ANNALS OF THE UNIVERSITY OF CRAIOVA

Series: ✓*Biology*
✓*Horticulture*
✓*Food products processing technology*
✓*Environmental engineering*

Vol. XXX (LXVI) - 2025

COMPARATIVE STUDY ON THE PHYSICO-CHEMICAL PROPERTIES OF TAP WATER AND SPIRITUALLY USED WATERS (HOLY WATER AND BASIL WATER) AND THEIR INFLUENCE ON THE IRRIGATION AND DEVELOPMENT OF TUBEROSE CULTURE (*Polianthes tuberosa*)

Mirea Emilian[1], Toma Dumitru-Mitel[1], Burnichi Floarea[1], Toma Florin[2]
[1]Vegetable Research and Development Station, Buzău
[2]University of Agronomic Sciences and Veterinary Medicine, Bucharest
* *Correspondence author. E-mail*: mirea_emilian_11@yahoo.com

Keywords*: physico-chemical analysis, holy water, basil water, irrigation, tuberose*

ABSTRACT

This experimental study analyzes the influence of the physico-chemical properties of waters with different origins and symbolic significance on the morphological and physiological characteristics of tuberose (Polianthes tuberosa)Crops. Three types of water - tap drinking water, basil-infused water, and holy water - were characterized based on physico-chemical parameters (pH, conductivity, mineral content, redox potential) and used for the controlled irrigation of plants under standardized experimental conditions.

The tuberose crop irrigated with tap water showed a normal growth rate but medium floral density. Basil water irrigation enhanced vegetative vigor and leaf coloration, suggesting a possible bioactive effect of volatile compounds present in the infusion. Holy water irrigation led to visibly improved floral symmetry, an increased number of inflorescences, and earlier blooming. The results suggest that modified physico-chemical parameters - potentially influenced by symbolic or biochemical charges - can positively modulate tuberose development. This exploratory study lays the groundwork for investigating the interaction between material and immaterial factors in agrotechnics, opening interdisciplinary directions in horticulture, biophysics, and environmental sciences.

INTRODUCTION

Water is an essential element of the biosphere, involved in all fundamental life processes. Due to its exceptional physico-chemical properties and atypical behavior under varying environmental conditions, water continues to attract the interest of the scientific community (Ball, 2008; Chaplin, 2022).

Smith et al. (2015), as well as Pollack (2013), argue that water is not a simple passive solvent, but a dynamic medium capable of changing its internal structure in response to physical and energetic environmental factors. This sensitivity is the result of the fluid network of hydrogen bonds that allows rapid molecular reorganization.

Alongside classical studies in chemistry and physics, there is growing interest in exploring the effects of less conventional influences on water – including biological, vibrational, or even spiritual factors (Voeikov & Del Giudice, 2009). Various experimental and observational studies have reported changes in the microcrystalline structure of water and in certain physico-chemical parameters as a

result of exposure to factors such as aromatic plant extracts, bioenergetic fields, or practices with spiritual significance (Bókkon et al., 2021; Montagnier et al., 2015).

Building on this conceptual basis, the present study proposes a comparative analysis of the physico-chemical properties of tap drinking water and two types of water used in spiritual contexts: holy water and basil water. In addition to the physico-chemical characterization (pH, conductivity, salinity, mineral content, etc.), the research aims to investigate the influence of these water types on the development of tuberose (*Polianthes tuberosa*) , a valuable ornamental species known for its sensitivity to environmental factors. By applying these waters under differentiated irrigation regimes and evaluating plant growth parameters (vigor, height, number of flower stalks, flowering period), the study explores the possibility that the structure and internal energy of water - shaped by its source and context - may directly influence plant physiological processes.

The main objective of the study was to observe whether the differences between these waters - in terms of composition, origin, and symbolic charge - significantly influence the growth and flowering processes in tuberoses.

This research follows an interdisciplinary approach at the intersection of natural sciences, horticulture, and environmental biophysics, offering a novel perspective on how water quality, including that associated with traditional or symbolic practices, may modulate the agricultural performance of ornamental plants.

MATERIAL AND METHODS

This experimental research was designed to compare the influence of three types of water with different characteristics on the morphological and physiological changes of tuberose (*Polianthes tuberosa)* crops.

The water types used reflect various sources and influences: tap water (predominantly physico-chemical influence), basil water (biologically active influences), and holy water - agheasma (with potential spiritual and informational impact).
The experiment was organized into three variants:

V1 – Tap water (control)

V2 – Basil water

V3 – Holy water

Each variant included four repetitions, with five plants per repetition. The water samples were initially analyzed in terms of physico-chemical properties, then used in controlled irrigation regimes under standardized conditions. All samples were handled under aseptic conditions to prevent contamination and ensure result validity.

RESULTS AND DISCUSSIONS

Comparative analysis of physicochemical parameters reveals significant differences between the three types of water.

The results suggest that basil water and agheasma can have a positive influence on tuberose culture not only through direct chemical input, but also through the superior quality of the overall composition (low mineralization, balanced pH, presence of bioactive compounds). These characteristics can stimulate

photosynthesis, nutrient absorption and plant resilience, a fact also confirmed by field observations on vegetative growth and floral development.

V1presents intermediate values for most parameters, having a good behavior, but weaker than V3. V2 had the worst results, indicating a lower efficiency in stimulating plant growth. Of the three variants tested, V3 is the most effective for stimulating tuberose growth, providing superior results in terms of leaf and plant development as a whole. This variant can be considered the most suitable for obtaining vigorous and well-developed plants (Graph 2).

Comparative analysis of physicochemical parameters reveals significant differences between the three types of water, which may reflect both the origin and the process of obtaining, as well as the potential use or impact on health (Table 1)**.**

pH- The pH values fall within the normal range for drinking water (6.5–8.5), however: Tap water has the highest pH (7.5), indicating a slightly basic water. Basil water has a pH of 6.8, being slightly acidic, which may indicate the presence of organic compounds or volatile acids extracted from basil. Holy water has an intermediate pH of 7.2, closer to neutral, suggesting a balanced composition.

Electrical Conductivity (µS/cm)- Basil water has the highest conductivity (540 µS/cm), a sign of high ionic content, probably due to the release of minerals or compounds from the basil plant. Holy water has a conductivity similar to tap water (455 vs. 450 µS/cm), indicating a relatively close mineral content and comparable purity to tap water.

Fixed Residue (mg/L) - Represents the amount of solids that remain after the water evaporates. Basil water has the highest fixed residue (310 mg/L), which supports the idea of a high content of dissolved compounds (possibly essential oils, minerals, salts). Holy water has an intermediate residue (230 mg/L), closer to that of drinking water (220 mg/L), confirming again a high purity and a stable chemical composition.

Nitrates (mg/L)- The level of nitrates is an important indicator for assessing water quality from a sanitary point of view. Drinking water contains the most nitrates (10.5 mg/L), but it is below the maximum permissible limit of 50 mg/L (WHO). Basil water has the lowest level of nitrates (9.8 mg/L), followed by holy water with 10.2 mg/L, both within safe limits.

Phosphates (mg/L) - Phosphates can come from detergents, fertilizers or organic materials. Basil water has a higher content (0.6 mg/L) compared to drinking water and holy water (0.3 mg/L). This can be associated with the presence of natural organic compounds in basil Graph 1.

Table 1

Results of Comparative Physico-Chemical Parameters between the Three Types of Water

Parameter	Tap water	Basil water	Holy water
pH	7.5	6.8	7.2
Electrical (µS/cm)	450	540	455
Fixed residue (mg/L)	220	310	230
Nitrates (mg/L)	10.5	9.8	10.2
Phosphates (mg/L)	0.3	0.6	0.3

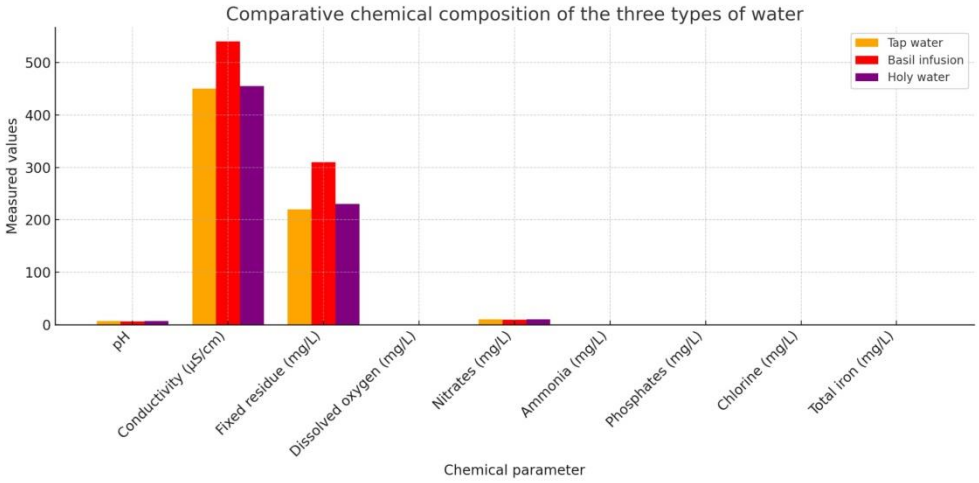

Figure 1. Graphical representation of the results of comparative physicochemical parameters between the three types of water

Table 2

The impact of watering with basil and holy water on the growth of tuberose plants

Polianthes tuberosa	**Media/V1**	**Media/V2**	**Media/V3**
Number of leaves	16	15	18
Plant height (cm)	35	31	37.5
Plant diameterc (cm)	18	16	21
Leaf blade shape	Linear	Linear	Linear
Leaf blade length (cm)	29	28	35
Leaf blade width (cm)	1.5	1.6	1.8
Leaf blade colour	Green	Green	Green

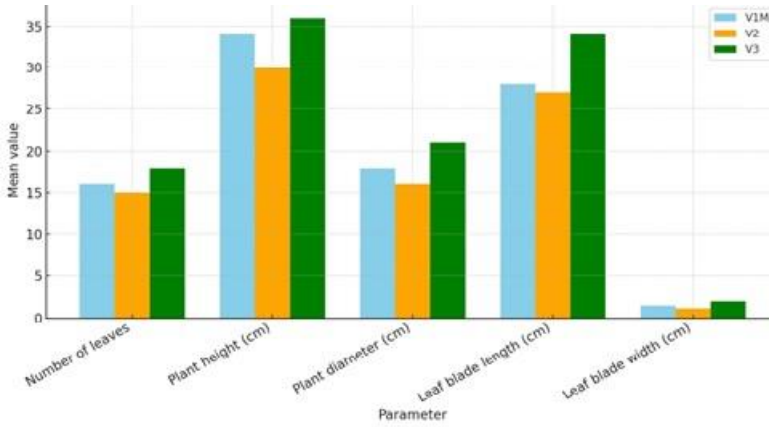

Figure 2. Comparison of growth parametres in tuberose

CONCLUSIONS

In conclusion, these results support the hypothesis that the physicochemical factors of water can be influenced not only by conventional treatments or the geological source, but also by biological interactions and spiritual context. The differences observed may have direct implications on the health and development of the tuberose crop, especially in terms of soil ionic dynamics and nutrient absorption.

The study highlights the importance of an interdisciplinary approach in the evaluation of alternative water sources for irrigation, integrating classical physicochemical analysis methods with broader perspectives that take into account biological and subtle influences. The results open promising directions for future research in organic agriculture, bioenergy, and ornamental plant physiology.

In conclusion tap water falls within all normal parameters, having a balanced chemical composition, slightly alkaline, with a moderate level of nitrates and phosphates, which makes it safe for consumption, basil water is distinguished by an increased content of salts, residues and phosphates, being influenced by the phytochemical properties of the plant. Its composition suggests a therapeutic or biological potential, but does not recommend it as regular tap water without additional analysis and agheasma which has a physicochemical quality close to tap water, but with a somewhat cleaner composition than that of basil water. It can be considered pure water, both symbolically and chemically.

REFERENCES

Ball, P. 2008. *Water as an active constituent in cell biology*. *Chemical Reviews, 108*(1), 74–108. https://doi.org/10.1021/cr068037a

Bókkon, I., Salari, V., & Tuszynski, J. A. 2021. Emergent properties of water in living systems: A review. *Frontiers in Molecular Biosciences, 8*, 642110. https://doi.org/10.3389/fmolb.2021.642110

Chaplin, M. 2022. *Water structure and science*. London South Bank University. Retrieved from https://www1.lsbu.ac.uk/water

Montagnier, L., Aïssa, J., Ferris, S., Montagnier, J. L., & Lavallee, C. 2015. Electromagnetic signals are produced by aqueous nanostructures derived from bacterial DNA sequences. *Interdisciplinary Sciences: Computational Life Sciences, 7*(1), 1–16. https://doi.org/10.1007/s12539-015-0140-4

Smith, J. D., Saykally, R. J., & Geissler, P. L. 2015. The effects of dissolved salts on water structure. *Annual Review of Physical Chemistry, 66*, 543–564. https://doi.org/10.1146/annurev-physchem-040214-121215