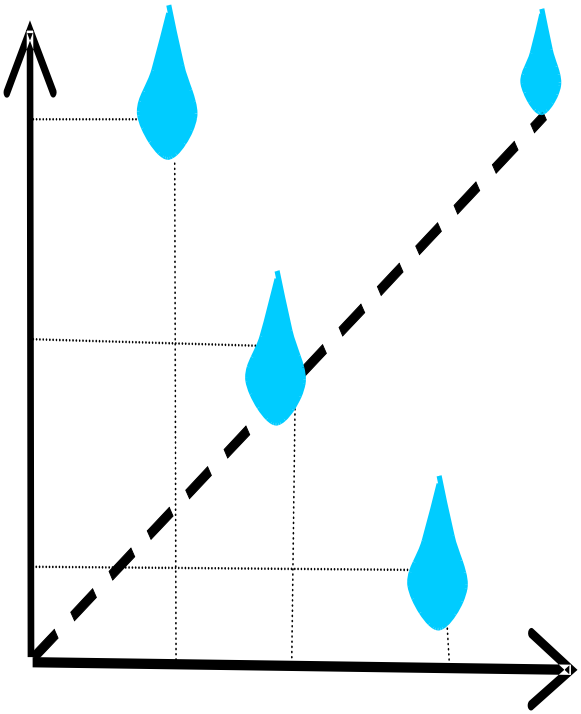
HOMEOPATHY AND WATER

Volume 2

1ST Edition



Federal University of Viçosa
Viçosa/ MG- Brasil

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2012

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HOMEOPATHY AND WATER

Volume 2

Experimental results on water treatment with high dilutions

Federal University of Viçosa
Center for Agricultural Sciences
Department of Plant Science

Viçosa – MG
Brazil
2012

HOMEOPATHY AND WATER

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HOMEOPATHY AND WATER

Volume 2
Experimental results on water treatment with high dilutions

Interpretations on high dilutions effects according to the principles of Homeopathy.

Sponsor - CONAHOM (National Council of Homeopathy)

Support - CNPq (Brazilian Council for Scientific and Technological Development).
-UNESCO- Brazil Bank Foundation
-IHAMA - (Institute of Homeopathy of Agriculture and Environment)
- CET-Agua / Interdisciplinary Center for the Study of Water- Brazil

This book is part of the Extension Program of UFV - "Disclosure of Medicinal Plants, Homeopathy and Organic Foods Production" and distributed to Libraries, Agricultural Family Schools and Organizations (non- government and government).

Orders - Department of Plant Science / V. W. D. Casali
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Payment via Arthur Bernardes Foundation.

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HOMEOPATHY AND WATER

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Edited by- Vicente Wagner Dias Casali
Cover Art – Steliane Pereira Coelho

Graphic Design - Steliane Pereira Coelho

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B713h
2012

Homeopathy and water. Volume 2. Experimental results on water treatment with high dilutions/ Casali, Vicente Wagner Dias, Fernanda Maria Coutinho de Andrade. Viçosa/MG. Brazil. 2012.
126. il. 21cm.
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CDD 22. ed. 615. 532

HOMEOPATHY AND WATER

GRATEFULNESS

To God, present at all times.

To Hahnemann, for the valuable science of Homeopathy.

To Agricultural Families for the wisdom and simplicity.

To the students of Homeopathy for their dedication.

To Federal University of Viçosa and Department of Plant Science, for their support.

To family relatives for love.

To friends for their confidence.

HONORABLE MENTION

CNPq (Brazilian Council for Scientific and Technological Development).

CONAHOM (National Council of Homeopathy)

DEDICATION

The Agricultural Families

To Earth.

To Water.

HOMEOPATHY AND WATER

CONTENTS

HOMEOPATHY AND WATER

Preface

The procedure of progressively dilutions and succussions of substances solutions generates the dynamization (potentialization) a phenomenon of nature, discovered by Hahnemann between 1811 and 1816.

Alchemy allowed space to systematization of the knowledge brought by Lavoisier in 1787 and so emerging the science named Basic Chemistry. In 1816, Avogadro proposed the limit number of molecules per mol. In 1820, Arndt and Schultz discovered the stimulating activity by small doses of toxic substances in living organisms.

Two hundred years have passed, researches were conducted, and many technologies were derived. The dynamization dyscovered by Hahnemann became known as High Dilutions and Ultra High Dilutions. The knowledge assembled in “Materia Medica” became the Homeopathic Acognosy or Homeopathic Acology.

People of Science attempt to elucidate the response phenomenon by living systems to dynamized solutions and they have tried explanatory theories about the origin of such activities: isopatic, hormesic and homeopathic. Recently it was emerged to scientists of high dilutions the challenge of understanding the physical processes, specifically the thermodynamic and physico-chemical activities of these substances after being dynamized.

Living organisms and living systems that are responsive to external actions are demanding studies that provide new directions through vitalist principle in the treatment of their diseased structures. The Earth is in crisis by anthropogenic activities, and the Monetary System calls for low-cost but effective treatments that can help in recovering the planet.

This book of results (volume 2) is the second gift of young researchers and a contribution to basic technologies that may be derived from high dilutions studies and generate very natural treatments for water and soil solutions.

Already the young researchers express their gratitude for the opportunity to confront challenges that mature researchers yet overlook.

CHAPTER 1

ELECTRICAL CONDUCTIVITY OF WATER TREATED WITH SEVEN HOMEOPATHIC PREPARATIONS

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Keywords: Homeopathy. High Dilutions. Water Treatment.

Introduction

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The homeopathic preparations are derived from plants, minerals, animals, microorganisms, and industrial molecules. They may be also obtained from secretions and excretions through the standard manipulation method as described by Dores et al., (2007). In rural areas, homeopathic preparations are used in human bodies, in animals, plants, soils and waters (ARRUDA et al., 2005). Basic studies on water response to homeopathic preparations are very important to build up a new model of treatments being viable and sustainable.

Some physico-chemical parameters (pH, electrical conductivity, dissolved oxygen, turbidity) are indicators of homeopathic preparations activity in water so, they should be analyzed in basic researches (CNPq, 2007; FIGUEIREDO, 2009).

The objective of this research was to determine the effect of homeopathic preparations in the electrical conductivity of the water.

Materials and Methods

The experiment was carried out at the Laboratory of Homeopathy, IF Southeast Minas, Rio Pomba/MG, in November 2010. The experimental design was the completely randomized of eight treatments (*Cuprum metallicum* 7CH, *Ferrum metallicum* 7CH, *Argentum nitricum* 7CH, *Plumbum metallicum* 7CH, *Sulphur* 7CH, *Zincum metallicum* 7CH, *Arsenicum album* 7CH), distilled water (control), five replicates, 40 experimental plots.

In forty borosilicate vials of 80 mL with 40 mL of mineral water (electric conductivity at 25 ° C = 9.15 µS / cm)

were applied two drops of treatments, a single dose, under double blind procedure. Basic homeopathic preparations were purchased in a commercial laboratory. The homeopathic solutions, potency 7CH, were prepared in distilled water immediately before the application of treatments. The mechanical arm machine performed 100 sucussions.

Electrical conductivity (CE), was measured by the conductivimeter DM-32 before treatment (CE- T0), after 24 hours (CE-T1), after 48 hours (CE- T2) and after 72 hours (CE- T3) of the treatments. After each reading, the electrode was washed off with distilled water. The data were processed statistically by analysis of variance in the program SAEG 9.1 (2007). The means were compared by Tukey test at 5% probability.

Results and Discussion

There was statistically significant treatment effects in the water CE after 24, 48 and 72 hours of application (table 1).

Table 1 - Analysis of variance of the electrical conductivity data before treatment (CE T-0), after 24 hours (CE T-1), after 48 hours (CE T-2) and after 72 hours (CE T-3) of application of treatments in water. Rio Pomba/ MG. 2010.

Source of Variation	**DF**	**Mean Square**			
		CE T-0	**CE T-1**	**CE T-2**	**CE T-3**
Treatments	7	0.18 ns	0.37 *	1.73 *	4.23 *
Residue	32	0.34	0.15	0.46	1.06
CV (%)		1.89	3.95	7.4	11.04

ns - not significant
*- significant at 5% probability by F test
DF= Degrees of freedom CV= Coefficient of variation

Zincum metallicum increased the CE indicating pathogenesis which was persistent after 72 hours of application. Based on the Principle of Similarity *Zincum metallicum* is indicated for the treatment of water with high CE (Table 2).

Table 2 - Mean values of electrical conductivity (µS / cm) before treatment (CE- T0), after 24 hours (CE- T1), after 48 hours (CE -T2) and after 72 hours (CE- T3) of treatments application in water. Rio Pomba/MG. 2010.

Treatments	**CE T-0**	**CE T-1**	**CE T-2**	**CE T-3**
Control (distilled water)	9.86A	9.64AB	9.35B	9.05B
Cuprum metallicum 7CH	9.92A	9.65AB	9.51B	9.31B
Argentum nitricum 7CH	9.74A	9.54B	9.23B	8.98B
Sulphur 7CH	9.79A	9.85AB	9.39B	9.02B
Zincum metallicum 7CH	9.79A	10.42A	10.99A	11.57A
Arsenicum album 7CH	9.90A	9.80AB	9.30B	8.74B

Means followed by same letter, in column, do not differ at 5% probability by Tukey test.

Conclusion

The homeopathic preparation *Zincum metallicum* 7CH caused pathogenesis in electrical conductivity of water. The effect persisted after 72 hours of treatment.

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CHAPTER 2

ELECTRICAL CONDUCTIVITY OF MINERAL WATER AFTER TREATMENT WITH HOMEOPATHIC PREPARATIONS

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Introduction

Homeopathic science is based on experimentations. The procedure to know the acological potential of homeopathic preparations is via trial in healthy experimenters, to generate

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signals of pathogenesis. The choice of the homeopathic preparation best suitable to imbalanced organisms depends on pathogenesis data.

Several substances used for homeopathic preparations have the pathogenesis already published. Hahnemann experimented homeopathized substances in healthy organisms for acological purposes (CASALI et al., 2009). The Homeopathic Acognosy applied to animals, plants, soils and waters, have proved the generality of the principles discovered in human experimentations (ANDRADE et al., 2010).

Studies on pathogenesis in water, have considered electrical conductivity as a physico-chemical parameter (LISBOA, 2010).

The objective of this research was to quantify the effects of seven homeopathic preparations in the electrical conductivity of mineral water.

Material and Methods

The experiment was carried out at the Laboratory of Homeopathy, Federal University of Viçosa, Viçosa / MG, in January 2011, in a completely randomized design of seven homeopathic preparations (*Cuprum metallicum* 7CH, *Ferrum metallicum* 7CH, *Argentum nitricum* 7CH, *Plumbum metallicum* 7CH, *Sulphur* 7CH, *Zincum metallicum* 7CH, *Arsenicum album* 7CH), distilled water as the control, five replicates and 40 experimental plots.

In forty borosilicate vials of 80 mL with 40 mL of mineral water, five drops of the treatment were applied in a

single dose under double-blind procedure. The homeopathic preparations, potency 6CH, were purchased in a commercial laboratory. The homoeopathic solutions, potency 7CH, were prepared as reported by Dôres et al. al (2007) in distilled water, few minutes before the application of treatment. The mechanical arm machine performed 100 sucussions.

The electrical conductivity (CE) was measured by a conductivimeter MD-32, before the treatment (CE- T0), after 24 hours (CE- T1), after 48 hours (CE -T2) and after 72 hours (CE- T3) of the treatments. The electrode was washed off with distilled water after each reading. The data were processed statistically by analysis of variance in the program SAEG 9.1 (2007). The means were compared by Tukey test at 5% probability.

Results and Discussion

After 24 hours of treatments applicaton, there was statistically significant response of the electrical conductivity (Table 1). *Argentum nitricum* reduced the CE after 24 hours of treatment (Table 2). There was a numerically progressive decrease in the CE of the water treated with *Argentum nitricum.*

Argentum nitricum is obtained from silver salt and the pathogenesis in humans, animals and plants were described (CASALI et al., 2009).

Table 1 - Analysis of variance of the electrical conductivity data before treatment (CE T-0), after 24 hours (CE T-1), after 48 hours (CE T-2) and after 72 hours (CE T-3) of treatments in mineral water. Viçosa / MG. 2011.

Source of Variation	**DF**	**Mean Square**			
		CE T-0	**CE T-1**	**CE T-2**	**CE T-3**
Treatments	7	1.11 ns	2.25 *	1.33 ns	2.66 ns
Residue	32	2.53	0.61	2.89	3.52
CV (%)		2.57	1.23	2.79	3.11

* - significant at 5% probability by F test

ns - not significant

DF= Degrees of freedom CV= coefficients of variation

Table 2 - Mean values of electrical conductivity (µS / cm), before application (CE T-0), after 24 hours (CE T-1), after 48 hours (CE T-2) and after 72 hours (CE T-3) of treatments application in mineral water. Viçosa / MG. In 2011.

Treatments	**CE T-0**	**CE T-1**	**CE T-2**	**CE T-3**
Argentum 7CH	60.59A	61.71B	59.84A	58.57A
Cuprum 7CH	61.49A	63.87A	60.93A	60.14A
Ferrum 7CH	61.94A	64.03A	61.00A	60.33A
Plumbum 7CH	61.74A	63.64A	60.76A	60.06A
Sulphur 7CH	61.84A	63.91A	61.60A	60.92A
Zincum 7CH	62.11A	63.82A	61.34A	59.96A
Arsenicum 7CH	62.04A	63.69A	60.52A	60.55A
Control (distilled water)	62.28A	63.64A	61.49A	61.32A

Means followed by same letter in column do not differ by Tukey test at 5% probability.

Conclusion

Argentum nitricum 7CH reduced the electrical conductivity of mineral water after 24 hours of application.

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CHAPTER 3

PRIMARY ACTION OF *Natrum Muriaticum* IN THE ELECTRICAL CONDUCTIVITY OF MINERAL WATER

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Keywords: Pathogenesis. Homeopathy. High Dilutions

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Introduction

According to the basic principle of Homeopathy Science named experimentation the signals of the healthy experimenter caused by homeopathic preparation are the primary action or pathogenesis. If those signs are similar to the symptoms of the ill organism then this homeopathic preparation will be the therapeutic choice.

The electrical conductivity (CE), as a water quality parameter, is variable due to some environmental conditions and to some anthropogenic actions (ESTEVES, 1998). But, in rural areas the electrical conductivity of water may vary due to salts, residues of chemical fertilizers and animal foods, that are in contact with rivers, lakes, ponds, and so on.

The homeopathic preparations by similarity is accessible to self regulation of living systems, and the homeostasis process will succeed (CASALI et al., 2006).

Natrum muriaticum is originated from the sodium chloride and is indicated to saline balance of organisms (CASALI et al., 2009). So, it is pertinent to investigate the activity of *Natrum muriaticum* measured by CE of the water.

Aiming at healthy food and environmental harmony the quality of water is essential. As a consequence of the principle of similarity, *Natrum muriaticum* is a potent homeopathic preparation to balance the living system with symptoms that are similar to the pathogenesis because of secondary action or the reaction of self-regulation (LISBOA et al., 2005).

The objective of this research was to quantify the primary action of *Natrum muriaticum* upon electrical

conductivity of mineral water.

Materials and Methods

The experiment was carried out at the Laboratory of Homeopathy, IF Southeast Minas Gerais, Rio Pomba / MG, by January 2011, in a completely randomized design of five treatments (6CH, 30CH, 100CH and 1000CH of *Natrum muriaticum*), distilled water as the control, five replicates and 25 experimental plots.

In twenty-five borosilicate vials of 80 mL with 40 mL of mineral water (electric conductivity at 25 ° C = 355 μS / cm) were applied two drops of treatments, a single dose, under double blind procedure. The potencies of *Natrum muriaticum* were prepared in distilled water few minutes before the application as reported by Lisboa et al (2007). The mechanical arm machine performed 100 sucussions

The electrical conductivity (CE) was measured by the conductivimeter MD-32, immediately after treatment (CE-T1), after 24 hours (CE -T2), after 48 hours (CE- T3) and after 72 hours (CE T4) of the treatments. The electrode was washed off with distilled water after each reading. The data were processed statistically by analysis of variance in the program SAEG 9.1 (2007). The means were compared by Tukey test at 5% probability.

Results and Discussion

Treatment effects after 24 hours and after 48 hours of applications to mineral water were statistically significant (Table 1).

Table 1- Analysis of variance of the electrical conductivity data immediately after application of treatments (CE T-1), after 24 hours (CE T-2), after 48 hours (CE T-3) and after 72 hours (CE T-4) of treatments in mineral water. Rio Pomba/MG. 2011.

Source of variation	**DF**	**Mean Square**			
		CE T-1	**CE T-2**	**CE T-3**	**CE T-4**
Treatments	4	249.59^{ns}	350.61*	362.24**	343.82^{ns}
Residue	20	140.37	80.92	16.01	126.24
VC (%)		3.77	2.87	1.25	3.66

**significant at 1% probability by the F test
*significant at 5% probability by the F test
^{ns} not significant
DF= Degrees of freedom VC= coefficients of variation

Table 2 – Mean values of electrical conductivity (µS/cm) immediately after treatment (C.E T-1), after 24 hours (C.E T-2), after 48 hours (C.E T-3) and after 72 hours (C.E T-4) of treatments application in mineral water. Rio Pomba / MG. 2011.

Treatments	**CE T-1**	**CE T-2**	**CE T-3**	**CE T-4**
Distilled water (control)	301.44A	299.10B	325.50A	291.80A
Natrum muriaticum 6C	318.20A	311.96AB	331.24A	308.86A
Natrum muriaticum 30C	317.34A	317.40A	316.42AB	310.92A
Natrum muriaticum 100C	316.98A	318.44A	311.90B	311.12A
Natrum muriaticum 1000C	316.06A	319,12A	312.52B	310.04A

Means followed by same letter, in column, do not differ at 5% probability by Tukey test.

After 24 hours of treatments application all the potencies of *Natrum muriaticum* increased CE in water. After 48 hours of treatments application, there was a reduction of the CE by potencies 100C and 1000C (Table 2).

The results after 24 hours of application indicated the primary action of homeopathic preparations (pathogenesis), while the results after 48 hours of application indicated secondary action or reaction of the water. In water samples treated with the potencies 100C and 1000C there was reverse action in the CE after 48 hours but after 72 hours of the treatments there was no effect on C.E.

Mineral water is regarded as a living system in equilibrium so, it is well fit to trials of homeopathic preparations as a healthy experimenter. Depending on local conditions of the source there are many differences in quality attributes of the spring water such as CE. The water of this experimental test was of high electrical conductivity, so, this should be considered in comparing the results. It is pertinent to take in account the possible secondary action of the water, since the CE of this water could be out of equilibrium. In this case, only the high potencies would be of effective activity.

Conclusion

There was pathogenesis of *Natrum muriaticum* in water. The potencies of *Natrum muriaticum* increased the electrical conductivity in the mineral water after 24 hours of application. The increase in CE was followed by the reduction in the samples treated with the potencies 100C and 1000C.

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CHAPTER 4

Natrum muriaticum PRIMARY ACTION IN ELECTRICAL CONDUCTIVITY OF SPRING WATER

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Introduction

The knowledge of Homeopathy Science is based on trials of homeopathic preparations in healthy organisms. The experimenter should be healthy, and the results are the signs or homeopathic pathogenesis or primary action of the substance. The complete set of pathogenesis results is named Acology of Homeopathic Preparations.

The forest soil and the spring water are regarded as salubrious experimenters because they are systems under equilibrium (ANDRADE, 2004; FIGUEIREDO, 2009).

The homeopathic acognosy or the research about pathogenesis in water aim informations that could be helpful to develop basic technologies of efficiency, sustainability and autonomy for water treatment in rural areas.

Social technologies derived from homeopathic acology are been used by farm families. The fundamental knowledge of Homeopathy has been applied for management of rural environments and also for families farms treatment (ANDRADE, 2007).

The objective of this research was to find the primary actions of *Natrum muriaticum* potencies in electrical conductivity of spring water.

Materials and Methods

The experiment was carried out at the Laboratory of Homeopathy, IF Southeast Minas Gerais, Rio Pomba / MG, February 2011, in a completely randomized design of five

treatments (6C, 30C, 100C and 1000C of *Natrum muriaticum),* distilled water as the control, five replicates and 25 experimental plots.

In twenty-five borosilicate vials of 80 mL with 40 mL of spring water (electric conductivity at 25 ° C = 25.0 μS / cm) were applied two drops of the treatment, a single dose, under double blind procedure. The potencies of *Natrum muriaticum* were prepared in distilled water few minutes before applications following standard rules. (DORES et al., 2007). The mechanical arm machine performed 100 sucussions.

The electrical conductivity (CE) was measured by the Conductivimeter MD-32, immediately after treatment (CE-T1), after 24 hours (CE- T2), after 48 hours (CE -T3) and after 72 hours (CE- T4) of treatments. The electrode was washed off with distilled water after each reading. The data were processed statistically by analysis of variance in the program SAEG 9.1 (2007). The means were compared by Tukey test at 10% probability.

Results and Discussion

The *Natrum muriaticum* effects on the CE of spring water were statistically significant. The results were interpreted as signs, pathogenesis or primary action all dependent on the potency and on the time (Table 1).

The potency 30CH increased the CE soon after was applied (Table 2). After 24 hours of treatments, there were no changes in the CE of the water. However, after 48 hours of application the homeopathic preparations increased the CE of spring water. Only the increase in CE caused by potency 100C was statistically significant (Table 2).

The studies aiming at homeopathic acognosy in water are still preliminary, but they point to the complexity of the phenomenon which seems to depend not only on the homeopathic preparation and potencies, but on the start conditions of the experimenter (prover), among others, which will interfere with the expression of pathogenesis (primary action) and the time.

Table 1 - Analysis of variance of electrical conductivity after treatment application (CE- T1), after 24 hours (CE -T2), after 48 hours (CE -T3), and after 72 hours (CE -T4) of treatments application in spring water. Rio Pomba / MG. 2011.

Source of variation	**DF**	**Mean Square**			
		CE-T1	**CE-T2**	**CE-T3**	**CE-T4**
Treatments	4	1.328**	0.252^{ns}	0.807***	0.279***
Residue	19	0.234	0.254	0.291	0.118
VC (%)		1.69	1.75	1.90	1.23

**significant at 1% probability by F test

^{ns} not significant

***significant at 10% probability by F test

DF= Degrees of freedom VC= coefficients of variation

Table 2 - Mean values of electrical conductivity (μS / cm) immediatly after the treatment (EC T-T1), after 24 hours (CE- T2), after 48 hours (EC- T3), and after 72 hours (EC-T4) of treatment application in spring water. Rio Pomba / MG. In 2011.

Treatments	**CE-T1**	**CE-T2**	**CE-T3**	**CE-T4**
Distilled water (control)	28.02B	28.65A	27.82B	27.85AB
Natrum muriaticum 6C	28.20B	28.60A	28.30AB	27.70B
Natrum muriaticum 30C	29.38A	29.18A	28.22AB	27.92AB
Natrum muriaticum 100C	28.44B	28.84A	28.90A	28.14AB
Natrum muriaticum 1000C	28.38B	28.86A	28.70AB	28.30A

Means followed by same letter, in column, do not differ at 10% probability by Tukey test

Conclusion

The increase in electrical conductivity of water caused by *Natrum muriaticum* was the primary action or the pathogenesis. The signals were time-dependent and of temporary response.

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CHAPTER 5

PATHOGENESIS OF *Natrum muriaticum* IN THE ELECTRICAL CONDUCTIVITY OF MINERAL WATER

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Keywords: High Dilutions. Homeopathy. Water Treatment.

Introduction

The knowledge of the potential uses of homeopathic solutions to bring into harmony the living systems starts with

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trials in healthy organisms (CASALI et al., 2006). The signals in the experimenter caused by the homeopathic preparation are named pathogenesis.The pathogenesis effects of *Natrum muriaticum* are known in humans, plants and soil (CASALI et al., 2009).

Mineral water is regarded a good quality water for drinking and has been recognised as a healthy experimenter to research the pathogenesis and to describe the Homeopathic Acognosy.

As stated in the experimental homeopathic protocol it is important to study the pathogenesis of homeopathic solutions in increasing potencies aiming at physical and functional signs in healthy organisms (CASALI, 2009).

The objective of this research was to know the pathogenesis of *Natrum muriaticum* potencies on electrical conductivity of mineral water.

Materials and Methods

The experiment was carried out at the Laboratory of Homeopathy, IF Southeast Minas Gerais, Rio Pomba/MG, in January 2011, in a completely randomized design of five treatments (6C, 30C, 100C and 1000C of *Natrum muriaticum*), distilled water as control, five replicates and 25 experimental plots.

In twenty-five borosilicate vials of 80 mL with 40 mL of mineral water (electric conductivity at 25 ° C = 19.2 µS / cm) two drops of treatments were applied, a single dose, under double-blind procedure. The potencies of *Natrum muriaticum* were prepared in distilled water few minutes prior to

application, following standard rules (DORES et al., 2007). The mechanical arm machine performed 100 sucussions.

The electrical conductivity (CE) was measured by the conductivimeter DM-32, immediately after treatment (CE-T1), after 24 hours (CE- T2), after 48 hours (CE- T3), and after 72 (CE- T4) of the treatment applications. The electrode was washed off with distilled water after each reading. The data were processed statistically by analysis of variance in the program SAEG 9.1 (2007). The means were compared by the Tukey test at 10% probability.

Results and Discussion

The potencies of *Natrum muriaticum* caused statistically significant effects in CE of water along with the experiment and after 72 hours of application (Table 1).

Table 1 - Analysis of variance of electrical conductivity immediatly after treatment application (CE- T1), after 24 hours (CE- T2), after 48 hours (CE- T3), and after 72 hours (CE- T4) of treatment application in mineral water. Rio Pomba / MG. In 2011.

Source of Variation	**DF**	**Mean Square**			
		CE-T1	**CE-T2**	**CE-T3**	**CE-T4**
Treatments	4	0.080^{ns}	0.990**	0.904*	2.329**
Residue	19	0.14	0.174	0.227	0.413
VC (%)		1.93	2.13	2.43	3.35

^{ns} not significant
**significant at 1% probability by F test
*significant at 5% probability by F test
DF= Degrees of freedom VC= coefficients of variation

The increase in water CE was interpreted as patogenesis of *Natrum muriaticum*. After 24 hours of application of potencies 100C and 1000C, as compared to control, there was a significant increase in CE. The pathogenesis of 6C and 30C potencies were statistically different from control after 48 hours and 72 hours of applications, respectively (Table 2).

As reported by Gomes (2009), the longer exposure time allows greater activity of the homeopathic preparation in healthy water.

The CE of water in the control was progressively reduced and the response, compared to treatments, was significantly different after 24, 48 and 72 hours of applications.

Table 2 - Mean values of electrical conductivity (µS / cm) immediatly after application (CE- T1), after 24 hours (CE- T2), after 48 hours (CE- T3) and after 72 hours (CE- T4) of treatment application in mineral water. Rio Pomba / MG. 2011

Treatments	**CE-T1**	**CE-T2**	**CE-T3**	**CE-T4**
Distilled water (control)	19.76A	18.88B	18.86B	17.98B
Natrum muriaticum 6C	19.89A	19.61AB	19.81A	19.53A
Natrum muriaticum 30C	19.89A	19.64AB	19.75AB	19.32A
Natrum muriaticum 100C	20.07A	20.08A	19.92A	19.70A
Natrum muriaticum 1000C	19.76A	19.79A	19.71AB	19.27A

Means followed by same letter in column do not differ at 5% probability by Tukey test

Conclusion

The homeopathic preparation *Natrum muriaticum* increase the electrical conductivity of water, as a pathogenesis effect along with the experimental period.

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CHAPTER 6

BIOCHEMICAL OXYGEN DEMAND (BOD) OF WATER TREATED WITH HOMEOPATHIC SOLUTIONS

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Keywords: Homeopathy, High Dilutions, Water Treatment.

Introduction

Dissolved oxygen in water is the most important gas in the dynamics and solubility of aquatic ecosystems (ESTEVES, 1998).

The biochemical oxygen demand (BOD) has been excellent parameter of water quality. BOD is defined as the amount of oxygen required for the oxidation of biodegradable organic matter under aerobic conditions. It quantifies the dissolved oxygen (DO) in mg/L of O2, which will be consumed by aerobic organisms to degrade organic matter (LIMA et al ., 2006).

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The BOD is the best variable of water quality that quantifies the organic pollution by decreasing the water oxygen, which can turn anaerobic the living systems (LIMA et al., 2006).The homeopathic solutions affect the DO of the water as evidenced by Figueiredo (2009).

The objective of this research was to quantify the responses in BOD of water samples treated with homeopathic solutions.

Materials and Methods

The experiment was carried out in January 2008, at the Laboratory of Soil and Water Homeopathy, Department of Plant Science, Federal University of Viçosa, in a factorial scheme (2x2), in a randomized block design of six replicates. The treatments were the combination of two Dilution Water (with or without oxygenation), with homeopathic treatment and distilled water (control), under the double-blind procedure. In the preparation of Dilution Water, with and without oxygen, it was followed the recommendations outlined in *Standard Methods for the Examination of Water and Wastewater* (1999).

It was used the BOD bottles of 300 ml. In each of the 24 BOD bottles there was a sample (50 ml) of the water collected from a local river. The samples were diluted in Dilution Water (250 ml), with or without oxygenation. After preparation of the BOD bottles it was proceeded the implementation of treatments. It was applied 9 drops per bottle of the homeopathic solution Oxygen 30CH. To the control bottle it was added an equal volume of distilled water.

Immediately after treatment applications it was the first reading of dissolved oxygen (initial DO) by the Oximeter DM4P. After the initial reading, the samples were incubated in BOD chamber at 20 ° C for five days, under light. After five days it was the final reading of dissolved oxygen (DO final).

Biochemical oxygen demand (DBO) was calculated with data of initial DO and final DO. The data were processed statistically by analysis of variance in the program SAEG 9.1 (2007). The means were compared by Tukey test at 1% probability.

Results and Discussion

There was statistically significant difference among treatments (Table 1). The homeopathic solution Oxygen 30CH significantly increased the Biochemical Oxygen Demand (BOD) as compared to controls (Table 2).

Oxygen 30H was chosen by analogy since the homeopathic preparations of systems constituents must be regarded when choosing the best treatments as reported by Castro (1999).

High dilutions of biological products, known as endogenous molecules, should be considered in the choice of treatments since they cause reactions in living organisms (BASTIDE, 2006). Oxygen, an intrinsic component of water molecule and also an important factor in water quality, was chosen and the homeopathic solution prepared of potency 30CH as recommended in the protocol of homeopathic acognosy (LISBOA et al., 2005).

There was no effects of oxygenation of the Dilution Water (Table 2). The oxygenation of water is suggested when nothing is known about the organic load of the water sample. Oxygenation is intended to prevent the total oxygen consumption of the sample along with incubation, as expected in samples with high concentration of organic compounds.

According to the principle of similarity and to the principle of experimentation, the homeopathic solutions that may increase the BOD will decrease the BOD when it is high or out of equilibrium.

Table 1. Analysis of variance of Biochemical Oxygen Demand (mg / L) data of water samples from local river. Viçosa / MG. 2008.

Source of Variation	**DF**	**Mean Square**
Treatment	3	3566.29**
Residue	20	3.92
VC (%)		6.9

** significant at 1% probability by F test
DF= Degrees of freedom VC= coefficients of variation

Table 2. Mean values of Biochemical Oxygen Demand (BOD). Viçosa / MG. 2008.

Treatments	**Mean**
Oxygenated Water Dilution + Distilled water (Control)	7.11B
Dilution Water + Distilled Water (control)	7.56B
Oxygenated Water Dilution + Oxygen 30CH	49.34A
Dilution Water + Oxygen 30CH	49.78A

Means followed by same letter do not differ by Tukey test at 1% probability

Conclusion

Oxygen 30CH increased the biochemical oxygen demand (BOD) in water samples from local river.

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CHAPTER 7

TURBIDITY OF WATER TREATED WITH HOMEOPATHIC SOLUTIONS

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Keywords: Homeopathy. High Dilutions. Pathogenesis.

Introduction

The turbidity, a physico-chemical property of the water, is the change in light penetration caused by particles of substances in suspension, such as clay, silt, organic matter, microorganisms, calcium carbonate, among others (PINTO, 2003).

Turbidity is a parameter of quality for public water supply. The potability standard is 5.0 NTU (PINTO, 2003). Turbidity is also of great concern in managing water quality, because of the association with pathogens (FIGUEIREDO,

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2009). Turbidity is correlated with total dissolved solids and suspended solids from runoff, landslides, land carriages, land slips (dredging, land works).

Figueiredo (2009) and Gomes (2009) outlined that the homeopathic solutions affect the turbidity of the spring water.

Turbidity has not been measured in experiments of high dilutions, but in view of sustainable water treatment by land man and family farms, the turbidity should be also considered (FIGUEIREDO, 2009).

According to the experimentation protocol, homeopathic solutions should be applied on diverse healthy experimenters to generate pathogenesis (LISBOA et al, 2005). That includes diverse waters.

Pathogenesis is the designation for a set of signals arised in experiments of healthy organism after homeopathic solutions are applied. The pathogenesis determine the most appropriated choice of homeopathic solutions to each alive system which is out of equilibrium, or diseased, in agreement with the Principle of Similarity (LISBOA et al, 2005) so, pathogenesis is an homeopathic acognosy procedure.

The objective of this research was to describe the pathogenesis of homeopathic solutions in two water samples (pond water and spring water) through the turbidity variable.

Materials and Methods

Experiment 1 (spring water) and Experiment 2 (pond water) were accomplished in September 2010, at the Laboratory of Homeopathy, Department of Plant Science, Federal University of Viçosa.

The experimental design was the randomized blocks of thirteen treatments: Spring Water 7CH or Pond Water 7CH, *Natrum muriaticum* 7CH, *Alumina* 7CH, *Silicea* 7CH, *Carbo vegetabilis* 7CH, *Arnica montana* 7CH, *Nux vomica* 7CH, *Pyrogenium* 7CH, *Calcarea carbonica* 7CH, *Sulphur* 7CH, *Lycopodium clavatum* 7CH, Ethanol 20% and Control (no application), five replicates and 65 experimental plots. In sixty-five borosilicate bottles of 100 ml with 80 ml of the respective water it was applied two drops of the treatment, a single dose, except for the control. The homeopathic solutions were purchased in a commercial laboratory, being prepared in Ethanol 20%.

The homeopathic solution Spring Water 7CH as well the Pond Water 7CH were manipulated following the standard procedures (DÔRES, 2007). The mechanical arm machine performed 100 sucussions.

By the portable turbidimeter DM TU, of measuring range 0 to 1,000NTU, turbidity was measured after 24 hours (TURB 1), after 48 hours (TURB 2), and after 72 hours (TURB 3) of treatment applications. After the reading of each sample, the electrode was washed off with distilled water before the next sample. The data were processed statistically by analysis of variance in the program SAEG 9.1 (2007). The means were compared by Tukey test at 5% probability.

Results and Discussion

The homeopathic preparations increased turbidity after 24 hours of applications (Table 1). The increases caused by the Spring Water 7CH and *Alumina* 7CH were statistically different from control. The increase in turbidity by Spring

Water 7CH application, was also found by Lisboa (2010). After 48 hours of treatments there were a persistent effect by *Alumina, Silicea* and *Sulphur*. After 72 hours of treatments it was ceased the activity of the homeopathic preparations in water turbidity (Table 2).

Responses of pond water differed statistically among treatments only after 72 hours of application (Table 3*). Arnica montana, Sulphur* and *Calcarea carbonica* increased water turbidity, as compared to the control no application (table 4).

The response of each water sample is interpreted as the specificity of action by homeopathic preparation as discussed by Figueiredo (2009).

The response diversity of water experimenters (spring and pond water), as shown by results, indicate the degree of turbidity of both waters. The spring water probably has some factor for increasing turbidity specific of the water source. The pond water factor was the pollution by discharges of waste. The speed of organisms response to homeopathic solution stimulus depends on the level of intoxication. The spring water is healthier, so the response was faster, unlike the intoxicated pond water.

According to Lisboa (2010) the increase in turbidity of the water, as an effect of homeopathic preparations, would be based on physical changes in water structure.

In all experimental plots of pond water, except Ethanol and control (no application) there was a gelatinous appearance in the water. In the experiment of spring water the gelatinous look was also present, but it was a structured feature, like filaments configurations.

Table 1 - Analysis of variance of turbidity data (TURB) after 24 hours (TURB 1), after 48 hours (TURB 2) and after 72 hours (TURB 3) of treatments application in spring water. Viçosa / MG. 2010.

Source of Variation	**DF**	**Mean Square**		
		TURB-1	**TURB-2**	**TURB-3**
Treatment	12	3.602**	0.966*	2.894^{ns}
Block	4	0.9675	0.4636	2.362
Residue	48	0.989	0.4317	2.477
VC (%)		50.54	47.26	110.98

**significant at 1% probability by F test
*significant at 5% probability by F test
^{ns} not significant
DF= Degrees of freedom VC= coefficients of variation

Table 2 - Mean values of turbidity (NTU), after 24 hours (TURB 1), after 48 hours (TURB 2), and after 72 hours (TURB 3) of treatments application in spring water. Viçosa / MG. 2010.

Treatments	**TURB-1**	**TURB-2**	**TURB-3**
Spring Water 7CH	2.66A	1.68AB	1.86A
Natrum muriaticum 7CH	1.99ABC	1.45AB	1.30A
Alumina 7CH	3.53A	1.93A	1.50A
Silicea 7CH	2.27ABC	1.75A	1.49A
Carbo vegetabilis 7CH	1.00BC	1.12AB	3.58A
Arnica montana 7CH	2.23ABC	1.12AB	0.90A
Nux vomica 7CH	2.34ABC	1.60AB	1.30A
Pyrogenium 7CH	1.70ABC	1.14AB	1.25A
Calcarea carbonica 7CH	2.38ABC	1.21AB	1.52A
Sulphur 7CH	2.14ABC	1.80A	1.05A
Lycopodium 7CH	2.22ABC	1.67AB	0.98A
Etanol 20% (Control)	0.95BC	1.37AB	1.59A
No application (Control)	0.20C	0.25B	0.24A

Means followed by the same letter, in column, do not differ significantly by Tukey test at 5% probability

Table 3 - Analysis of variance of turbidity data (TURB), after 24 hours (TURB 1), after 48 hours (TURB 2), and after 72 hours (TURB 3), of treatments application in pond water. Viçosa / MG, 2010.

Source of Variation	**DF**	**Mean Square**		
		TURB-1	**TURB-2**	**TURB-3**
Treatment	12	0.3162**	12.965ns	2.6199**
Block	4	0.1075	1.2088	0.5195
Residue	48	0.1159	7.7003	0.6394
VC (%)		30.34	91.8	31.76

**significant at 1% probability by F test

ns not significant

DF= Degrees of freedom VC= coefficients of variation

Table 4 - Mean values of turbidity (NTU), after 24 hours (TURB 1), after 48 hours (TURB 2), and after 72 hours (TURB 3), of treatments application in pond water. Viçosa / MG, 2010.

Treatments	**TURB-1**	**TURB-2**	**TURB-3**
Pond Water 7CH	0.96A	1.98A	2.21AB
Natrum muriaticum 7CH	1.31A	2.43A	2.58AB
Alumina 7CH	1.00A	2.27A	2.27AB
Silicea 7CH	0.87A	2.33A	2.09AB
Carbo vegetabilis 7CH	1.15A	2.28A	2.44AB
Arnica montana 7CH	0.97A	3.74A	3.67A
Nux vomica 7CH	1.06A	2.06A	2.60AB
Pyrogenium 7CH	1.14A	3.83A	2.52AB
Calcarea carbonica 7CH	1.30A	2.50A	2.92A
Sulphur 7CH	1.62A	3.16A	3.54A
Lycopodium 7CH	1.48A	2.71A	2.62AB
Ethanol 20% (control)	1.02A	2.27A	2.58AB
No application (Control)	0.70A	0.73A	0.68B

Means followed by same letter, in column, do not differ significantly by Tukey test at 5% probability

Conclusion

The homeopathic preparations influenced both turbidity of the spring water, and of pond water.

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CHAPTER 8

ELECTRICAL CONDUCTIVITY IN SALINE SOLUTIONS OF SOIL TREATED WITH SIX POTENCIES OF *Natrum muriaticum*

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Keywords: High Dilutions. Homeopathy. Water Treatment.

Introduction

The water for agricultural uses must have electrical conductivity consistent with the tolerance of plants (FIGUEIREDO, 2009). Among the problems of agriculture it is of great importance the salinization of the soil resulting from mishandling of fertilizers.

As stated by Caminha Junior et al. (2000), the electrical conductivity gives a good estimate of soil solution salinity.

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The electrical conductivity reflects the changes in water content of salts or the concentrations in the soil solution (RICHARDS, 1954). As an alternative treatment for salinity there are the homeopathic preparations (FIGUEIREDO, 2009). *Natrum muriaticum* is made of sea salts (CASALI et al., 2009). The salinity of the water is responsible for toxicities in general, nutritional imbalances and environmental contaminations. *Natrum muriaticum* is recommended in areas unsuitables for plant growth, for drought conditions and for freezing stress (CASALI et al., 2009).

The objective of this research was to know the electrical conductivity of saline soil solutions treated with six potencies of *Natrum muriaticum.*

Materials and Methods

The experiment was carried out at the Laboratory of Homeopathy, Federal University of Viçosa (Brazil), in 2011. The experimental design was the completely randomized design with seven potencies of *Natrum muriaticum*: 2CH, 4CH, 6CH, 8CH, 10CH and 12CH, distilled water as control, four replicates and 28 experimental plots.

In preparing the soil solution, the green clay was diluted in 0.05 M NaCl. After 24 hours the overnatant solution (soil saline solution) was separated and poured into 80 mL vials.

In twenty-eight borosilicate vials of 80 mL with 60 ml of saline soil it was applied five drops of treatments, a single dose and under double blind procedure. The potencies of *Natrum muriaticum* were prepared in distilled water few minutes before the applications. The mechanical arm machine

performed 100 sucussions.

The electrical conductivity (CE) was measured by the conductivimeter DM-32, immediately after treatment application, after 24, 48 and 72 hours of applications. After each reading the electrode was washed off with distilled water. The data were processed statistically by analysis of variance in the program SAEG 9.1 (2007). The mean values were compared by Tukey test at 5% probability.

Results and Discussion

There was statistically significant differences among treatments (Table 1). *Natrum muriaticum* 8CH increased the CE immediately after application so indicating pathogenesis. After 24 and 48 hours of application, there was no effect on the CE. After 72 hours of application there was decreased activity of *Natrum muriaticum* 6CH, statistically lower than the control (Table 2).

The saline solution was intoxicated by high salt content in soil. So, the mean values of high conductivity are of consistency with the results of Andrade (2004) in which the more intoxicated system demanded greater reaction time.

Table 1 - Analysis of variance of electrical conductivity after treatment application (CE- T1), after 24 hours (CE - T1), after 48 hours (CE- T2), and after 72 hours (CE- T3) of treatments application in the saline soil solution of green clay. Viçosa / MG. 2011.

Source of Variation	**DF**	**Mean Square**			
		CE-T1	**CE-T2**	**CE-T3**	**CE-T4**
Treatments	6	0.027*	0.017*	0.0090^{ns}	0.208*
Residue	21	0.0036	0.0054	0.011	0.010
VC (%)		1.12	1.36	2.08	1.95

*significant at 5% probability by F test
**significant at 1% de probability by F test
^{ns} not significant
DF= Degrees of freedom VC= coefficients of variation

Table 2 - Mean values of electrical conductivity (CE) in µS / cm in saline soil solution of green clay. Viçosa / MG. 2011.

Treatments	**CE-T1**	**CE-T2**	**CE-T3**	**CE-T4**
Control	5.37BC	5.32A	5.22	5.42A
Natrum muriaticum 2CH	5.47AB	5.45A	5.25A	5.27AB
Natrum muriaticum 4CH	5.42ABC	5.47A	5.25A	5.25AB
Natrum muriaticum 6CH	5.32C	5.42A	5.20A	5.17B
Natrum muriaticum 8CH	5.55A	5.37A	5.22A	5.22AB
Natrum muriaticum 10CH	5.32C	5.32A	5.17A	5.20AB
Natrum muriaticum 12CH	5.45ABC	5.47A	5.32A	5.20AB

Means followed by same letter, in column, do not differ at 5% probability by Tukey test

Conclusion

Natrum muriaticum changes electric conductivity in saline soil solutions of green clay depending on the potency and treatment time.

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CHAPTER 9

Silicea AND ELECTRICAL CONDUCTIVITY OF THREE SOIL SOLUTIONS

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Keywords: Homeopathy. High Dilutions. Water Treatment.

Introduction

The intensive use of fertilizers and some management practices in agriculture have increased the concentration of ions in soil solution. The result is an increase in electrical conductivity (CE) at critical levels of affecting the germination and development of plants.

Although the homeopathic preparations are highly diluted it is already proved that they affect the CE of soil solution (ANDRADE, 2004) and of water (FIGUEIREDO, 2009).

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Possibly, the responses of the CE are a result of changes in water structure (LISBOA, 2009), since Elia (2008), stated that the electrical conductivity is intrinsic to water, but depends on, or it is a function of the structural organization of the water.

The potential capability to conduct electrical current is associated with ions dissolved in water because they carry the electric charge. When the ions are in large amounts therefore, the electrical conductivity of water is greater (FIGUEIREDO, 2009).

This research aimed quantify the effect of *Silicea* 6CH in electrical conductivity of three soil solutions, subjected or not to dark conditions.

Materials and Methods

The experiments were carried out at the Laboratory of Homeopathy for Soil and Water, Department of Plant Science, Federal University of Viçosa, Brazil, in May 2011. The experimental design was the completely randomized of four treatments (soil solution with *Silicea* 6CH under light, soil solution with distilled water under light, soil solution with *Silicea* 6CH in the dark and the soil solution with distilled water, in the dark), five replicates and 20 experimental plots.

The experiments were differentiated regarding the origin and weight of the clay for preparing soil solution. The weight of each clay was chosen in preliminary tests following a standard stability and the electrical conductivity of its solution.

The preparation of the three soil solutions (white clay,

green clay or yellow clay) was in borosilicate vials with 1200 mL of demineralized water. Inside the vials of solution 1 it was added 6 g of a white clay. In the preparation of solution 2 it was added 60 g of green clay. Solution 3 was prepared with 6 g of yellow clay.

The solutions were well mixed and after 24 hours the overnatants were removed from each solution, then labeled solution 1, solution 2, solution 3.

In twenty borosilicate vials of 80 mL with 40 mL of solution 1 or solution 2 or 3 were applied five drops of the treatments (distilled water or *Silicea* 6CH), a single dose, double blind procedure. The vials for the dark treatment were covered with aluminum foil.

The homeopathic solutions *Silicea* 6CH was prepared with distilled water few minutes before the application of treatments. The mechanical arm machine performed 100 sucussions. The electrical conductivity (CE) was measured by the Conductivimeter DM-32, every 24 hours after application of treatments, for three consecutive days. After each reading the electrode was washed off with distilled water. The data were processed statistically by analysis of variance in the program SAEG 9.1 (2007). The means were compared by the Tukey test at 5% probability.

Results and Discussion

The solution 1 (white clay) did not respond to treatments (Tables 1 and 2). In solution 2 (green clay) *Silicea* 6CH increased the CE throughout the experimental period, compared to controls. Immediately after treatments

application (CE- T1) there was a response of the solutions to *Silicea* 6 CH, exposed or not, to light (Tables 3 and 4).

In solution 3 (yellow clay), only 24 hours later there was pathogenesis effects (Table 5). The *Silicea* 6 CH reduced the CE of solution under light, which differed from the control (Table 6).

The concentration of salts in the solution, indirectly measured by the CE, was statistically different among treatments depending on the clay. The values of CE from solutions 1 and 3 (Tables 2 and 6) were very close but those solutions still were less responsive to treatments (Table 3).

The *Silicea* preparation is obtained from silica. The element Si has some relationships with the light and also some retention of information carried on by homeopathic preparations (ENDLER et al., 1998).

The results confirm the importance of diversity among experimenters and of homeopathic preparations, also of environmental factors (light, dark) in the protocol for experimentations in Homeopathy.

Table 1 - Analysis of variance of electrical conductivity data immediately after treatment (CE- T1), after 24 hours (CE- T2), after 48 hours (CE- T3) and after 72 hours (CE- T4) of treatments application in soil solution 1 (white clay). Viçosa / MG. 2011.

Source of variation	**DF**	**Mean Square**			
		CE-T1	**CE-T2**	**CE-T3**	**CE-T4**
Treatments	3	5.918^{ns}	1.428^{ns}	0.472^{ns}	3.813^{ns}
Residue	16	3.465	0.999	0.566	1.981
VC (%)		2.77	1.51	1.12	2.07

^{ns}- not significant at 5% probability by F test
DF= Degrees of freedom VC= coefficients of variation

Table 2 - Mean values of electrical conductivity (µS / cm) immediately after treatment (CE- T1), after 24 hours (CE- T2), after 48 hours (CE- T3), and after 72 hours (CE- T4) of treatments application in solution 1 (white clay). Viçosa / MG. 2011.

Treatments	**CE-T1**	**CE-T2**	**CE-T3**	**CE-T4**
Light + distilled water	68.2A	66.65A	66.72A	67.84A
Dark + distilled water	66.6A	66.20A	67.12A	68.00A
Light + *Silicea* 6CH	65.85A	65.49A	66.43A	66.67A
Dark + *Silicea* 6CH	67.81A	66.60A	67.00A	68.78A

Means followed by the same letter, in column, do not differ at 5% probability by Tukey test

Table 3 - Analysis of variance of electrical conductivity data immediately after treatment (CE- T1), after 24 hours (CE- T2), after 48 hours (CE- T3), and after 72 hours (CE- T4) of treatments application in solution 2 (green clay). Viçosa / MG. 2011.

Source of variation	**DF**	**Mean Square**			
		CE-T1	**CE-T2**	**CE-T3**	**CE-T4**
Treatments	3	638.2**	1472.2**	764.9**	1000.1**
Residue	16	6.33	14.32	29.9	7.95
VC (%)		1.50	2.12	3.05	1.51

**-significant at 1% probability by F test.
DF= Degrees of freedom VC= coefficients of variation

Table 4 - Mean values of electrical conductivity (µS / cm) immediately after treatment (CE- T1), after 24 hours (CE- T2), after 48 hours (CE- T3), and after 72 hours (CE- T4) of treatments application in solution 2 (green clay). Viçosa / MG. 2011.

Treatments	**CE-T1**	**CE-T2**	**CE-T3**	**CE-T4**
Light + distilled water	155.2D	161.54B	167.45B	173.94B
Dark + distilled water	161.0C	164.88B	170.14B	174.71B
Light + *Silicea* 6CH	172.44B	190.71A	187.04A	196.68A
Dark + *Silicea* 6CH	180.38A	194.70A	192.52A	200.64A

Means followed by the same letter, in column, do not differ at 5% probability by Tukey test

Table 5 - Analysis of variance of electrical conductivity data immediately after treatment (CE- T1), after 24 hours (CE- T2), after 48 hours (CE- T3), and after 72 hours (CE- T4) of treatments application in solution 3 (yellow clay). Viçosa / MG. 2011.

Source of variation	**DF**	**Mean Square**			
		CE-T1	**CE-T2**	**CE-T3**	**CE-T4**
Treatments	3	0.667^{ns}	0.458*	0.136^{ns}	0.780^{ns}
Residue	16	0.333	0.096	0.176	0.509
VC (%)		1.09	0.59	0.79	1.33

^{ns}- not significant at 5% probability by F test
*-significant at 5% probability by F test
DF= Degrees of freedom VC= coefficients of variation

Table 6 - Mean values of electrical conductivity (µS / cm) immediately after treatment (CE- T1), after 24 hours (CE- T2), after 48 hours (CE- T3), and after 72 hours (CE- T4) of treatments application in solution 3 (yellow clay). Viçosa / MG. 2011.

Treatments	**CE-T1**	**CE-T2**	**CE-T3**	**CE-T4**
Light + distilled water	52,7A	52,9A	53,1A	53,9A
Dark + distilled water	52,9A	52,9A	53,3A	54,0A
Light + *Silicea* 6CH	52,1A	52,3B	52,9A	53,1A
Dark + *Silicea* 6CH	52,4A	52,5B	53,1A	53,5A

Means followed by the same letter, in column, do not differ at 5% probability by Tukey test

There was increasing values of CE (Table 5) as a response to solution 3, but only after 48 hours of treatments application (Table 6).

Conclusion

The solution of soils are responsive to *Silicea* 6CH. The responses depend on the type of clay and on exposure to light. The immediate response was by green clay solution.

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CHAPTER 10

Natrum muriaticum ACTIVITY IN THE ELECTRICAL CONDUCTIVITY OF MINERAL WATER

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Keywords: Homeopathy. High Dilutions, Water Treatment.

Introduction

A drinking water is stated healthy when it can be consumed by humans. Most of the earth water is contaminated and should not be ingested directly. Cleaning and treating the water is a complex operation and still expensive. The treatments aim eliminate off the water those contaminants which are dangerous to health. Over the past 50 years, the degradation of water quality has increased in large urban centers and industrial areas. In agricultural areas, because of intensive use of chemical fertilizers or pesticides, the quality of water is poor. Some of usable water in Brazil have lost the characteristic of renewable natural resource (especially in densely populated areas), due to processes of

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urbanization, industrialization and agricultural production. These processes are being encouraged, but they are poorly structured in terms of environmental preservation and water quality conservation.

As stated by Bastide (2006), dynamized substances (diluted and succussed) in aqueous solutions can cause abnormal behavior of water. Electrical conductivity, pH and fluorescence spectrum are the changes that stands out. Some of these abnormalities are intrinsic to water, understood as a complex system since water is self-organized after disturbances.

The uses of high dilution preparations in water are being studied in order to assess the potential uses for treatment purposes and their effects after applications.

In the attempt of some rational and scientific explanation about the information transmission from substances through ultrahighdilutions (homeopathic preparations), some assumptions were based on physico-chemical models. Highlighted researches are those with focus on changes in the electromagnetic nature of the water or on "quantum theory of superradiance" (REIS et al., 2010).

The use of high dilution preparations in water treatments or in processes involving homeopathy principles are of great attention by scientists looking forward new and clean technologies.

The trials in healthy organisms, the basic principle of Homeopathy, have been performed whenever there is a need to know the potential use of any homeopathic preparation. The signals generated in the experiments are named pathogenesis and characterize the primary action of each

preparation. This step is named Acognosy of Homeopathic Preparations, or Homeopathic Acology. The similarity of those signals with the pathological picture of the organism to be treated determines the choice of the homeopathic preparation to be used.

Salinity in irrigated areas for agriculture production is a consequence of the inadequate use and of poor water quality associated with the management of the soil-water-plant systems. Whatever is the source, the water for irrigation always contains salts, although the quality and amount may vary greatly (MEDEIROS, 1994).

The objective of this study was to test the hypothesis of the homeopathic preparation *Natrum muriaticum*, prepared with NaCl, for causing any effect on the electrical conductivity of saline water.

Materials and Methods

The potencies of *Natrum muriaticum* were chosen based on data generated by experimentations and on guidelines for soils that are of salinity tendency (CASALI et al., 2009).

Natrum muriaticum 1CH was purchased in a Homeopathic Pharmacy. With *Natrum muriaticum* 1CH the potencies of *Natrum muriaticum* were prepared (2CH, 3CH, 4CH, 5CH, 6CH, 7CH, 8CH, 9CH, 10CH, 11CH, 12CH, 15CH, 18CH, 21CH) in the Homeopathy Laboratory of Plant Science Department, Federal University of Viçosa (DFT / UFV) following the Brazilian Homeopathic Pharmacopoeia (1997).

The vehicle in the homeopathic preparations was the

distilled water in order to avoid the interferences of ethanol (commonly used). The succussion (100) was performed by the mechanical arm machine, model D-10-50. The treatments were applied under double blind procedure.

The choice of mineral waters by the time of purchasing was in observing the labeled diversity of electrical conductivity at the equivalent temperature of 25 ° C.

It was carried out, from July to September of 2010, the experiment with the waters A and B, of electrical conductivity at 25 ° C, 200μS/cm and 38.4 μS / cm, respectively. Experimental treatments were the high dilutions of *Natrum muriaticum:* 3CH, 6CH, 9CH, 12CH, 15CH, 18CH, 21CH. The experimental design was the completely randomized of eight treatments, seven potencies and distilled water as the control, four replicates and 32 experimental plots.

From January to March, the experiment with water C, of electrical conductivity at 25 ° C = 9.15 μS / cm was accomplished. The experimental design was the completely randomized of 13 treatments (*Natrum muriaticum* 1CH, 2CH, 3CH, 4CH, 5CH, 6CH, 7CH, 8CH, 9CH, 10CH, 11CH, 12CH) and distilled water as the control, four replicates and 52 experimental plots.

In thirty-two borosilicate vials of 100 mL with 40 mL of water A (200μS/cm) and another 32 vials with 40 mL of water B (38, 4μS/cm) 10 drops of treatments were applied. In the experiment with the water C inside fifty-two polystyrene cups of 80 ml with 40 ml of water (9.15 μS / cm) it was applied 10 drops of treatments.

The variable measured in the experimentas A, B and C was the electrical conductivity (CE). In trademarks A and B it

was measured immediately after treatment (CE- T 0) and after 24 hours of treatment (CE- T1). In C, electrical conductivity was measured before treatment (CE- T0), immediately after treatment (CE- T1), after 24 hours (CE- T2), after 48 hours (CE- T3) and after 72 hours of treatment (CE- T4).

The electrical conductivity of the samples was determined at the Laboratory of Homeopathy by the conductivimeter DM-32, range 0.01 μS / cm to 200 μS / cm, resistivity 5 ohms, salinity 0-80% STD 0 to 10,000 ppm NaCl or CaCo, compensation of the temperature range from -20 to 120 ° C and coefficient of temperature compensation adjustable from 0.1 to 9.9% ° C. After reading the electrode was washed off with distilled water. The data were processed statistically by analysis of variance in the program SAEG 9.1 (2007). The means were compared by Tukey test at 5% probability.

Results and Discussion

By the analysis of variance of CE data, immediately after treatment of water A and B, the F test was not significant, however after 24 hours of application it was significant. The treatments were effective after 24 hours of applications (Table 1 and 3).

The CE mean values of water A and B treated with *Natrum muriaticum* 6CH were higher compared to other potencies but differing from control distilled water and thus characterizing the pathogenesis of the *Natrum muriaticum* potencies (Table 2 and 4).

Table 1 - Analysis of variance of electrical conductivity data of mineral water A (electrical conductivity at 25 ° C = 200µS/cm) before treatment (CE- T0) and after 24 hours of treatments application (CE-T1) of seven potencies of *Natrum muriaticum*. Viçosa / MG. 2011.

Source of Variation	**DF**	**Mean Square**	
		CE-T0	**CE-T1**
Treatments	7	4.56^{ns}	8.54**
Residue	24	4.80	2.38
VC (%)		1.31	0.95

** Significant at 1% probability, respectively, by F test

ns - not significant at 5% probability by F test

DF= Degrees of freedom VC= coefficients of variation

Table 2 - Mean values of electrical conductivity of mineral water A (electrical conductivity at 25 ° C = 200μS/cm), after 24 hours of application (CE- T1) of seven potencies of *Natrum muriaticum*. Viçosa / MG. 2011.

Treatments	**CE-T1**
Distilled water (Control)	159.26B
Natrum muriaticum 3CH	160.39AB
Natrum muriaticum 6CH	163.06A
Natrum muriaticum 9CH	163.29A
Natrum muriaticum 12CH	162.90A
Natrum muriaticum 15CH	161.33AB
Natrum muriaticum 18CH	161.14AB
Natrum muriaticum 21CH	160.64AB

Means followed by at least one same letter do not differ significantly by Tukey test at 5% probability.

Table 3 - Analysis of variance of electrical conductivity data of mineral water B (electrical conductivity at 25º 38.4 µS / cm) before treatment (CE- T0) and after 24 hours of treatment application (CE- T1) of seven potencies of *Natrum muriaticum.* Viçosa / MG. 2011.

Source of Variation	**DF**	**Mean Square**	
		CE-T2	**CE-T3**
Treatments	7	$1,09^{ns}$	1.78*
Residue	24	0.74	0.71
CV (%)		1.44	0.42

* -Significant at 5%, probability, respectively, by F test.

ns - non-significant at 5% probability by F test.

DF= Degrees of freedom VC= coefficients of variation

Table 4 - Mean values of electrical conductivity (μS / cm) of mineral water B (electrical conductivity at 25° 38.4 μS / cm) after 24 hours of treatment application (CE T-1) of seven potencies of *Natrum muriaticum*. Viçosa / MG. 2011.

Treatments	**CE-T1**
Distilled water (Control)	58.97AB
Natrum muriaticum 3CH	60.01AB
Natrum muriaticum 6CH	60.39A
Natrum muriaticum 9CH	58.18B
Natrum muriaticum 12CH	59.42AB
Natrum muriaticum 15CH	59.66AB
Natrum muriaticum 18CH	59.44AB
Natrum muriaticum 21CH	59.34AB

Means followed by at least one same letter do not differ significantly by Tukey test at 5% probability.

According to variance analysis of data (water C) the C.E before application and after application were not significant, however after 24 hours of application and after 48 hours application the CE mean values were significant.

The CE mean of water treated with *Natrum muriaticum* 1CH after 24 hours of treatment was greater than control but there was no significant differences compared to means of 2CH, 6CH and 12CH. After 48 hours of treatment, *Natrum muriaticum* 1CH still was different from control but statistically equal to CE of samples treated with 2CH, 3CH, 4CH, 6CH and 12CH, thus characterizing the pathogenesis.

The mean of CE- 4 (after 72 hours of treatment) did not differ from control and from each other, what characterized the return to equilibrium and the self-regulation effect. (Table 6)

Table 5 - Analysis of variance of electrical conductivity data from mineral water (electrical conductivity 9.15 μS / cm) before treatment (CE- T0), immediately after application (CE- T1), after 24 hours (CE- T2), after 48 hours (CE -T3) of treatment application of 12 potencies of *Natrum muriaticum*. Viçosa/MG. 2011.

Source of Variation	**DF**	**Mean Square**			
		CE-T0	**CE-T1**	**CE-T2**	**CE-T3**
Treatments	12	1.54^{ns}	2.06^{ns}	0.40**	0.45**
Residue	39	1.89	1.33	0.10	0.15
VC (%)		15.22	13.29	3.84	4.55

** - Significant at 1% probability, respectively, by F test

ns - not significant at 5% probability by F test

DF= Degrees of freedom VC= coefficients of variation

Table 6 - Mean values of electrical conductivity (μS / cm) of mineral water C (electrical conductivity 9.15 μS / cm), after 24 hours (CE- T2) and after 48 hours (CE- T3) of treatment application of twelve potencies of *Natrum muriaticum*. Viçosa / MG. 2011.

Treatments	**C.E. T-2**	**C.E. T-3**
Distilled water (Control)	8.41B	8.32B
Natrum muriaticum 1CH	9.37A	9.41A
Natrum muriaticum 2CH	8.61AB	8.61AB
Natrum muriaticum 3CH	8.46B	8.59AB
Natrum muriaticum 4CH	8.49B	8.45AB
Natrum muriaticum 5CH	8.21B	8.2618B
Natrum muriaticum 6CH	8.82AB	8.81AB
Natrum muriaticum 7CH	8.30B	8.29B
Natrum muriaticum 8CH	8.31B	8.28B
Natrum muriaticum 9CH	8.25B	8.21B
Natrum muriaticum 10CH	8.29B	8.28B
Natrum muriaticum 11CH	8.27B	8.36B
Natrum muriaticum 12CH	8.65AB	8.80AB

Means followed by at least one same letter, in column, do not differ significantly by Tukey test at 5% probability.

In the experiment with mineral water A and B treatments were effective after 24 hours of application. In water C, the electric conductivity was measured more times, the treatments were effective after 24 and 48 hours of

treatment, characterizing the pathogenesis of *Natrum muriaticum.* The experiment with mineral water C confirms the pathogenesis (primary action) after 24 hours of application and after 48 hours of application.

In water A and water B both treated with *Natrum muriaticum* 6CH CE was higher, differing from control, characterizing pathogenesis and the greatest potential for 6CH. However, in water C treated with *Natrum muriaticum* 1CH the CE mean was higher than the control, characterizing the pathogenesis. The difference in the effects of three water may indicate variations in the activity of the homeopathic preparations in accordance with the original characteristics of the treated water.

In water C, the electric conductivity was measured more times. So, after 72 hours of treatment there was no difference of CE means compared to control, what characterized the return to equilibrium by self-regulation as reported by Casali (2006).

Conclusion

In mineral water A (200 μS / cm) and B (38.4 μS / cm) both treated with *Natrum muriaticum* there was pathogenesis after 24 hours of application.

In mineral water C (9.15 μS / cm) after 24 and 48 hours of treatments there was pathogenesis of *Natrum muriaticum*.

The effects of *Natrum muriaticum* depends on the electrical conductivity of the water to be treated.

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CHAPTER 11

ELECTRICAL CONDUCTIVITY AND TEMPERATURE OF WATER TREATED WITH *Apis mellifica*

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Keywords: High Dilutions. Homeopathy. Water Treatment.

Introduction

The total volume of water is around 1.34 billion km ^{3}, what means 80% of the Earth surface. However, only 2.7% is of fresh water, and part of this water is frozen at the poles (about 75%) or stored into underground deposits. Lakes, streams and rivers are the main sources of drinking water, with only 0.01% of total water supply (FREIRE & FREIRE, 2005).

In fresh water, a finite natural resource, the quality is

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becoming low due to population growth and the lack of public policies for preserving (MERTEN & MINELLA, 2002). The loss of water quality for domestic purposes is a result of pollution by domestic sewage, industrial effluents, urban and agricultural surface runoff (MERTEN & MINELLA, 2002). The preservation of water quality is connected to life because the human body is made of 70% water.

Despite the lower percentage of availability fresh water is widely used by the human population and is fundamental for: public supply, industrial processes, agriculture, recreation, and unfortunately, as a deposit of waste produced by anthropogenic activities (FREIRE & FREIRE, 2005).

The water is a versatile solvent and often is used for carrying through waste products to the discharges (MORAES & JORDAN, 2002). Population growth and socioeconomic development are often accompanied by increasing demand for water, whose quantity and quality are essential to health and to the development of any community (BUENO et al., 2005).

Chemical and ecological changes in aquatic systems cause imbalance of fauna and flora, then the economic losses range from the reduction of fishing to the increased costs of water treatment for drinking. The water quality variables most important are: temperature, pH, dissolved oxygen (O2), electrical conductivity and organic matter content (CARVALHO et al., 2000).

The direct influence of water temperature depends on some variables such as dissolved oxygen and organic matter content. The solar radiation (irradiance) is the main variable that affects the water temperature in small streams by influencing evaporation and the aquatic fauna. The acidity of water can be quantified by the Potential of Hydrogen (pH).

Changes in water pH may reflect the type of soil or the sources of contamination (algae, decreased oxygen, increased CO2). The dissolved oxygen content depends on variations of: daily temperature, seasonal temperature, photosynthetic activity, turbulence of the water and of the river flow, presence of suspended solids, biodegradable organic substances, domestic sewage, slop, industrial waste, among others (BUENO et al., 2005).

Apis mellifica, the homeopathic preparation originated from bees, is used in agricultural systems with diverse objectives. In plants it is used in some varieties not tolerant to heat. It is usefull when the disturbs affect the biosynthesis of carbohydrates, when there is an accumulation of starch or sugar in plants, when there is disruption of plant development. In animals, *Apis* is against allergies to insect bites *(*CASALI et al., 2009).

It was not found in the bibliography any report on use of *Apis* in water. Homeopathy research in the treatment of water are at an embryonic stage and aim technologies to recover the original water structure. The water molecules respond to homeopathic solutions and to vibration energy by restructuring the original conformation, or modifying the clusters and bond angles between molecules (PORTO, 2007).

The goal of this study was to know the influence of twelve potencies of *Apis mellifica* (1CH to 12CH) in distilled water, by the variables temperature and electrical conductivity.

Material e Methods

Apis mellifica 1CH was purchased in homeopathic pharmacy and used for handling the following potencies (up to 12CH) at the Homeopathy Laboratory of Federal University of Viçosa, by the mechanical arm machine D-10-50. The vehicle used in the preparation was the distilled water in order to avoid interference of ethanol. It was followed the methodology described in the Brazilian Homeopathic Pharmacopoeia (2011). The mechanical arm machine performed 100 sucussions.

The treatments were applied according to the procedure of double blind. The experimental design was the completely randomized of four replicates, twelve treatments (*Apis mellifica* 1CH to 12CH) and 56 experimental plots. Ethanol 70% and distilled water were the controls.

Borosilicate transparent vials of 100ml were filled with 40mL of distilled water. It was measured the electrical conductivity and the temperature, before and after, application of five drops of each treatment, immediately after application and after 24h, 48h and 72h of application. Data were submitted to analysis of variance and regression, also the mean test (Tukey) at 5% probability in the program SAEG 9.1 (2007).

Results and Discussion

The effect of *Apis mellifica* 12CH on distilled water was statistically significant and remained until the time after 72h of application. *Apis* is known as an inducer of temperature rise or exothermic reactions (CASALI, 2009).

There was linearity of response (TEMP1) immediately after treatment, by *Apis* 4CH to 9CH. There was also oscillatory response, characterizing the induction of the system recovery. The energy shift was noticed in the potencies 6CH, 9CH and 12CH.

The Ethanol 70% is known as of exothermic solution reaction but still was of less effect on the thermal balance.

Table 1 - Analysis of variance of water temperature data (°C) after treatment with Apis *mellifica* 1CH to 12CH, immediately after application (TEMP1), after 24 hours (TEMP24), after 48 hours (TEMP48), and after 72 hours of application (TEMP72), and electrical conductivity data (µS / cm) immediately after application (CEIM), after 24 hours (CE24), after 48 hours (CE48) and after 72 hours of application (CE72). Viçosa / MG. 2011.

Treatment	**Means**							
	TEMP1	**TEMP24**	**TEMP48**	**TEMP72**	**CEIM**	**CE24**	**CE48**	**CE72**
Ethanol 70%	19.10F	19.90AB	20.30AB	20.20BC	4.25A	5.85A	5.64A	5.69A
Water	19.15EF	19.68B	20.30BC	20.83DE	3.41B	2.78B	2.66B	2.26B
Apis 1CH	19.22BCDEF	19.70B	20.25C	20.95ABC	2.94B	2.40B	2.40B	2.44B
Apis 2CH	19.75CDEF	19.68B	20.30BC	20.95ABC	2.62CD	2.12B	2.12B	2.12B
Apis 3CH	19.23CDEF	19.70B	20.30B	20.92ABC	2.54CD	2.09B	2.11B	2.15B
Apis 4CH	19.18DEF	19.70B	20.33BC	20.90ABC	2.31D	2.18B	2.11B	2.07B
Apis 5CH	19.26BCDE	19.75B	20.30BC	20.88CDE	2.37D	2.16B	2.17B	2.12B
Apis 6CH	19.36BCD	19.73B	20.30B	20.90BCD	2.37D	2.12B	2.09B	2.09B
Apis 7CH	19.33BCDE	19.73B	20.33BC	20.90BCD	2.43CD	2.17B	2.18B	2.18B
Apis 8CH	19.35BC	19.83AB	2.30BC	20.90BCD	2.39D	2.20B	2.22B	2.24B
Apis 9CH	19.43AB	19.83AB	20.35B	20.90BCD	2.52CD	2.33B	2.36B	2.34B
Apis 10CH	19.38AB	19.90AB	20.33BC	20.98AB	2.48CD	2.09B	2.13B	2.18B
Apis 11CH	19.43AB	19.93AB	20.33BC	20.98AB	2.55CD	2.20B	2.21B	2.23B
Apis 12CH	19.60A	20.05A	20.50A	21.00A	2.44CD	2.07B	2.05B	2.03B
QM Treat.	0.07**	0.05**	0.012**	0.012**	1.140**	3.90**	3.45**	3.56**
CV (%)	0.36	0.58	0.17	0.17	8.01	25,93	24.16	25.06

Means followed by same letter, in column, do not differ significantly by Tukey test at 1% probability.
** Significant at 1% probability by F test
QM treat = mean square for treatments.
DF= Degrees of freedom VC= coefficients of variation

After 24 hours of application (TEMP24) the oscillatory response was characteristic of pathogenesis. The strong exothermic reaction was noted in Ethanol (control) and in *Apis mellifica* 10CH to 12CH.

After 48 hours (TEMP48) and 72 hours (TEMP72) of application *Apis* 12CH still was increasing the temperature. *Apis mellifica* 12CH (from TEMP-1 to TEMP-72) caused linearity of response (y = 0.465 t +19.125, r2 = 0.9993), meaning that the increase in time was proportional to the increase in water temperature.

This prolonged effect of increased temperature may be related to the pathogenesis. *Apis mellifica* is described in homeopathic acognosy or acology as an inducer of redness and warmth, and is used by similarity against skin inflammation (CASALI et al., 2009).

Several factors may be analyzed in this experiment. The mimic of native molecules (memory of water) is defined as the water property to retain informations about substances that water may have been previously exposed to. Water maintain these properties even after the physical removal of the substance. Water can self-organize when some tension, pressure or heat is introduced into the system (such as the temperature increase induced by *Apis*). The water begins to self organize in specific patterns, named “space-time patterns with specific electromagnetic frequency” (HUTCHINSON, 2008).

In potencies above 12CH, there is no more substance. It is just information which come from the successive dilutions (1:99), beyond the Avogadro constant ($6{,}02 \mathbf{x}10^{23}$) , what validates the response to *Apis* 12CH, in this experiment.

In table 1, the initial conductivity of the water is 3.41 μS/cm (distilled water, control). It was only overcome by Ethanol (4.24 μS / cm), which is a mixture of water and ethanol. Water has the particularity of reacting with itself in self-ionization reaction by forming ions H3O + (hydronium) and OH-(hydroxide), responsible for conducting electrical current, thus explaining the effect of Ethanol. The more water in alcoholic solution, the more ions, with higher values of electrical conductivity. The electrical conductivity in water is the ability to conduct electrical current. It is related to the presence of ions dissolved in water, which are electrically charged particles. The greater the amount of ions dissolved, the greater the conductivity.

Ionic substances when dissolved, they release ions in solution (electrolyte) and thus conduct electricity better than the pure solvent. *Apis*, in all potencies, decreased the electrical conductivity with emphasis: *Apis* 4CH, *Apis* 5CH and *Apis* 6H. At this first time, there was a response wave, between the potencies. In subsequent hours, there were no statistically significant differences among treatments. *Apis mellifica* carries the information “unable to dissociate”. However, *Apis* reduced the electrical conductivity of dynamized aqueous solutions, along with the increase in potency and the time.

This result is validated by experiments of Harduim et al. (2008) wherein the electrical conductivity of dynamized aqueous solutions is not modified as a function of the dynamization process (manual succussion or by mechanical arm). And there is no change in temperature related to the type of bottle (glass type, I and III).

Elia et al. (2007) when assessing dynamized solutions

stored for four years concluded that the electrical conductivity increases significantly after one year of storage. That result validates the data from this experiment.

Conclusion

In systems where water is well balanced, there is a rise of the temperature and of the electrical conductivity due to instability in the energy system. *Apis* 12CH was more effective for increasing temperature. The informations of Ethanol 70% were more effective in altering the electrical conductivity.

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CHAPTER 12

ACTIVITY OF *Apis mellifica* IN HEATED WATER

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Keywords: Homeopathy. High Dilutions. Water Treatment.

Introduction

The water is claimed for multiple uses such as domestic supply, industrial, agriculture, recreation, leisure, power generation, navigation, cleaning, harmonious landscape, wildlife conservation, preservation of flora, irrigation, among

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others (MARENGO, 2008) .

The temperature is a physical characteristic of water and it is the intensity of heat or the thermal energy, which indicates the degree of molecules agitation (BLEICH, 2002). The homeopathic preparation *Apis mellifica* can be used for reducing the temperature of many systems (CASALI et al., 2009).

As proposed by Pavanelli (2001), the temperature allows the estimate of some variables, affects the calculation of alkalinity, salinity, pH, the saturation values of dissolved oxygen, and toxicity of substances. It is important to know the temperature variations in the processes of water treatment.

The knowledge of water structure is critical in understanding the phenomena of high dilutions and of homeopathy. The structure of water is a dynamic organization so, there are fast changes in the position of the molecules and the mean time for reorientation of each molecule is 10^{-12} seconds (PORTO, 2004).

Despite the simplicity of the molecule, water is of great complexity in the transition from liquid phase with a multiplicity of manifestation. The water reflects the intricacy of responses to stimuli in the variables or factors that interact with each other (BELLAVITE, 2002).

The use of high dilutions in water has been poorly studied, however, it is an important subject due to physical and chemical behavior of water.

The objective of this research was to determine the effect of twelve potencies of *Apis mellifica* in water at 40 ° C and the time to reduce the temperature.

Material and Methods

The experiment was carried out at the Laboratory of Homeopathy, Department of Plant Science, Federal University of Viçosa, Viçosa, Minas Gerais, Brazil (geographic coordinates 42 ° 52'O 50'O and 42 ° longitude and 20 ° 44'S and 20 ° 47'S latitude.

Apis mellifica (1CH to 12CH) was chosen based on the knowledges generated in prior experiments, on published works and on indications for nonspecific human fever (CASALI et al., 2009).

Apis mellifica 1CH was purchased in Homeopathic Pharmacy and used in the preparation of other potencies (2CH to 12CH) in the Laboratory of Homeopathy, according to standard procedures, by machine (mechanical arm) and 100 succussions.

The experimental design was the completely randomized of four replicates, fourteen treatments of *Apis mellifica* (1CH to 12CH), Ethanol 70% (control 1), distilled water (control 2) and fifty-six experimental plots.

Beakers of 1L containing 200 mL of water at 25 ° C were placed inside polystyrene boxes. Beakers of 250 mL containing 100 ml of heated water (40 °C) were placed inside those beakers of water at 25ºC. Treatments with *Apis* were applied in heated water. It was applied five drops of treatment in each replicate (plot). The box was capped by polystyrene and temperature readings begun. The time to stabilization of two temperatures (two beakers) was measured by a digital chronometer.

The water temperature in the smaller beaker and in the

larger beaker was measured by electrodes of the "Indicator Alutal", a temperature measurement system with independent electrodes but a central control.

The experimental procedure was the "double blind". The data were submitted to analysis of variance and mean values were compared by Scott-Knott test at 1% probability in the program SAEG 9.1 (2007).

Results and Discussion

In conformity with the variance analysis of stabilization time there was significant effects of treatments according to F test at 1% probability (Table 1).

Table 1 - Analysis of variance of time for reducing temperature of heated water (40 ° C) after treatment with *Apis mellifica.*Viçosa / MG. 2011.

Source of Variation	**DF**	**Mean Square**
		TIME
Treatments	13	14928.99**
Residue	42	2756.22
VC (%)		9.85

**- Significant at 1% probability by F test.
DF= Degrees of freedom VC= coefficients of variation

In water treated with *Apis mellifica* 2CH, 4CH, 7CH, 9CH, 10CH and 12CH the mean values were lower. The

stabilization time of the temperature was lower and differed significantly from controls. *Apis mellifica* 10CH decreased the time for reducing the temperature of heated water (Table 2).

In the treatments with *Apis mellifica* 1CH, 3CH, 5CH, 6CH, 11CH the mean was higher than the 2CH, 4CH, 7CH, 9CH, 10CH and 12CH, but all (except 8CH) differ from the controls proving the effectiveness to reduce the temperature of heated water (Table 2).

Apis mellifica 8CH, with the longer time to stabilize the temperature, was not statistically different from controls (Table 2).

As stated to Bastide (2006), dynamized substances in aqueous solutions may cause behavior changes of water. The water temperature modification after homeopathic preparation treatments is an indicative of abnormality.

The significant differences among treatments of *Apis mellifica*, proves the activity of each homeopathic preparation from 1CH to 12CH.

Table 2 - Mean time to reduce the temperature of heated water (40 ° C) after treatment with potencies of *Apis mellifica* (1CH to 12CH). Viçosa / MG. 2011.

Treatment	**TIME (seconds)**
Distilled Water	618.75A
Ethanol 70%	633.50A
Apis mellifica 1CH	538.75B
Apis mellifica 2CH	502.00C
Apis mellifica 3CH	538.00B
Apis mellifica 4CH	482.50C
Apis mellifica 5CH	557.00B
Apis mellifica 6CH	525.25B
Apis mellifica 7CH	476.50C
Apis mellifica 8CH	639.00A
Apis mellifica 9CH	476.00C
Apis mellifica 10CH	450.50C
Apis mellifica 11CH	538.00B
Apis mellifica 12CH	48450C

Means followed by the same letter do not differ by Scott-Knott test at 1% probability.

This study proved the efficiency of *Apis mellifica* to reduce the water temperature.

Conclusion

The potencies of *Apis mellifica* 1CH, 7CH, 9CH and 12CH are effective in lowering water temperature. *Apis mellifica* 10CH is more appropriated to reduce the temperature due to less time.

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CHAPTER 13

ACTIVITY OF HOMEOPATHIC PREPARATION *Rhus toxicodendron* IN HEATED WATER

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Introduction

As an alternative for fishing in seas or rivers there is the production of aquatic organisms in some type of confinement (aquaculture). This is being performed by agroecological farmers in ponds or dams. The volume of water may vary throughout the year. The changes in water temperature can influence the original conditions for rising aquatic organisms. In oceans or lakes the temperature may influence, for example, the oxygen solubility in water. Oxygen consumption is doubling every 10ºC of increase in water temperature

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(KUBITZA, 1998). The fish temperature is altered by environment and if suddenly the temperature is changed that may be detrimental to fishes. (SABINO, 1996).

Deforestation near the rivers can increase brightness and temperature, what changes the microenvironments for fishes. If environment is changed, sensitive fish populations are reduced or even they may be locally extinct (SABINO, 1996). If the temperature in rivers, lakes and oceans rises after human actions the flora and fauna will be affected. Anthropogenic modifications such as building dams or to divert the course of a river cause changes in water temperature. Reduction of water volume affects temperature. The floods are expected in the warmer months and the lack of good water supply may favor the warm water state (CARVALHO, 2002).

Water is also characterized as a prime ingredient in the production of food. The irrigation water maintains the health of soil and carry nutrients for plants growth. The water treatment is complex and an expensive operation. It aims eliminate the water contaminants. Over the past 50 years, the degradation of water has increased at an alarming rate. Currently, large urban centers, industrial areas and agricultural regions, with high use of chemical fertilizers and pesticides are already facing a lack of water quality, which can cause serious health problems.

Despite the simplicity of the molecule water is complex in the transition stage and in its liquid state. The water reflects over physico-chemical variables the complexity of the responses (BELLAVITE, 2002). The use of high dilutions in water is not well researched. However, it is important for the development of social technologies.

Basic solution or tincture of *Rhus toxicodendron* is made of the plant "poison ivy" of Anacardiaceae family (CASALI et al., 2009). This plant contains gallic acid, flavonoids and uruois (nitration of uroxilo group) of systemic toxic action, as they penetrate the tissues causes severe burns (FREITAS et al., 1995). The homeopathic preparation *Rhus toxicodendron* is widely used by homeopaths against fever because of reactions and the restabilization of temperature, ceasing the fever.

The objective of this research was to quantify the effect of six potencies of *Rhus toxicodendron* on heated water and the time to reduce the water temperature.

Materials and Methods

The experiment was carried out at the Laboratory of Homeopathy, Department of Plant Science, Federal University of Viçosa, Viçosa, Minas Gerais, Brazil (geographic coordinates 42 ° 52'O 50'O and 42 ° longitude and 20 ° 44'S and 20 ° 47'S latitude).

Rhus tox 3CH, 5CH, 7CH, 9CH, 11CH and 13CH were chosen based on trials and the indications against nonspecific human fever (CASALI et al., 2009). *Rhus tox* 3CH was purchased in a Homeopathic Pharmacy, and used for preparation of the potencies in the Laboratory of Homeopathy, by the techniques of Brazilian Homeopathic Pharmacopoeia (1997). The succussion (100) was performed by the mechanical arm machine D-10-50.

The experimental design was the completely randomized of four replicates, seven treatments (*Rhus tox*

3CH, *Rhus tox* 5CH, *Rhus tox* 7CH, *Rhus tox* 9CH, *Rhus tox* 11CH, *Rhus tox* 13CH), Ethanol 70% (Control) and 28 experimental plots. It was quantified the stability time of water temperature (25 ° C) and the temperature of heated water (40 ° C).

Beakers of 1 L containing 300 mL of water at 25 ° C were placed inside polystyrene boxes. Beakers of 250 mL containing 150 ml of water at 40 ° C were placed inside those beakers of 1L. The treatments were applied in the water at 40°C, five drops in each replicate (plot). The box was capped by polystyrene and temperature readings begun. The time to stabilization of two temperatures was measured by a digital chronometer.

The water temperature in the smaller beaker and larger beaker were measured by electrodes of the "Indicator Alutal", a temperature measurement system with independent electrodes. The indicator enabled the measurement of temperatures of four replicates, of the same treatment, simultaneously.

The experiment was carried out in the procedure "double blind". The data were submitted to analysis of variance and means were compared by Tukey test at 5% probability, in the program SAEG 9.1 (2007).

Results and Discussion

By the analysis of variance there was statistically significant effect of treatments on stabilization time (Table 1).

Table 1 - Analysis of variance of stabilization time data of water temperature (25° C) and the temperature of heated water (40° C) after the application of six potencies of *Rhus tox* and Ethanol 70% (control). Viçosa / MG. 2011.

Source of variation	**DF**	**Mean Square**
		TIME
Treatments	6	18.781**
Residue	23	4.177
VC (%)		17. 91

** - Significant at 1% probability by the F test

DF= Degrees of freedom VC= coefficients of variation

In water samples treated with *Rhus tox* 11CH and 13CH the mean temperatures were higher. The stabilization time was higher but not statistically different from control (Table 2).

Table 2 - Mean values of stabilization time of water temperature (25° C) and the temperature of heated water (40° C) after application of six potencies of *Rhus tox*. Viçosa / MG. 2011.

Treatment	**TIME (minutes)**
Ethanol 70% (Control)	10.75 A
Rhus tox 3CH	8.50 B
Rhus tox 5CH	11.00 AB
Rhus tox 7CH	9.75 AB
Rhus tox 9CH	9.75 AB
Rhus tox 11CH	14.50 A
Rhus tox 13CH	13.50 A

Means followed by at least one same letter do not differ significantly by Tukey test at 5% probability.

In water treated with *Rhus tox* 3CH the mean temperatures were lower. The stabilization of temperature statistically took more time in the control Ethanol 70% (10.75 min), and in treatments of *Rhus tox* 5CH, 7CH and 9CH (Table 2, Figure 1).

Rhus tox 3CH was more effective in reducing the stabilization time, because of the potential activity of this homeopathic treatment on above-normal temperatures, including human bodies. *Rhus tox* 3CH differed from control and from potencies 11CH and 13CH, by Tukey test at 5%.

Figure 1 - Comparison of mean values of the stabilization time of the water temperature (25 ° C) and the temperature of heated water (40 ° C) after application of six potencies of *Rhus tox* and Ethanol 70% (test). Viçosa / MG. 2011.

Basic studies on the response of water to high dilutions, interpreted by the theory of homeopathy or other theories are essential in proposing any treatment technology that is sustainable, does not disturby the environment and is economically viable.

Conclusion

There was homeopathic activity of *Rhus tox* in the water temperature. *Rhus tox* 3CH was faster for reducing the temperature of the heated water.

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CHAPTER 14

Natrum muriaticum IN SALINE SOLUTION OF SODIUM CHLORIDE

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Keywords: High Dilutions. Homeopathy. Water Treatment.

Introduction

According to FAO (Food and Agriculture Organization) of the 250 million hectares irrigated on earth, 50% are limited for agricultural use because of salinization. In most irrigated areas of Earth there is soil salinization. Some areas that were major food producers are now saline and unproductive. Scarcity of water suitable for agricultural use is turning a very common situation and is limiting agricultural development.

Under salinity there is less water available to plants due to lower osmotic potential. So, plants spend more energy to absorb the nutrient ions (LEONARDO, 2003). Salinization causes nutritional imbalance because the excess of salts in the soil solution affect the absorption, and consequently, the

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concentrations of Ca, Mg and Na in the plant (VIANA et al., 2001).

In Homeopathy there are scientific procedures, also there is theory and knowledge, all with technologic potential for recovery the physical and chemical properties of irrigation waters.

The water must have physical and chemical attributes that enable to nourish and hydrate the plants properly. Among the properties of water, electrical conductivity, dissolved oxygen, turbidity and pH are of greater importance (LEONARDO, 2003).

According to Bastide (2006) dynamized substances applied to aqueous solutions may change water behavior concerning electrical conductivity, pH, and fluorescence.

This research aimed at effects of seven potencies of *Natrum muriaticum* on saline water.

Materials and Methods

The experiment was carried out at the Laboratory of Homeopathy, Department of Plant Science, Federal University of Viçosa (Brazil) in a completely randomized design. The potencies of *Natrum muriaticum* were chosen based on the knowledge generated by prior trials and on indications for use in saline soils.

The treatments were seven potencies of *Natrum muriaticum* (3CH, 6CH, 9CH, 12CH, 15CH, 18CH, 21CH) and distilled water (control), four replicates and 32 experimental plots, under double-blind procedure. The potency 3CH of *Natrum muriaticum* was purchased in

Homeopathic Pharmacy and used in the preparation of the potencies in the Laboratory of Homeopathy, by rules of the Brazilian Homeopathic Pharmacopoeia (1997). The mechanical arm machine performed 100 succussions.

The homeopathic solutions were prepared in distilled water for avoiding the effects of Ethanol 70% (solvent commonly used in the preparation). In thirty-two borosilicate vials of 100 mL with 40 mL of 0.05M NaCl were applied the treatments of 10 drops per vial.

The electrical conductivity (CE) was measured before the treatment, after treatment (CE-TO) and after 24 hours (CE-T1) of application. The data were processed statistically by analysis of variance in the program SAEG 9.1 (2007). The mean values were compared by Tukey test at 5% probability.

Results and Discussion

By the F test at 5% probability, the CE before application of the treatment was not significant assuring the homogeneity of the samples.

The F test at 5% probability CE-T0 was not significant indicating that immediately after application of *Natrum muriaticum* there was no effect on salinity of the samples. The F test at 5% probability indicated that there was effect of treatments on saline water after 24 hours of treatment (Table 1).

Table 1 - Analysis of variance of electrical conductivity data before treatment (CE- T0) and after 24 hours (CE- T1) of application of seven potencies of *Natrum muriaticum* in saline solution (0.05 M NaCl). Viçosa / MG. 2011.

Source of variation	**DF**	**Mean Square**	
		CE-T0	**CE-T1**
Treatments	7	0.44 ns	0.10**
Residues	24	0.70	0.0037
VC (%)		1.37	1.03

** - Significant at 1% probability by F test

ns - not significant at 5% probability by F test

DF= Degrees of freedom VC= coefficients of variation

It was statistically significant the decrease in electrical conductivity of saline solution 24 hours after application of *Natrum muriaticum* 6 CH compared to control. Therefore homeopathic treatments own the potential to reduce salinity of saline water (Table 2).

Table 2 - Mean values of electrical conductivity (µS / cm) before application (CE-T0) and after 24 hours of application of *Natrum muriaticum* (CE-T1) in saline solution (0.05 M NaCl). Viçosa / MG. 2011.

Treatments	**CE-T1**
Distilled water (control)	6.0525A
Natrum muriaticum 3CH	6.0400A
Natrum muriaticum 6CH	5.5500B
Natrum muriaticum 9CH	6.0250A
Natrum muriaticum 12CH	6.0050A
Natrum muriaticum 15CH	5.9925A
Natrum muriaticum 18CH	6.0025A
Natrum muriaticum 21CH	5.9750A

Means followed by at least one same letter do not differ significantly by Tukey test at 5% probability

Conclusion

In salinized water the electrical conductivity is reduced after 24 hours of *Natrum muriaticum* 6CH application.

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CHAPTER 15

HOMEOPATHIC PREPARATIONS EFFECTS ON ELECTRIC CONDUCTIVITY OF SPRING WATER

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Introduction

In agreement with the Principle of Experimentation the healthy experimenter responses are interpreted as primary action or pathogenesis of the homeopathic preparation. The pathogenesis data are included in the Homeopathic Acognosy or Acology.

The pathogenesis are the guidelines for choosing the homeopathic preparation more similar to the symptoms of the not- healthy organism. By the principle of similarity in functional imbalanced organisms the secondary action or reaction is developed stimulated by the homeopathic treatment (LISBOA et al., 2005).

The spring water is regarded as a living system and under equilibrium. The pathogenesis in water may be marked by several indicators, including electrical conductivity (CE) (FIGUEIREDO, 2009, LISBOA, 2010)

The objective of this research was to evaluate the electrical conductivity of the spring water treated with homeopathic preparations.

Materials and Methods

The experiment was carried out at the Laboratory of Homeopathy, Federal Institute of Education, Science and Technology, Rio Pomba-MG in November 2010. The experimental design was the completely randomized of eight treatments (*Argentum nitricum* 7CH, *Cuprum metallicum* 7CH, *Ferrum metallicum* 7CH, *Plumbum metallicum* 7CH, *Sulphur* 7CH, *Zincum metallicum* 7CH, *Arsenicum* a*lbum*

7CH and distilled water), five replicates, and 40 experimental plots.

In forty borosilicate vials of 80 mL were poured 40 mL of spring water collected in Rio Pomba-MG. The homeopathic solutions of potency 6CH were purchased at a commercial laboratory. At the time of implementation of the treatments it was manipulated the homeopathic solutions of potency 7CH, in distilled water to avoid the effect of Ethanol (solvent commonly used in the homeopathic preparations).

It was evaluated the electrical conductivity (CE), measured before treatment (CE- T0), after 24 hours (CE- T1), after 48 hours (CE- T2) and after 72 hours (CE- T3) of application. After the first reading (CE- T0) it was applied two drops of each treatment (single application) under double-blind procedure. The electrode of the conductivimeter T-4MP was immersed directly into the vial containing the sample. After reading in μS / cm of each treatment, the electrode was washed off with distilled water and dried before the next reading.

The data were processed statistically by analysis of variance in the program SAEG 9.1 (2007). The means were compared by Tukey test at 1% probability.

Results and Discussion

The homeopathic preparations caused a statistical significant effect on CE of the spring water, as a function of time after application. (Table 1)

Table 1 - Analysis of variance of electrical conductivity data before treatment (CE- T0), after 24 hours (CE- T1), after 48 hours (CE- T2) and after 72 hours (CE -T3) of treatments applications in spring water . Rio Pomba / MG. 2010.

Source of variation	**DF**	**Mean Square**			
		CE-T0	**CE-T1**	**CE-T2**	**CE-T3**
Treatments	7	1.25^{ns}	5.84^{**}	2.47^{ns}	20.38**
Residues	32	0.75	0.61	1.33	2.92
VC (%)		1.66	1.52	2.25	3.30

** - Significant at 1% probability by the F test

ns - not significant

DF= Degrees of freedom VC= coefficients of variation

After 24 hours of application, there was an increase in the CE by *Sulphur, Zincum metallicum, Arsenicum album* (Table 2). The results were interpreted as the primary action (pathogenesis) regarding the water as healthy experimenter. CE was decreased after 72 hours of *Plumbum metallicum, Sulphur, Zincum metallicum* and *Arsenicum album* application.

Oscillation response was the first data interpretation of *Sulphur, Zincum metallicum* and *Arsenicum album* application. However, the second interpretation was the primary action (pathogenesis) in T1 or reorganization of the system (T2) or a new organization forward water balance (secondary action) after 72 hours of application.

According to Elia (2006), CE of very dilute solutions

increases in time, confirming the results observed in this study and by the control (Table 2).

Table 2 - Mean values of Electrical Conductivity (µS / cm) before treatment (CE- T0), after 24 hours (CE- T1), after 48 hours (CE- T2) and after 72 hours (CE- T3) of treatments application in spring water. Rio Pomba / MG. 2010.

Treatments	**CE-T0**	**CE-T1**	**CE-T2**	**CE-T3**
Control (distilled water)	51.58 a	50.18 b	52.54 a	55.26 a
Cuprum metallicum 7CH	53.12 a	50.94 ab	51.76 a	53.36 ab
Ferrum metallicum 7CH	52.14a	50.10b	50.68a	51.70ab
Plumbum metallicum 7CH	52.26a	51.28ab	51.06a	50.80b
Sulphur 7CH	52.98a	52.50a	51.58a	51.00b
Zincum metallicum 7CH	52.68a	52.58a	50.44a	49.42b
Arsenicum album 7CH	52.60a	52.82a	50.64a	49.42b

Means followed by same letter, in column, do not differ by Tukey test at 1% probability.

Conclusion

Along with 72 hours of observation in spring water there was pathogenesis in CE followed by the lack of response and the reverse effect or reaction to homeopathic treatments.

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