic waves of clays, as well as a correlation between the green pigment of plant leaves and the absorption of light. Sunlight (white) contains all visible colors. The wavelength of the green color absorbs all colors and reflects the green, giving rise to the color green. The white color reflects waves much more than it absorbs.

## Conclusion

Soil solutions are responsive to treatment with the homeopathic preparation *Natrum muriaticum* 6CH. The answers depend on the type of clay and soil solution. The answer is different in light and dark.

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## CHAPTER 5

### **PATHOGENESIS OF PREPARATIONS HOMEOPATHICS IN SOIL SOLUTION**

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Keywords: High Dilutions, Water treatment, Electrical conductivity of water

#### **Introduction**

Water has been interpreted as a great and fundamental tool for homeopathic preparations, but water is healthy. Water as the majority constituent of vital processes enables the generalization of research data. The soil solution is the aqueous phase of the soil, thus it is conducive to basic soil research.

In experimentation, the principle of the science of

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Homeopathy, the signs caused in the experimenter are called pathogenesis. The signs arise according to the experimenter's responsiveness, constituting the potential of the homeopathic preparation and the therapeutic basis of the homeopathic substance (VITHOULKAS, 1980). Pathogenesis guides the choice of homeopathic preparation, according to the principle of similarity.

Most chemical reactions that occur in soil are mediated or occur in the soil solution. The soil solution acts to retain substances by the solid phase, such as precipitation-dissolution, adsorption-desorption and ion exchange. It is these reactions that determine the activity of the various substances in the soil (ESSINGTON, 2004). The kinetics of the reactions and the rate of biological absorption control the concentration of ions in the soil solution. The absorption of chemical elements and water by plant roots involves the soil solution (RAIJ, 1997). The chemical composition of the soil solution makes it possible to understand the chemical and physical changes resulting from agriculture (CAMPBELL et al., 1986).

The characteristics of the soil solution partially depend on natural conditions and the formation clay deeply characterizes the soil. They also depend on the consequences of industrialization, conventional agriculture, and consumerism that disrupt the natural balance of a large part of ecosystems. The loss of water quality is a consequence of inadequate management of natural resources (QUIAN et al., 1994).

Human activities have affected the quality and quantity of water, especially surface water, through the discharge of effluents without any treatment (MIRANDA et al., 2006). The pH of the soil solution resulting from human actions interferes with the availability of nutrients



essential for plant development (BRANDÃO & LIMA, 2002).

Homeopathic preparations modify the physical-chemical characteristics of water (FIGUEIREDO, 2009), being a promising resource in the management of soil solutions.

This work aimed to evaluate the response of soil solutions to nine homeopathic preparations.

### **Materials and methods**

Three experiments were conducted at the Soil and Water Homeopathy Laboratory, of the Department of Phytotechnics, at the Federal University of Viçosa in July 2011. The experiments differed in terms of the clays used in preparing the soil solution. Three clays were used: green, white and yellow.

A completely randomized design was adopted in all experiments, four replications, totaling 44 experimental plots, with eleven treatments consisting of: Control (no application), *Lycopodium*, *Nux vomica*, *Carbo vegetabilis*, *Alumina*, *Pyrogenium*, *Natrum muriaticum*, *Calcareo carbonica*, *Arnica montana*, *Sulphur*, Dynamized Distilled Water, all applied in dynamization

7CH.

In the UFV laboratory, homeopathic preparations were made in distilled water immediately before implementing the treatments, following described procedures (DÔRES et al., 2007).

When preparing the soil solutions, in three beakers each containing 2900 ml of demineralized water, 145g of green clay was added respectively; 14.5g of white clay and 14.5g of yellow clay. After 24 hours of

After decantation, the supernatant solution was removed and 60 ml aliquots of the solution were added to borosilicate bottles with a capacity of 80 ml, which constituted the experimental plots. In each plot, 5 drops of the treatments were applied, except for the control.

After 24 hours, 48 hours and 72 hours after applying the treatments, the following were measured: electrical conductivity (EC) using a conductivity meter, model DM -32 and pH using a potentiometer, model DM-23. The data were statistically processed by analysis of variance in the SAEG 9.1 program (2007) and the means were interpreted using the Tukey test at 5% probability.

## **Results and discussions**

Homeopathic preparations caused changes in the pH and EC of the green clay soil solution during the experimental period (Table 1).

After 24 hours of applying the treatments, the homeopathic preparations *Lycopodium* and *Carbo vegetabilis* significantly increased the pH of the solution. The increase in pH in the soil solution with *Lycopodium* was significantly greater than the other treatments throughout the experimental period. After 48 and 72 hours there was also an increase in pH caused by *Nux vomica* (Table 2). EC increased only with *Lycopodium* treatment and the effect was persistent up to 72 hours later (Table 2).

Table 1- Summary of the analysis of variance of pH and Electrical Conductivity (EC) data 24 hours (pH1, EC1), 48 hours (pH2, EC2) and 72 hours (pH3, EC3) after applying the treatments in the solution green clay soil. Viçosa/MG. 2011.

FV GL	Medium Square						
	pH1 CE1		pH2 CE2 pH3 CE3				
<b>Treat.</b>	10	1.14**	1029.93**	0.55**	657.25**	0.61**	2613.81**
<b>Res.</b>	3	0.32	70.88	0.10	66.49	0.12	471.14
<b>CV (%)</b>		2.24	3.98	1.41	1.26	3.82	9.95

\*\* significant at 1% probability by F test

Table 2- Average pH and Electrical Conductivity values at 24 hours (pH1, EC1), 48 hours (pH2, EC2) and 72 hours (pH3, EC3) after applying the treatments in the green clay soil solution. Viçosa/MG. 2011.

Treatments	pH1	CE1	pH2	CE2	pH3	CE3
<i>Lycopodium</i> 7CH	9.0A	259.1A	8.9A	250.0A	8.9A	293.7A
<i>Nux vomica</i> 7CH	8.1B	208.5B	8.5B		216.2B	8.7A 217.5B
<i>Carbo vegetabilis</i> 7CH	9.0A	215.4B	8.0CD	218.7B	8.2B	222.6B
<i>Alumina</i> 7CH	8.2B	205.6B	7.8DE	208.4B	8.1BC	213.0B
<i>Pyrogenium</i> 7CH	7.8BC	206.2B	7.8DE	207.5B	7.9CD	208.3B
<i>Natrum muriaticum</i> 7CH	7.6C	205.4B	7.8DE	207.7B	7.8CD	208.6B
<i>Calcarea carbonica</i> 7CH	7.6C	206.7B	7.8BE	206.3B	7.8D	208.9B
<i>Arnica</i> 7CH	7.6C	204.9B	7.7E	207.6B	7.8D	207.6B
<i>Sulfur</i> 7CH	7.5C	204.5B	7.7E	208.1B	7.8CD	206.8B
7CH Distilled Water	7.9BC	204.3B	7.9CDE	206.7B	7.9CD	204.7B
Distilled water (Control)	8.2B	207.6B	8.1C	209.6B	8.0BC	209.6B

The means, followed by at least the same letter in the column, do not differ from each other, at 5% probability, using the Tukey test.

In the white clay soil solution, the homeopathic preparations caused a change in pH during the experimental period. However, the EC changed 72 hours after applying the treatments (Table 3).

*Lycopodium* increased the pH of the solution throughout the experimental period. After 24 hours *Nux vomica* increased the pH. After 48 hours, all homeopathic preparations increased the pH, with emphasis on *Lycopodium*, *Nux vomica*, *Carbo vegetabilis*, *Alumina* and *Pyrogenium*. After 72 hours *Lycopodium*, *Nux vomica* and *Carbo vegetabilis* increased statistically the pH (Table 4).

The EC of the white clay soil solution was increased by *Lycopodium* and the signal appeared 72 hours after application (Table 4).

Table 3- Summary of the analysis of variance of pH and Electrical Conductivity (EC) data 24 hours (pH1, EC1), 48 hours (pH2, EC2) and 72 hours (pH3, EC3) after applying the treatments in the solution white clay soil. Viçosa/MG. 2011.

FV GL	Medium Square						
		pH1	CE1	pH2	CE2	pH3	CE3
<b>Treat.</b>	10	0.22**	2.69NS	1.48**	2.18NS	0.90**	411.08**
<b>Res.</b>	33	0.12	2.24		0.17	2.87	0.25
<b>CV (%)</b>		1.50	2.42		1.71	2.73	2.00
							13.73

\*\*significant at 1% probability by F test

nsnot significant

Table 4- Average pH and Electrical Conductivity values 24 hours (pH1, EC1), 48 hours (pH2, EC2) and 72 hours (pH3, EC3) after application of the treatments in the white clay soil solution. Viçosa/MG. 2011.

Treatments	pH1	CE1	pH2	CE2	pH3	CE3
<i>Lycopodium</i> 7CH	8.0A	62.9A	9.2A	63.7A	8.9A	95.7A
<i>Nux vomica</i> 7CH	7.7B	61.5A	8.2B	62.1A	8.7A	63.1B
<i>Carbo vegetabilis</i> 7CH	7.5BC	61.7A	7.8C	62.1A	8.2B	62.1B
<i>Alumina</i> 7CH	7.3BC	61.5A	7.7CD	61.3A	7.9BC	62.0B
<i>Pyrogenium</i> 7CH	7.3CD	61.1A	7.5DE	62.2A	7.9BC	62.0B
<i>Natrum muriaticum</i> 7CH	7.3CD	61.1A	7.4DEF	62.1A	7.8C	62.1B
<i>Calcarea carbonica</i> 7CH	7.2CD	61.9A	7.3EF	61.3A	7.7C	61.6B
<i>Arnica</i> 7CH	7.2CD	61.5A	7.4DEF	61.8A	7.6C	62.7B
<i>Sulfur</i> 7CH	7.2D	63.2A	7.2EF	61.8A	7.6C	61.8B
7CH Distilled Water	7.3CD	61.9A	7.2EF	63.3A	7.6C	61.7B
Distilled water (Control)	7.22CD	63.3A	7.1F	62.4A	7.6C	62.2B

The averages, followed by at least one letter in the

column, do not differ from each other, at 5% probability, using the Tukey test.

The treatments caused a significant effect on the pH variable after 48 hours of application in the yellow clay soil solution. The effects on EC were after 24 hours and significant throughout the experimental period (Table 5).

After 72 hours of application, all homeopathic preparations increased the pH of the yellow clay soil solution (Table 6). As for EC, there was a significant increase caused by *Lycopodium* throughout the experimental period.

Table 5- Summary of the analysis of variance of pH and Electrical Conductivity (EC) data 24 hours (pH1, EC1), 48 hours (pH2, EC2) and 72 hours (pH3, EC3) after applying the treatments in the solution yellow clay soil. Viçosa/MG. 2011.

FV GL	Medium Square						
	pH1 CE1		pH2 CE2		pH3 CE3		
<b>Treat.</b>	10	0.52ns	208.90**	0.15**	206.88ns	1.46**	165.10**
<b>Res.</b>	33	0.38	49.81	0.51	59.65	0.12	54.25
<b>CV (%)</b>		2.85	13.48	3.22	14.72	1.39	14.47

\*\*significant at 1% probability by F test

nsnot significant

Table 6- Average pH and Electrical Conductivity values 24 hours (pH1, EC1), 48 hours (pH2, EC2) and 72 hours (pH3, EC3) after application of the treatments in the yellow clay soil solution. Viçosa/MG.2011.

Treatments	pH1	CE1	pH2	CE2	pH3	CE3
<i>Lycopodium 7CH</i>	7.1A	74.1A	7.4A	47.1A	9.22A	68.6A
<i>Nux vomica 7CH</i>	7.0A	51.4B	7.3A	50.9B	8.95B	51.0AB
<i>Carbo vegetabilis 7CH</i>	6.9A	50.6B	7.1A	50.2B	8.45B	50.2B
<i>Alumina 7CH</i>	6.9A	51.3B	7.0A	51.0B	8.10D	51.1AB
<i>Pyrogenium 7CH</i>	6.8A	50.2B	7.0A	50.2B	8.00DE	49.8B
<i>Natrum muriaticum 7CH</i>	6.8A	50.3B	6.9A	50.3B	7.8DE	50.1B
<i>Calcarea carbonica 7CH</i>	6.8A	49.5B	6.9A	50.2B	7.7FA	49.5B
<i>Arnica 7CH</i>	6.8A	49.7B	6.8A	49.9B	7.7FG	49.3B
<i>Sulfur 7CH</i>	6.8A	49.9B	6.95A	49.7B	7.55G	48.8B
7CH Distilled Water	6.8A	49.4B	6.9A	49.7B	7.50G	41.6B
Distilled water (Control)	6.9A	49.7B	6.8A	51.0B	7.42G	50.0B



The means, followed by at least the same letter in the column, do not differ from each other, at 5% probability, using the Tukey test.

Depending on the clay, the signs of pathogenesis were differentiated depending on the homeopathic preparation or the time until these signs appeared.

The *Lycopodium* 5CH results are consistent with pathogenesis in distilled water. *Lycopodium* causes pathogenesis in physical-chemical properties: increased EC, pH, turbidity and reduced temperature (CASALI et al., 2009).

According to Andrade et al. (2010), among the experiences of rural homeopaths, *Lycopodium* increases soil moisture.

According to Casali et al. (2009), *Lycopodium* in human organisms rescues lost potentialities.

*Lycopodium* is one of the oldest plant species still present on Earth and has the potential to help plants retain moisture (CAMPOS, 2004).

## **Conclusion**

There was pathogenesis of homeopathic preparations in clay solutions. The pH and EC variables were affected by homeopathic preparations.

The responses varied depending on the type of clay in the soil.

The time until signs of pathogenesis appeared depended on the homeopathic preparation and soil clay.

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## CHAPTER 6

# **PATHOGENESIS OF HOMEOPATHIC PREPARATIONS IN MINERAL WATER**

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Keywords: High Dilutions, Water treatment, Homeopathy.

### **Introduction**

Mine water is considered a living system in balance and is therefore used in basic experiments on homeopathic preparations (FIGUEIREDO, 2009).

Water quality indicators, electrical conductivity, pH, dissolved oxygen and turbidity are indicators of the pathogenesis of homeopathic preparations in water (FIGUEIREDO, 2009; GOMES, 2009; LISBOA, 2010).

According to the protocol, dynamization of homeopathic substances must be tried in different

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healthy experimenters, with the aim of understanding the most complete picture of pathogenesis (LISBOA et al., 2005). The study of pathogenesis is constructive, as new experimental results, with repeatability, are added to the published pathogenesis.

Homeopathic preparations intended for organisms in imbalance are chosen based on pathogenesis. Homeopathic preparations similarly access the self-regulation of living systems, promoting balance (CASALI et al., 2006).

The health of humanity is closely associated with the quality of food. The quality of food depends on the balance of the components of agricultural systems, of which the water system is a part (ANDRADE et al., 2011). In rural areas, water quality is often reduced due to inadequate management, abusive use of agrochemicals, garbage and lack of sanitation. Water quality is essential for the production of healthy food, environmental balance, and the health of animals and humans.

(LISBOA, 2010).

This work aimed to characterize the pathogenesis of homeopathic preparations in mineral water, through electrical conductivity and pH.

## **Materials and methods**

The experiment was conducted at the Soil and Water Homeopathy Laboratory, of the Phytotechnics Department of the Federal University of Viçosa in August 2011. A completely randomized experimental design was adopted, 65 plots, 5 replications and thirteen treatments (*Natrum muriaticum* 7CH, *Alumina* 7CH, *Silicea* 7CH, *Carbo vegetabilis* 7CH, *Arnica montana* 7CH, *Nux vomica* 7CH, 70

*Pyrogenium 7CH, Calcarea carbonica 7CH, Sulfur 7CH, Lycopodium clavatum 7CH, Mineral Water 7CH, Control-Ethanol 20% 7CH and Control - no application*). The 7CH dynamization was chosen in this experiment because it is common in rural areas.

In sixty-five 100 mL borosilicate bottles with 80 mL of mineral water, 2 drops of homeopathic preparations were applied in a single dose, except in the Control treatment (no application), in the double blind procedure.

Homeopathic preparations (6CH) were purchased from a commercial laboratory and prepared in 20% ethanol. The homeopathic preparation Mineral Water 7CH was made with mineral water, following described procedures (DÔRES et al., 2007).

Electrical conductivity (EC) was measured using a conductivity meter, model DM -32. The pH was measured using a potentiometer, model DM-23.

The variables were measured 24 hours, 48 hours and 72 hours after applying the treatments. The data were statistically processed by analysis of variance in the SAEG 9.1 program (2007) and the means were interpreted using the Tukey test at 5% probability.

## **Results and discussions**

Mineral water was responsive to treatments and signs persisted during the experimental period (Table 1).

Table 1. Summary of analysis of variance of pH and Electrical Conductivity (EC) data 24 hours (pH1 and EC1), 48 hours (pH2 and EC2) and 72 hours (pH3 and EC3) after application of treatments in mineral water . Viçosa/MG. 2011

FV GL	Medium Square						
	pH1	CE1	pH2	CE2	pH3	CE3	
<b>Treat.</b>	12	4.90**	19.14**	3.23**	30.24**	2.55**	75.29**
<b>Res.</b>	52	0.10	6.35	0.24	12.39	0.15	26.06
<b>CV (%)</b>		1.47	8.45	2.18	11.66	1.62	16.50

\*\*significant at 1% probability by F test

Homeopathic preparations caused a change in the pH of mineral water 24 hours after application and the signs persisted throughout the experimental period (Table 2). *Natrum muriaticum*, *Alumina*, *Silicea*, *Carbo vegetabilis* and *Arnica montana* significantly increased the pH of the water in relation to the control, without application. *Nux vomica*, *Pyrogenium*, *Calcarea carbonica*, *Sulfur* and *Lycopodium* reduced pH.



Table 2- Average pH and Electrical Conductivity values 24 hours (pH1 and CE1), 48 hours (pH2 and CE2) and 72 hours (pH3 and CE3) after application of treatments in mineral water. Viçosa/MG. 2011.

Treatments	pH1	CE1	pH2	CE2	pH3	CE3
<i>Natrum muriaticum</i> 7CH	9.28A	36.30A	9.32A	38.35A	9.36A	43.64A
<i>Alumina</i> 7CH	8.40B	29.40B	8.36B	29.36B	8.60B	31.09B
<i>Silicea</i> 7CH	7.70C	29.58B	7.56C	29.64B	8.00B	30.05B
<i>Carbo vegetabilis</i> 7CH	7.28D	29.26B	6.94D	29.16B	7.56C	29.40B
<i>Arnica montana</i> 7CH	6.84E	28.98B	6.96D	29.38B	7.42DE	29.71B
<i>Nux vomica</i> 7CH	6.56FG	29.46B	6.80DEF	29.69B	7.26EF	30.01B
<i>Pyrogenium</i> 7CH	6.40GH	29.20B	6.92DE	29.74B	7.22EF	30.21B
<i>Calcarea carbonica</i> 7CH	6.38GH	29.32B	6.98 D	29.61B	7.16EF	28.91B
<i>Sulfur</i> 7CH	6.32H	29.21B	6.92DE	29.74B	7.10F	29.47B
<i>Lycopodium</i> 7CH	6.20HI	29.35B	6.76DEF	29.55B	7.06F	29.65B
7CH Mineral Water	6.0I	29.37B	6.58EF	29.48B	7.04F	31.24B
Control. Ethanol 20%7CH	6.04I	29.65B	6.46F	29.55B	7.16F	26.56B

Control. No application 6.6EF 28.77B 6.76DEF 29.16B 7.02F 29.12B

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Means followed by at least one same letter in the column do not differ from each other, using the Tukey test, at 5% probability

By comparing the average pH of the water after treatment with the average of the 20% Ethanol 7CH control, there was an effect of the solvent (ethanol). However, some treatments caused changes in pH that differed significantly from the control/no application (Table 2).

The homeopathic preparation Mineral Water 7CH is called autosodium or isotherapeutic. The inclusion of autosodium in this experiment was due to its adoption in rural areas. Nosodes are effective and easily accessible, as they are obtained from local resources (ANDRADE et al., 2010). However, in this experiment it was observed that the 7CH Mineral Water treatment was not effective on pH, compared to the 20% 7CH Ethanol control.

Considering the healthy experimenter mineral water, the results mean pathogenesis of homeopathic preparations on pH. The results indicate the potential of Homeopathy to increase or decrease pH according to needs.

There was a significant increase in electrical conductivity and pH up to 72 hours after application of *Natrum muriaticum* 7CH. Considering the pathogenesis result, *Natrum muriaticum* 7CH can balance unbalanced waters with high EC. In water treated with *Natrum muriaticum* 7CH, EC increased over time (Table 2). The results are consistent with Elia et al. (2006), in which the EC of ultradilute solutions increases over time. The activity of *Natrum muriaticum* in water has been verified in several studies (CASALI et al., 2009). According to Andrade et al.

(2011), *Natrum muriaticum* generates signs of pathogenesis in

mineral water in 6CH, 30CH, 100CH and 1000CH dynamizations, depending on the treatment time. Electrical conductivity is considered a good indicator of the responses of homeopathic preparations in water. The results depend on: the dynamization, the time of exposure of the water to the homeopathic preparation and the number of doses (ARAÚJO et al., 2011; CAMPOS et al., 2011; ROCHA et al., 2011).

The mechanism of action of homeopathy has been little theorized and requires more data. The results of the activity of homeopathic preparations in water are fundamental due to the irreplaceable presence of water in living organisms (CASALI et al., 2006).

The fact that homeopathic preparations have been dynamized up to 7CH means that they still contain molecules in the solution, in small quantities, and could have influenced the value of the variables. However, in the case of the CE variable this statement is not valid, as only *Natrum muriaticum* 7CH caused a significant change. According to Lisboa (2011), the hypothesis of a substance present in the solution is the one most used by homeopathic biologists and pharmacologists, when explaining the activity of homeopathic preparations at low dynamizations. The responses of homeopathic preparations above 12CH are the current great physicochemical challenge.

## **Conclusion**

There was pathogenesis of homeopathic preparations in mineral water.

pH and electrical conductivity are effective indicators of the pathogenesis of homeopathic preparations in water.



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## CHAPTER 7

### CHANGES IN BIOCHEMICAL DEMAND FOR OXYGEN (BOD) IN WATER TREATED WITH HOMEOPATHIC PREPARATIONS

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Keywords: Pathogenesis, Homeopathy, High Dilutions.

#### Introduction

Water quality has a great influence on land cover, soil composition and human activity. The way humans use and occupy the soil has a direct impact on water quality. In general, water quality is a function of land use and occupation in the river basin (LOUZADA et al., 2002).

The degradation of water resources through human actions, such as the disposal of domestic and industrial sewage in riverbeds, affects the physical and environmental properties of water resources.

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water chemicals causing numerous negative impacts.

Among the physical-chemical properties of water, biochemical oxygen demand (BOD) stands out. According to Lima et al. (2006), BOD is the amount of oxygen required to oxidize biodegradable organic matter under aerobic conditions, or the amount of dissolved oxygen L-1 of O<sub>2</sub>, which will be when degrading consumed by (DO) in mg aerobic organisms the matter organic.

BOD is an important water quality parameter and quantifies organic pollution through oxygen consumption and the anaerobic condition of the aquatic system. Oxygen, among the gases dissolved in water, is important in the dynamics, characterization and health of aquatic ecosystems (LIMA et al., 2006).

For decades, nature has been showing strong signs of transition, as if it were awakening a new sense of life in humans. And everything happens so quickly that changes generate new paradigms, determine new behaviors and require new paths in the management of natural resources (LIMA et al., 2006). In the case of water resources management, scarcity, inappropriate use and growing demand are foreshadowing water as a serious problem for humanity in the 21st century. Water with compromised quality causes illnesses in: plants, animals, soil and microorganisms. Agriculture depends on quality water in the production of healthy food (RODRIGUES et al., 2011).

Homeopathy has resources and knowledge that can transform living conditions on Earth, from polluted and sick, to balanced, organized and healthy conditions (CASALI et al., 2002). Homeopathic preparations act on the self-regulation of living systems

causing reaction and balance (CASALI et al., 2006).

Homeopathic preparations cause changes in the physical-chemical properties of water, as evidenced by Figueiredo (2009), Gomes (2009) and Lisboa (2010).

Research in Homeopathy begins with the study of the pathogenesis of substances. Pathogenesis is the set of signs caused in experimentation on a healthy organism by homeopathic preparations. In each experiment, the signals are carefully recorded and subsequently analyzed and classified, composing the homeopathic ecology of the substances. More than 3,000 substances have their homeopathic acology published. Pathogenesis will serve to choose the most suitable homeopathy for each organism in imbalance according to the principle of similarity (CASALI et al., 2006).

The objective of this work was to evaluate the pathogenesis of four homeopathic preparations on the BOD of the water.

## **Materials and methods**

The experiment was conducted at the Soil and Water Homeopathy Laboratory, of the Phytotechnics Department of the Federal University of Viçosa (UFV), in August 2011.

A completely randomized experimental design was adopted with 6 treatments and 5 replications, totaling 30 plots. The treatments were: *Calcarea carbonica* 30CH, *Magnesia carbonica* 30CH, *Silicea* 30CH, *Phosphorus* 30CH, control 1 (no application), control 2 (Distilled Water 30CH).

Homeopathic preparations were purchased from a commercial laboratory using 29CH dynamization. At the time of

implementation of the treatments, 30CH dynamizations were prepared in distilled water. According to Andrade (2004), in microbial activity experiments, the solvent ethanol should be avoided in preparations due to the sensitivity of microorganisms.

Control 2 (30CH Distilled Water) was prepared in the Homeopathy Laboratory of the Department of Phytotechnics at UFV, following procedures described (DÔRES et al., 2007).

30 bottles of BOD were used, with a volume of 300 ml. Each BOD bottle with 50 ml of mineral water was diluted in 250 ml of Dilution Water. In preparing the dilution water, the methodology suggested by Fernandes (2003) was adopted.

After preparing the BOD bottles, the initial dissolved oxygen reading (initial DO) was taken using the portable Oximeter DM-4P equipment. Immediately after reading, the treatments were applied, with 9 drops/bottle of homeopathic preparations in a double-blind procedure. Immediately after applying the treatments, the samples were incubated in a BOD chamber, at 20°C, for 5 days, protected from light, when the final dissolved oxygen reading (final DO) was taken.

From the initial DO and final DO values, the biochemical oxygen demand (BOD) was calculated. The data were statistically processed by analysis of variance in the SAEG 9.1 program (2007) and the means were compared using the Tukey test at 5% probability.

## **Results and discussion**

Homeopathic preparations caused changes

significant differences in the BOD of mineral water (Table 1).

Table 1. Summary of analysis of variance of biochemical oxygen demand (BOD) data in mineral water samples. Viçosa-MG. 2011.

<b>FV</b>	<b>GL</b>	<b>Medium Square</b>
<b>Treatment</b>	5	11.33**
<b>Residue</b>	24	0.84
<b>CV (%)</b>		7.13

\*\* significant at 1% probability by F test

Homeopathic preparations reduced BOD values in relation to Control 1, with emphasis on *Magnesia carbonica* 30CH, *Silicea* 30CH and *Phosphorus* 30CH, which also reduced BOD in relation to Control 2 (Table 2).

Table 2. Average values of Biochemical Demand for Oxygen (mg/L) in mineral water. Viçosa-MG. 2011.

<b>Treatments</b>	<b>Averages</b>
Control 1: no application	6.46A
Control 2: 30CH Distilled Water	4.80 B
<i>Calcareo carbonica</i> 30CH	4.74 B
<i>Carbonic magnesium</i> 30CH	2.98C
<i>Silicea</i> 30CH	2.86C
<i>Phosphorus</i> 30CH	2.66C

Averages followed by the same letters in the column do not differ 84

among themselves using the Tukey test at 5% probability.

There was an effect of Control 2 (30CH Distilled Water) in reducing BOD, when compared to Control 1. The effect of 30CH Distilled Water was statistically equal to the effect caused by *Calcareo carbonica* 30CH.

Distilled water was used in the Control because it is the vehicle (solvent) for homeopathic preparations. The 30CH Distilled Water control, with dynamization equal to other homeopathic preparations, is based on the possible physical effect of dynamization.

From the similar responses of Distilled Water 30CH and *Calcareo carbonica* 30CH, it is possible to infer the effect of oxygen present in the bottles at the time of dynamization. It is hypothesized that *Calcareo carbonica* interferes with the oxygen present inside the preparation bottle at the time of succussion. This hypothesis should be tested in future trials.

The homeopathic preparations in this experiment were selected based on previous research that demonstrated their effect on microbial activity. According to Andrade (2004), *Calcareo carbonica*, *Magnesia carbonica*, *Phosphorus* and *Silicea* cause changes in the activity and efficiency of soil microorganisms.

Reducing BOD means greater activity of microorganisms and consequently greater consumption of dissolved oxygen. The results are consistent with those observed and inferred by Andrade (2004).

Mineral water, in basic research in Homeopathy, is adopted as a healthy experimenter and the results mean pathogenesis (FIGUEIREDO, 2009). Homeopathic preparations caused the pathogenesis of

increase microbial activity, growth of microorganisms and reduce BOD.

Rodrigues et al. (2011), confirmed the increase in BOD in river water treated with 30CH Oxygen. The results in river water are interpreted as the system's reaction to the homeopathic stimulus.

Figueiredo (2009), proved that *Calcarea carbonica* 5CH increases the dissolved oxygen of mine water. However, the results were dependent on the time the water was exposed to treatment. The longer exposure time (60 hours) allows the appearance of signs of *Calcarea carbonica*, which slowly causes pathogenesis.

Gomes (2009) evaluated several water quality indicators as signs of pathogenesis of homeopathic preparations. The dissolved oxygen variable was not reliable in terms of signs of pathogenesis. Oxygen dissolved in water is highly transient, therefore, due to instability mainly in light and temperature, there is variability in the results.

Andrade (2004) proved the activity of homeopathic preparations in soil solution. The activity of homeopathic preparations on primary and secondary metabolism can be known from published pathogenesis (CASALI et al., 2009).

The homeopathic preparation in 30CH dynamization is devoid of molecules. From the 12th successive dilution of any substance, on the centesimal scale, it is probabilistically impossible for the presence of molecules of the original raw material, according to Avogadro's principle. The results of tests with high dilutions imply the hypothesis of the dynamic physical action of homeopathy (CASALI et al., 2006).

## **Conclusion**

Homeopathic preparations cause pathogenesis in mineral water, in the variable biochemical oxygen demand (BOD).

Homeopathic preparations *Calcareo carbonica* 30CH, *Magnesia carbonica* 30CH, *Silicea* 30CH and *Phosphorus* 30CH reduce BOD in water.

The activities of high dilutions on properties biological characteristics of water highlight the dynamic physical effect.

BOD is recommended in research into the pathogenesis of homeopathic preparations.

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## CHAPTER 8

### **ELECTRICAL CONDUCTIVITY OF DISTILLED WATER AFTER TREATMENT WITH DOSES OF *ARGENTUM NITRICUM***

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Keywords: Homeopathy, High Dilutions, Water Treatment

#### **Introduction**

Homeopathic preparations of strong substances produce effects in just a few doses. Homeopathic preparations of weak substances should be tried with a greater number of doses. The action of homeopathic preparations of very weak substances is researched in more responsive and sensitive experimenters

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(LISBOA et al., 2005).

According to Gomes (2009), the longer action time of homeopathic calcium carbonate preparations and more doses (number of applications) increased the interaction and responses of water.

The electrical conductivity of water has been researched as an indicator of the effects of homeopathic preparations (FIGUEIREDO, 2009).

The objective of this research was to evaluate the changes in the electrical conductivity of distilled water and interpret the effects of *Argentum nitricum*.

## **Materials and methods**

The experiment was conducted at the Homeopathy Laboratory of the Federal University of Viçosa, Viçosa/MG, in January 2011.

The experimental design was completely randomized, with five treatments, four replications, totaling 20 experimental plots that consisted of 20 80 mL borosilicate bottles containing 40 mL of distilled water. The treatment was the number of applications (doses) of the homeopathic preparation *Argentum nitricum* 7CH. Dose 0 (without application of control homeopathy), Dose 1 (1 application), Dose 2 (2 applications), Dose 3 (3 applications) and Dose 4 (4 applications). 5 drops of *Argentum nitricum* were applied 7CH per dose. The homeopathic preparation was purchased from a suitable Homeopathy Laboratory.

Electrical conductivity (EC) was determined using a conductivity meter, model DM-32. The readings were taken before applying the treatments (CE-T0),

immediately after applying the treatments (CE T1), 24 hours (CE-T2), 48 hours (CE-T3) and 72 hours (CE-T4) after applying the treatments. Statistical processing of the data was carried out using analysis of variance and the Schott Knott mean test at 10% probability in the SAEG 9.1 program (2007)

## Results and discussions

According to Table 1, there was a significant effect of treatments at times T2 and T4.

The number of applications of the homeopathic preparation was effective in causing water response. The highest dose (4 applications) increased the EC of the water, 24 and 72 hours after the first dose (Table 2).

The results indicate the effect of *Argentum nitricum* 7CH on distilled water. The manifestation of signals over time, as happened in this experiment, is foreseen in the experiment protocol (LISBOA et al., 2005)

The absence of a significant effect of the data at time zero has experimental methodological importance as it characterizes the uniformity between the bottles of distilled water used as part (experimental unit) of the test. It also confirms the hypothesis that all experimenters (bottles of distilled water) are balanced regarding the physical-chemical property of the water under study, of conducting electrical impulses.

When applying the third dose, there was no response as quick as the others. *Argentum nitricum* in Acology Homeopathy is considered one of the most characteristic preparations related to the acceleration of processes. It is recommended for organisms in a phase of imbalance due to movement or accelerated metabolism (CASALI et al, 92

2009)

Data analysis indicates that there was coherence between the pathogenesis of *Argentum nitricum* described in Homeopathic Acology texts and the results of this experiment.

It was interpreted that experiments on human organisms and other living organisms generate analogous signals in distilled water.

Table 1- Summary of the analysis of variance of electrical conductivity data before application of treatments (CE T0), immediately after application (CE T1), 24 hours (CE T2), 48 hours (CE T3) and 72 hours (CE T4) after applying treatments in distilled water. Viçosa/MG. 2011.

FV	GL	Medium Square					
		CE T-0	CE T-1	CE T-2	CE T-3	CE T-4	
<b>Treatments</b>	3	0.0052ns	0.0086ns	0.093**	0.11ns	0.22**	
<b>Residue</b>	15	0.0054	0.0064		0.039	0.056	0.086
<b>CV (%)</b>		5.22	15.05	5.71	13.55		17.90

\*\*\*significant at 5% probability by F test

ns not significant

Table 4- Average electrical conductivity values ( $\mu\text{S}/\text{cm}$ ) before applying treatments (CE T0), immediately after applying treatments (CE T1), 24 hours (CE T2), 48 hours (CE T3) and 72 hours (CE T4) after application of treatments in distilled water. Viçosa/MG. 2011.

Treatments	CE T-0	CE T-1	CE T-2	CE T-3	CE T-4
No application	1.4A	1.38A	1.43B	1.51A	1.56B
An application	1.42A	1.41A	1.41B	1.54A	1.54B
Two applications	1.38A	1.38A	1.35B	1.47A	1.51B
Three applications	1.37A	1.36A	1.36B	1.51A	1.52B
Four applications	1.45A	1.48A	1.72A	1.87A	2.06A

Means followed by the same letter in the column do not differ significantly from each other using the Schott Knott test at 10% probability.

## Conclusion

The homeopathic preparation *Argentum nitricum* causes effects on the electrical conductivity of distilled water. Responses are dose and time dependent.

There is an analogy between the primary action signals of water and the signals in humans.

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## CHAPTER 9

### **PATHOGENESIS OF SEVEN PREPARATIONS HOMEOPATHICS IN ELECTRICAL CONDUCTIVITY FROM WATER**

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## **Introduction**

Research in homeopathy applied to living organisms begins with experimentation on healthy organisms and the data generated characterize pathogenesis, that is, the set of signs caused by the homeopathic preparation.

The pathogenesis of homeopathic substances is the main criterion for choosing the most suitable homeopathic preparation for each case of imbalance (CASALI et al., 2006).

Mineral water is considered healthy and there is great diversity in terms of physical-chemical characteristics. Electrical conductivity is the most striking characteristic because of the variability in the soil conditions where the source is located.

According to the homeopathic research protocol, healthy experimenters must be diverse, enabling complete and generalizable pathogenesis (LISBOA et al., 2005).

The objective of the work was to evaluate the pathogenesis of seven homeopathic preparations on the electrical conductivity of mineral water from two sources.

## **Materials and methods**

The experiments were conducted at the Homeopathy Laboratory of IF Sudeste de Minas, Rio Pomba-MG, in November 2010. In each experiment, a completely randomized experimental design was adopted with eight treatments: *Cuprum metallicum* 7CH, *Ferrum metallicum*

7CH, *Argentum nitricum* 7CH, *Plumbum metallicum* 7CH, *Sulfur* 7CH, *Zincum metallicum* 7CH, *Arsenicum album* 7CH and distilled water (Control), five replications, totaling 40 experimental plots.

In forty 80 mL borosilicate bottles with 40 mL of commercial mineral water A (electrical conductivity at 25°C=16.2µS/cm) and another 40 bottles with 40 mL of commercial mineral water B (electrical conductivity at 25°C= 355µS/cm) , 5 drops of treatments were applied in a double-blind procedure. Homeopathic preparations in 7CH dynamization were made in distilled water immediately before implementing the treatments.

Electrical conductivity (EC) was measured using a conductivity meter, model DM-32, before applying the treatments (CE-T0), 24 hours (CE-T1), 48 hours (CE-T2) and 72 hours (CE- T3) after application of treatments. Statistical processing of the data was carried out through analysis of variance in the SAEG 9.1 program (2007). The means were interpreted using the Tukey test at 5% probability.

## **Results and discussion**

According to Tables 1 and 2, electrical conductivity (EC) was influenced by homeopathic treatments. In water "A", the signs were noticeable up to 72 hours after applying the treatments. In water "B", the signals were noticeable 24 hours after applying the treatments.

Table 1- Summary of the analysis of variance of electrical conductivity data before applying the treatments (C.ET-0), 24 hours (CE T-1), 48 hours (CE T-2) and 72 hours (CE T- 3) after application of commercial mineral water treatments "A" (16.2  $\mu\text{S/cm}$ ).

<b>FV</b>	<b>GL</b>	<b>Medium Square</b>			
		<b>CE T-0</b>	<b>CE T-1</b>	<b>CE T-2</b>	<b>CE T-3</b>
<b>Treatments</b>	7	1.28ns	2.25*	2.54*	3.68*
<b>Residue</b>	32	0.96	0.89	0.87	1.17
<b>CV (%)</b>		4.69	4.59	4.53	5.26

\*significant at 1% probability by F test

ns not significant

Table 2- Summary of the analysis of variance of electrical conductivity data before applying the treatments (CE-T-0), 24 hours (CE T-1), 48 hours (CE T-2) and 72 hours (CE T- 3) after application of treatments in commercial mineral water "B" (355.0  $\mu\text{S/cm}$ ).

<b>FV</b>	<b>GL</b>	<b>Medium Square</b>			
		<b>CE T-0</b>	<b>CE T-1</b>	<b>CE T-2</b>	<b>CE T-3</b>
<b>Treatments</b>	7	15.40ns	126.03**	7.22ns	8.86ns

<b>Residue</b>	32	19.89	6.70	17.16	0.81	1.31	10.28
<b>CV (%)</b>	1.40						0.99

\*\* significant at 1% probability by F test

ns not significant

The average EC values before applying the treatments (T-0), Tables 3 and 4, indicate the uniformity of the water samples.

Mineral waters are healthy experimenters and the difference in electrical conductivity was considered pathogenesis. In water "A", with the lowest EC (16.2  $\mu\text{S}/\text{cm}$ ), pathogenesis was present up to 72 hours after treatment.

*Cuprum metallicum* 7CH increased the EC of water A. This effect is considered pathogenesis at 24 hours, 48 hours and 72 hours after treatment (Table 3).

In water A, after 48 hours, there was pathogenesis of *Ferrum metallicum* 7CH and after 72 hours there was pathogenesis of *Argentum nitricum* 7CH, *Plumbum* 7CH and *Sulfur* 7CH (Table 3).

Table 3- Average electrical conductivity values ( $\mu\text{S}/\text{cm}$ ) before application of treatments (CE T-0), 24 hours (CE T-1), 48 hours (CE T-2) and 72 hours (CE T-3) after applying treatments in mineral water A (16.2  $\mu\text{S}/\text{cm}$ ).

<b>Treatments</b>	<b>CE T-0</b>	<b>CE T-1</b>	<b>CE T-2</b>	<b>CE T-3</b>
Control	20.50A	19.48B	19.16B	18.70B
<i>Cuprum metallicum</i> 7CH	22.10 A	21.84 A	21.62 A	20.88 AB
<i>Ferrum metallicum</i> 7CH	20.58 A	20.90 AB	21.18 A	21.28 A
<i>Argentum nitricum</i> 7CH	20.68 A	20.36 AB	20.66 AB	21.10 A

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*Plumbum metallicum* 7CH 20.82 A 20.32 AB 20.68 AB 21.10 A

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*Sulfur* 7CH 20.90 A 20.66 AB 20.90 AB 21.24 A

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*Zincum metallicum* 7CH 20.70 A 20.82 AB 20.46 AB 20.52 AB

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*Arsenicum album* 7CH 20.90A 20.94AB 20.52AB 20.28AB

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Means followed by the same letter in the column do not differ from each other, at 5% probability using the Tukey test.

In water "B" with the highest EC (355  $\mu\text{S}/\text{cm}$ ) there was pathogenesis 24 hours after treatments (Table 4). Homeopathic preparations increased EC except *Cuprum metallicum*.

The signs of pathogenesis in mineral waters A and B were differentiated and demonstrate the principle of specific action of the preparations (FIGUEIREDO, 2009).

Table 4- Average electrical conductivity values ( $\mu\text{S}/\text{cm}$ ) before application of treatments (CE T-0), 24 hours (CE T-1), 48 hours (CE T-2) and 72 hours (CE T-3) after application of treatments in mineral water "B" (355  $\mu\text{S}/\text{cm}$ )

<b>Treatments</b>	<b>CE T-0</b>	<b>CE T-1</b>	<b>CE T-2</b>	<b>CE T-3</b>
Control	317.24A	310.16B	315.70A	322.58A
<i>Cuprum metallicum</i> 7CH	317.66 A	311.30 B	312.60 A	320.12 A
<i>Ferrum metallicum</i> 7CH	316.62 A	319.64 A	315.04 A	321.74 A
<i>Argentum nitricum</i> 7CH	318.06 A	319.92 A	315.52 A	322.24 A
<i>Plumbum metallicum</i> 7CH	319.10 A	321.38 A	314.70 A	324.34 A

*Sulfur* 7CH

316.98 TO 321.08 TO 314.60 TO 321.04 A

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*Zincum metallicum* 7CH 313.40 A 323.56 A 315.34 A 322.34 A

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*Arsenicum album* 7CH 315.34A 321.86A 316.80A 323.54A

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The means followed by the same letter in the column do not differ from each other, using the Tukey test at 1% probability.

## **Conclusion**

Homeopathic preparations cause pathogenesis in mineral water EC. The time for signs to appear depends on the mineral water.

## **Thanks**

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## CHAPTER 10

### **ACTIVITY OF *Calcareo carbonica* IN WATER INFLUENCED BY AIR VOLUME AVAILABLE AT SUCCUSSION**

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#### **Introduction**

Water is essential for living organisms, agricultural production, domestic use and industrial processes (Hu, 2009). Many organic and inorganic wastes have been released into the environment, damaging the waters that border Brazilian cities. Organic and mineral loads are frequent, exceeding the self-purification capacity (LEITE et al., 2005). The receiving waters are unsuitable for several

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types of use (domestic, commercial or agricultural supply, recreation, etc.). It is very important to consider the assimilation capacity of rivers. And also prevent the release of treated effluents at a flow rate exceeding the support capacity.

The release of loads of organic matter contributes to an increase in biological oxygen demand (BOD), causes negative impacts on the environment and causes destabilization of aquatic ecosystems. The quality of available and accessible water has a great impact on the population's standard of living and well-being (ODJADJARE & OKOH, 2010).

According to Lima et al. (2006,) BOD is defined as the amount of oxygen required to oxidize biodegradable organic matter under aerobic conditions, that is, the L-1 of O<sub>2</sub>, amount oxygen (DO) in mg that will be consumed by of dissolved aerobic organisms when degrade organic matter.

BOD is an important water quality parameter, it quantifies organic pollution due to oxygen depletion, which makes the aquatic system anaerobic. Oxygen, among the gases dissolved in water, is important in the dynamics, characterization and health of aquatic ecosystems (LIMA et al, 2006).

Andrade et al (2011) evaluated BOD in water samples treated with homeopathic preparations. There was a reduction in BOD with the homeopathic preparations *Calcarea carbonica* 30CH, *Magnesia carbonica* 30CH, *Silicea* 30CH and *Phosphorus* 30CH. It was concluded that BOD is responsive to information conveyed by homeopathic preparations and is indicated in pathogenesis studies.

In Homeopathy, constructive and defensive information enables a diversity of resources in treatment

of living organisms and water transforming degradation into balance, health and wholesomeness (ANDRADE et al, 2006).

Experimentation is the fundamental principle of Homeopathic Science. The experiment demonstrates the treatment potential of homeopathic preparations.

According to the experimentation protocol, homeopathic preparations must be tested on several experimenters, making it possible to understand the most complete pathogenesis of the substances. Pathogenesis is the set of signals generated in a healthy organism by homeopathic preparations, important in choosing the homeopathic substance most suitable for imbalances, according to the Principle of Similitude (RODRIGUES, 2009).

Andrade et al (2011) evaluated the pathogenesis of several homeopathic preparations on water BOD. *Calcarea carbonica* 30CH and the control (Distilled Water 30CH) did not differ statistically. Then the hypothesis arises of the interaction of oxygen in the air with homeopathic preparations during the succussion process. This interaction may have caused similar effects of Distilled Water 30CH and *Calcarea carbonica* 30CH (ANDRADE et al, 2011).

The objective of the research was to evaluate the interference of oxygen in the air, available in the bottle, on the activity of the homeopathic preparation *Calcarea carbonica* on the BOD of water.

## **Materials and methods**

The experiment was conducted at the Soil and Water Homeopathy Laboratory, Department of Phytotechnics, Federal University of Viçosa (UFV), in 2011.

Distilled Water 30CH and Homeopathic Preparations

were carried out at the Homeopathy Laboratory/UFV, following procedures described by Dôres (2007). The homeopathic preparations were manipulated with three volumes of distilled water. Being 10 ml, 20 ml and 30 ml and 3, 5 and 8 drops, respectively.

A completely randomized experimental design was adopted with 7 treatments, 4 replications, totaling 28 plots. The treatments were: *Calcarea carbonica* 30CH in 10ml, *Calcarea carbonica* 30CH in 20ml, *Calcarea carbonica* 30CH in 30ml, Distilled Water 30CH in 10ml, Distilled Water 30CH in 20ml, Distilled Water 30CH in 30ml, Control (no application), Control (Distilled Water 30CH, 20 ml).

When implementing the treatments, 30CH dynamization was prepared in distilled water. According to Andrade (2004), in experiments that evaluate microbial activity, ethanol should be avoided in the preparation of homeopathic solutions, due to the fragility of microorganisms.

28 bottles of BOD were used, with a volume of 300 ml. In each bottle of BOD with 50 ml of mineral water, dilution was made in 250 ml of Dilution Water. In preparing the dilution water, the methodology suggested by Fernandes (2003) was adopted.

After preparing the BOD bottles, the initial dissolved oxygen reading (initial DO) was taken using the portable Oximeter DM4P equipment. Immediately after reading, the treatments were applied, with 9 drops/bottle of homeopathic preparations in a double-blind procedure. Immediately after applying the treatments, the samples were incubated in a BOD chamber, at 20°C, for 5 days, protected from light, when the final dissolved oxygen reading (final DO) was taken.

Using the initial DO and final DO values, the biochemical oxygen demand (BOD) was calculated. The data were statistically processed by analysis of variance in the SAEG 9.1 program (2007). Means were compared using the Tukey test at 5% probability.

## Results and discussion

Homeopathic preparations caused changes significant differences in the BOD of mineral water (Table 1).

Table 1. Summary of analysis of variance of biochemical oxygen demand (BOD) data in mineral water samples treated with homeopathic preparations. Viçosa/MG. 2011.

<b>FV</b>	<b>GL</b>	<b>Medium Square</b>
<b>Treatment</b>	6	13.09**
<b>Residue</b>	21	2.83
<b>CV (%)</b>		35.04

\* significant at 5% probability using the F test.

Homeopathic preparations increased the BOD of mineral water. *Calcareo carbonica* 30CH (10ml and 30ml) caused the highest BOD.

The BOD values of the 10ml volume (greater presence of oxygen) are higher when compared to other treatments. *Calcareo carbonica* 30CH affected BOD according to volume (Table 2).

Table 2. Average values of Biochemical Oxygen Demand (mg/L) in mineral water treated with homeopathic preparations. Viçosa/MG. 2011.

Treatments	Averages
Control 1: no application	1.7B
Control 2: Distilled Water 30CH – 10 ml	5.5AB
Control 3: Distilled Water 30CH – 20 ml	4.7AB
Control 4: Distilled Water 30CH – 30 ml	3.6AB
<i>Calcarea carbonica</i> 30CH – 10 ml	7.3A
<i>Calcarea carbonica</i> 30CH – 20 ml	4.3AB
<i>Calcarea carbonica</i> 30CH – 30 ml	6.4A

Means followed by the same letter in the column do not differ significantly from each other using the Tukey test at 5% probability.

## Conclusion

The greater volume of air associated with the smaller volume of solvent during succussion affected the activity of *Calcarea carbonica* 30CH in the BOD of mineral water.

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