ALPINIA ZERUMBET FLORAL (PERS.) B.L.BURTT & R.M.SM (MATTOS FLORAL) – PRESENCE OF ANTHOCYANIN VALIDATING PREPARATION AND ACTION

https://doi.org/10.56238/rabfvv2n2-001

Submitted on: 03/23/2025 **Publication Date:** 04/23/2025

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ABSTRACT

Most of the theories that explain the action of flower essences state that they do not have molecules of physical matter, there are etheric impressions of the plants from which they are prepared. During the course of the thesis that gave rise to this article, the phytochemical and histological study of the flowers, and the conductivity and absorbance of the Alpínia zerumbet flower was carried out, with the objective of knowing its chemical compounds and relating this knowledge to the action of the floral essence. The method followed the "General Roadmap for the Chemical Study of Plants", developed by Matos (2009), following six steps, ranging from the choice of the plant to the writing and publication of the work. An experimental procedure was applied to measure the electrical conductivity and absorbance of mineral water and the non-solarized and solarized floral solution. The phytochemical study of Alpinia zerumbet flowers demonstrated the presence of saponins, steroids, reducing sugars and anthocyanins. Anthocyanins were highlighted for their amphoteric character, they have high conductivity. The electrical conductivity of flower essences prepared with solarization has been proven and in the dark, it is perceived that the flowers can release their healing potentials through water.

Keywords: Alpinia. Complementary Therapies. Flower Therapy. Public health. Product Technology.

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INTRODUCTION

Biomedicine has a cosmological view based on classical Newtonian physics and the Cartesian metaphor that compares the body to a machine commanded by the mind. In traditional therapeutic practices, living beings as a whole have a great interrelationship with the environment in which they live (Nascimento *et al*., 2013).

The philosophical theories of these natural and traditional therapies, including floral therapy, help to understand how living beings can contradict the second law of thermodynamics (entropy), whose prerogative focuses on the premise "the world tends to chaos", that is: living matter, due to its characteristic of maintaining life, has an effective organization, with a consequent local decrease in entropy, usually surpassed by the increase in entropy in the environment in which they live (Oliveira, 2024).

Flower essences are extracted from flowers, but according to most theories that explain the phenomenon of their action, there are no molecules of physical matter in the essences, there are etheric impressions, which travel a path when ingested, but when they are "deposited between the nervous and circulatory systems, the polarity between the two systems generates an electromagnetic current" (Gerber, 2007, p. 204).

It is necessary to understand that the theories that support the efficacy of flower essence therapy range from esotericism, which is considered vibrational therapy, to sciences such as Quantum Physics, Mathematics, Chemistry and Biology (Gerber, 2007; Calderon; Orta, 2005; Caldera *et al*., 2020).

During the research with the *Alpínia zerumbet flower*, a phytochemical study was carried out with the objective of knowing its chemical compounds and evaluating its relationship with the action of the floral. The phytochemical analysis showed a prominent presence of anthocyanins, demonstrating their amphoteric property. With the motivating stimulus of curiosity, according to Matos (2009), it was possible to describe how anthocyanins act, scientifically justifying the action of the flower essences, as something beyond the energetic action.

This article is an excerpt from the doctoral research linked to the Northeast Family Health Network (RENASF), nucleating the Alpinia zerumbet (pers.) B. L. Burtt & R. M. Sm. – Sustainable technology of the living pharmacy for the SUS with action on emotional well-being".

FLORAL

Flower essences can strongly influence all levels of the human multidimensional system, from the physical-molecular levels to the higher subtle levels and the soul level. Healing will move from the realm of physical methods of treating the body to mental and spiritual healing, providing harmony between the soul and the mind (Gerber, 2007; Bach, 2006; Gayatri; Dolas, 2023).

Most of the theories that explain the action of flower essences reveal their action as energetic or vibrational on the physical body and subtle areas. This action occurs through the transfer of information from nature, through flowers, capable of providing stimuli at deep levels of human consciousness and acting on human energy fields, which, in turn, influence spiritual, mental, physical and emotional well-being (Bach, 2006; Gerber, 2007; Santos, 2019; Guerrini; Domene, 2020; Leite, 2021; Albuquerque; Turrini, 2022).

Thus, the study of the physical and energetic characteristics of mother plants yields knowledge about the attributes of flower essences. Extensive findings from recent research on its benefits in clinical practice and home care help refine and validate the indications (Gayatri; Dolas, 2023).

The searches in scientific research follow the information left by Bach, who emphasized that the healing energy of flowers is in their petals, as they matched the person's consciousness. Flowers provide rejuvenation, reproduction, and fruiting while promoting new development and awareness. Bach experimented with several preparation techniques, focusing on flowers for his therapeutic essences (Caldera *et al*., 2020; Gayatri; Dolas, 2023).

Dr. Bach's words, described below, are guiding principles of the scientific explanation of flower essences. He said the following:

> The action of the flower essences is translated by the elevation of our vibrations, the opening of our channels to the spiritual Self, flooding our nature with the particular virtue we need and removing from us the imperfection that is causing us harm. Like a beautiful song or any glorious element of praise that provides us with inspiration, they have the property of dignifying our nature, bringing us closer to our souls, thus bringing us peace and relieving our sufferings. They heal, not by fighting disease, but by flooding our body with the sublime vibrations of our Higher nature, in whose presence illness dissolves like snow in the sunlight. There is no authentic cure unless there is a change of perspective, mental serenity and inner happiness (Bach, 2006, s. p.).

The study of the physical and energetic characteristics of mother plants yields knowledge about the attributes of flower essences. Extensive findings from recent research on its benefits in clinical practice and home care help refine and validate the indications (Gayatri; Dolas, 2023).

1.2 ALPINIA ZERUMBET (PERS.) B. L. BURTT & R. M. SM.

The species *Alpinia zerumbet* (Pers.) B.L.Burtt & R.M.Sm. is registered in the Prisco Viana Bezerra Herbarium, of the Department of Biology, Federal University of Ceará, and the exsicata is filed with registration numbers EAC 41041 and EAC 43055 (Oliveira, 2008; 2020, p. 193).

It originates from the East Indies and is naturalized in the tropical and subtropical regions of South America, Oceania, and Asia. The species is distributed throughout Tropical and Western Asia, China, Polynesia, Indonesia, Malaysia, the Philippines and Brazil, and is widely cultivated in Southeast Asia (Brazil, 2014; Zahara, 2019). It belongs to the Zingiberaceae family, synonymous with *Alpinia speciosa*, also called barked ginger, in addition, it is part of the genus *Alpinia*. It grows widely in tropical and subtropical regions, including the Okinawa Islands (Teschke; Xuan, 2018).

It is found throughout Brazil, especially in the Northeast, because it is acclimatized in the Caatinga, belongs to the National List of Medicinal Plants of Interest of the Unified Health System and to the ethnobotanical collection of the Horto de Plantas Medicinas Professor Francisco José de Abreu Matos of the Federal University of Ceará (Ceará, 2012; Magellan; Bandeira, 2020).

ANTHOCYANINES

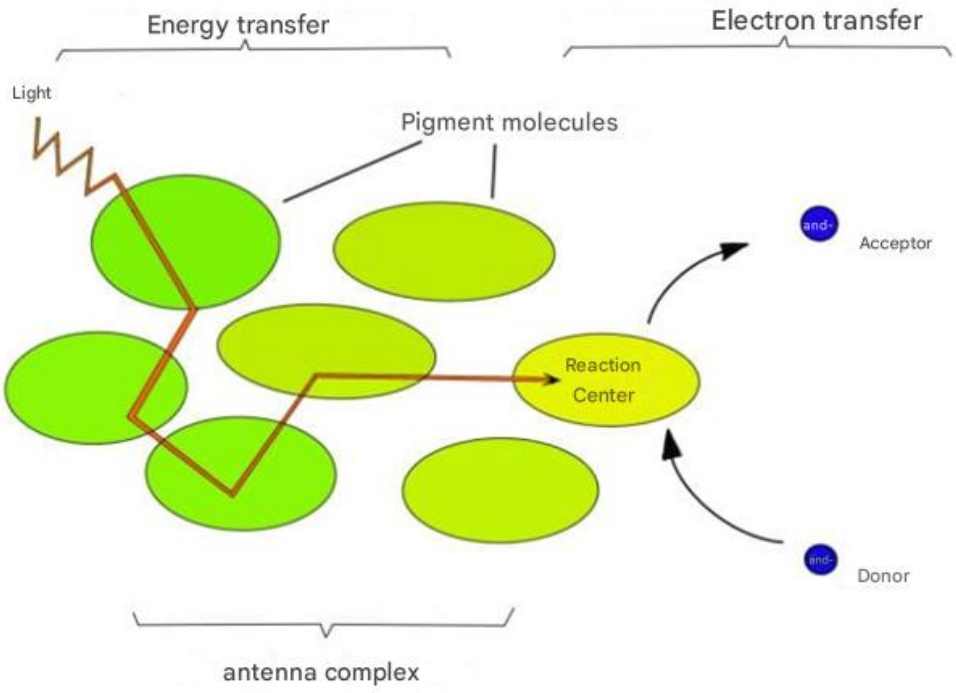
The plant cell found in plant tissues is eukaryote, as well as the animal cell, however, it has its peculiarities, such as the cellulose-rich cell wall, the plastids or plastids, the cell juice vacuoles and the glyoxisomes (Da Glória; Guerreiro, 1992).

Cell juice vacuoles, usually called just vacuoles or central vacuole, are characterized by being regions surrounded by a single membrane (tonoplast) with fluid inside them (cell juice). Its main function is to maintain osmotic balance, however, many have the function of

substance reserve. It should be noted that anthocyanins are plant pigments that are found in the vacuole of cells (Da Glória; Guerreiro, 1992).

Anthocyanins make up the largest group of water-soluble pigments in the plant kingdom, have chromophore groups that are very sensitive to changes in the pH of the medium and absorb light (Lopes, 2007). They are present in most flowers, including Alpinia *zerumbet*. The scheme presented in Figure 1 represents the instigation of the search for chemical elements of the flowers present in the flower essences, combined with the concept of the Theory of Solar Energy Capture by specific plant cells, an effect evaluated by chemistry, when the particles of anthocyanins that capture UV rays (Szostak, 2014) can be observed in phytochemical experiments.

Figure 1 – Conceptual scheme of energy transfer during photosynthesis



Source: Oliveira (2022)

As most flowers do not have chlorophyll, but may contain other pigments, most of these serve as antenna complexes (Figure 1), collecting UV energy and transferring energy to the reaction centers, where the chemical reactions of oxidation and reduction initially occur, which lead to long-term energy storage (Oliveira, 2022).

THEORIES OF ACTION OF FLOWER ESSENCES AND THE SCIENCES

Like many plants and trees, the signature is specifically in their innate medicine and properties. In these cases, the physical effects, or when the flower is used herbally, are usually transferred to the essence of the flower as part of the plant's signature. The effect of flower essences on the physical body, including the cellular level, diseases, miasms, and nutrients are also considered. The atomic level of the physical body consists of specific groupings of cellular tissue that genetically form into a specific organ, such as the heart. The cellular level reveals itself to the physical body, but at the level of each individual cell, as individual neurological cells (Gurudas, 1989, p. 65).

The true essence, of course, is the electromagnetic pattern of the plant's form. Just as there are elements that are part of the physical body in several plants, there are also numerous parameters of biomagnetic energies discharged by flowers and various other parts of plants, with more intensity in the place where they bloom (Gerber, 2007). Hence the justification for the need to leave the floral, in preparation, next to the mother plant.

To understand, it is necessary to keep in mind that every scientific theory is made up of a set of mathematical laws and postulates in order to describe the real world. We can say that scientific theories end up having a limit of validity, beyond which they are no longer valid to describe the physical phenomena involved (Dartora, 2015).

To explain the action of the flower essences, two forces were mentioned, the electromagnetic and the biomagnetic, both exist in the plants, both circulate in the organism that ingests the flower essence, and the references expose an interrelationship within the system to be treated.

The electrons in the electron shells that are not fully filled are called valence electrons, and these incomplete shells are known as valence shells. "The Theory of Chemical Bonding and effectively the Theory of Electromagnetic Interactions between the ions and electrons of the valence shells are treated according to the laws of quantum mechanics" (Dartora, 2015, p. 12).

When immersing the flower in water, physical, chemical, bioenergetic and mathematical phenomena occur. Water is the universal solvent, the flower releases electrons from the plant's DNA, denatured, a hyperchromic phenomenon through solar irradiation, and they are stored, because, according to the Japanese researcher Mr. Masaru

Emoto (2004), water has the ability to store information. This is the fundamental principle of flower essences, anticipated by Edward Bach since the 1930s: information/quality and/or virtue imprinted in water. For this reason, "flower essences totally escape any type of existing product on a quantitative basis" (Barnard, 2012, p. 320).

Another phenomenon to be considered in the preparation of flower essences is hyperchromaticity, defined as the increase in absorbance (optical density) of a material. The most famous example is the hyperchromicity of DNA that occurs when the DNA duplex is denatured. When there is DNA unfolding, which consists of opening the DNA strand due to the rupture between the bonds that arise between the bases, electrons are released, promoting the hyperchromic effect, in which these electrons absorb more light (Borges, 2024).

Studies by physicist Goswami (2021) reveal that in Quantum Physics there are waves of possibilities, that is, electrons can be in several places, making it impossible to determine a defined location. Thus, consciousness is perceived, the one that determines the various possibilities of choice to create a reality, generating various actions when using a flower essence, because, in an open system, the tendency will be to change the existing reality, to assume quantum coherence, or broad consciousness. Electrons are charges present in the Floral, they have the ability to penetrate the physical and energetic body, promoting changes, or not, because living beings are formed by magnetic fields and electromagnetic interactions.

De Broglie and Schodinger's idea of wave and matter presents three properties of the atom: stability, reciprocal identity, and the ability to regenerate, repeating the same performance over and over again. As for electrons, they differ from ordinary waves, they are probability waves. According to physicist Max Born, "the greatest probability of finding this particle is the place where the greatest disturbances occur" (Goswami, 2021, p. 55-56). In this way, the resonance in relation to the action of the flower would be justified with the action of the essence exactly where there is imbalance, without discarding the biophysical activity in the whole process, both in relation to the maintenance of patterns and with the search for balance with the particles present in the essence compound.

This text highlights the issue of polarity: in the flower, it is positive; and in the man to be treated, it is negative, which is the necessary constituent to modify the state of

imbalance. It reveals that there are channels, which, in a state of illness, may be blocked. Thus, with the use of the appropriate flower essence, it allows the opening by putting the individual in contact with his deep, immaterial and powerful Self, glimpsing his inner light.

Consequently, the authors consider it doubtful that the effects of the flower remedy result from biophysical or physiological processes. The most likely explanation, according to them, is that the flower essences operate through energetic resonance (Mundim; Mundim; Mundim; 1997; Gayatri; Dolas, 2023).

METHODOLOGY

Phytochemical research aims to know the chemical compounds of plant species and evaluate their presence in them, identifying groups of relevant secondary metabolites (Simões *et al*., 2004).

After solarization, the solid components of the solution (flowers) were separated from the liquid (floral) and the phytochemical approach of the flowers was carried out according to Matos (2009).

A phytochemical study, conductivity analysis and UV spectrophotometry were performed. This moment of the research took place between the months of June 2023 and July 2024, at the Laboratories of the Garden of Medicinal Plants and Chemistry Laboratory of the Federal University of Ceará, located on the Pici campus, Fortaleza, Ceará; at the Pharmacy Laboratory of the Federal University of Ceará, located on the Porangabussu campus, Fortaleza, Ceará; and at the University of Fortaleza (UNIFOR), Fortaleza, Ceará.

MATERIALS AND METHODS

Material

Harvesting of botanical material

The flowers of the adult plant of *Alpinia zerumbet* (Pers.) B.L.Burtt & R.M.Sm. were collected at 9 a.m. at the Francisco José de Abreu Matos Medicinal Plants Garden, PICI Campus, Federal University of Ceará (UFC). The exsicata is registered in the Herbarium Prisco Bezerra of UFC with registration number EAC 41041.

Methods

a) Phytochemical approach: preliminary prospection of chemical constituents

Preliminary chemical prospecting was carried out on samples consisting of flowers of *Alpinia zerumbet* (Pers.) B.L.Burtt & R.M.Sm., and the method followed the "General Script for the Chemical Study of Plants", developed by Matos (2009), following six steps: 1) the choice of the plant; 2) botanical identification; 3) the survey of bibliographic references on the identified species and its congeners; 4) the preliminary prospection of the main constituents; 5) the isolation and purification of the main constituents and 6) the writing and publication of the work.

The following chemical classes were investigated: alkaloids, anthocyanins, coumarins, steroids, free phenols, flavonoids, saponins, tannins and triterpenoids.

b) Histochemical analysis

Cross-sectional histological sections were made in the flower petals, freehand, with the aid of a stainless steel blade. These sections were mounted between slides and coverslips, and three examinations were performed: one for direct examination in water (neutral); in addition, in two examinations, chemical reactions were used in acid (SR HCl) and base (SR ammonia) medium. The microscopic illustrations were made using a Binocular Microscope, Olen brand, 40x magnification, and were recorded in a cellular photographic device to visualize the color change in the epidermis and parenchyma according to the pH of the medium.

c) Extraction of anthocyanins in different polarities of solvents.

The flowers (2 g) were crushed with the aid of degree and pistil for each solvent (10 ml) in increasing polarities: hexane, dichloromethane, ethyl acetate, alcohol and water. For each extract, the anthocyanin reaction was performed by means of amphoteric verification, and the organic extracts were evaporated and resumed by 1:1 hydroalcoholic solution (Matos, 2009).

d) Quantification of anthocyanins by spectroscopy (UV-Vis)

The anthocyanin content was quantified by means of two spectrophotometric methods, according to Teixeira, Stringheta and de Oliveira (2008), namely, the Single pH Method and the Differential pH Method described, as highlighted below: the absorbances in

both methods were evaluated in the *Spectronic Genesys* 10 UV (Thermo) device; *VisioNlite software*; Scan in the region of 200 to 800 nm (Figure 10); Quartz cuvette with 1cm of optical path, with readings at a wavelength of 535 nm, emphasizing that the direct analysis of the Colony Floral (without brandy; solarized) and the Colony Floral (without brandy, without solarization/dark) and the mineral water used in this wavelength were also performed.

The total anthocyanin content was expressed in mg anthocyanins/100g of the fraction of the sample analyzed. The average Extinction Coefficient (E1% 1cm) of several anthocyanins was used, adopting a value of 982 for the Single pH method (pH 2.0); and the Differential pH method 873 and 775, respectively, for pHs 1.0 and 4.5.

The flowers of Colônia (*Alpinia zerumbet*) were weighed (9.7g), previously crushed with the aid of gral and 80 mL of extracting solvent (Ethanol-Water (70:30) and enough HCl were added to adjust the pH of the medium to 2.0. This material was then left to rest for 24 hours at 5ºC, sheltered from light, for extraction. After this period, the material was manually pressed in a fabric filter in order to retain the residue, and the extract was transferred to a 100 mL volumetric flask (VEc), and its volume was completed with the extracting solvent, forming the Concentrated Extract (EC). The contents of the flask were centrifuged at 2000 rpm for 10 minutes. The supernatant was later filtered on Whatman No. 1 paper.

The single pH method consisted of the quantitative transfer of an aliquot (VAlq) of the Concentrated Extract to a volumetric flask (EVd) of 10 mL, and the volume was completed with a 95% Ethanol solution – HCl 1.5N (85/15), thus forming the Diluted Extract (DE). The absorbance values (DO) were contrasted with the values of the blanks (1.5N EthanolHCL Solution (85:15)).

For the Differential pH method, pH 1.0 and 4.5 buffer solutions were used. The pH 1.0 solution was prepared from the mixture of KCl (0.2 N) and HCl (0.2N) solutions in the 25/67 ratio. The pH 4.5 buffer was prepared from a solution of Sodium Acetate (1N), HCl and Water in the proportion 100/60/90. Concentrated extract aliquots (VAlq) were quantitatively transferred to 25 mL and 10 mL volumetric flasks (VEd), and their volumes were completed with pH 1.0 and pH 4.5 buffer solutions, respectively; the absorbance values were contrasted with the values of the respective blanks (buffer solutions pH 1.0 and 4.5).

The calculation of the Total Anthocyanin (AntT) content per 100 grams of the evaluated fraction was obtained according to Formula 01, adapting the DO value to the difference in reading between the two pHs.

Formula 01: Ant T = $\frac{DO + VE1 \times VE2 + 1000}{Valq + m + 982}$

AntT: quantity of anthocyanin mg/ 100g of the sample

DO* 535: Optical Density of Dilute Extract

Single pH: Direct measurement of OD in the spectrophotometer

Differential pH: Difference between the DO at pH's 4.5 and 1.0.

VE1= 100 mL (total amount of concentrated extract)

VE2 = 10 mL (amount of solution to read)

V alq 1 mL (aliquot used for solution

m-= 9.7g (mass of the sample used)

982= Correction coefficient

Before verifying the absorbances at 535nm, in both methods, a scanning analysis was performed in a UV/VI spectrophotometer from 200 to 788nm, including analysis of the *solarized* Alpínia zerumbet floral.

e) Conductometric analysis of Alpinia *zerumbet Floral*

Conductometric analysis, also known as conductometry, is a method of analysis that measures the electrical conductivity of an electrolyte solution. Electrical conductivity is a result of the migration of positive and negative ions when an electric field is applied (Soares *et al*., 2010).

Electrical conductivity tests were carried out in mineral water compared to distilled water, as well as in the solarized and non-solarized *alpinia zerumbet* floral (in the dark). These tests were carried out in collaboration with the University of Fortaleza (UNIFOR). A CG 2500 conductivity meter device was used (Figure 2).

Procedure performed

Measurement of the electrical conductivity of mineral and distilled water solution, non-solarized and solarized floral.

Materials: 01 conductivity meter; 02 beakers (50 mL) and Bottles with the solution of Solarized Floral and Non-Solarized Floral Solution.

Experimental procedure

1) The following substances have been added to each of the 3 beakers available on the bench:
    - Beaker 1: 20 mL of non-solarized prepared floral solution;
    - Beaker 2: 20 mL of floral solution prepared with solarization;
    - Beaker 3: 20 mL with mineral water used in the preparation of the flower essences;
    - Beaker 4: 20 mL with distilled water
2) The electrodes were inserted into the solarized floral solution;
3) The electrodes were dipped in the conductivity meter in each of the beakers, leaving them approximately 3 cm apart from each other;
4) The device was turned off and the electrodes were cleaned between each measurement;
5) The results were noted. See Table 3.

Figure 2 - Experimental procedure for measuring the electrical conductivity of the mineral and distilled water solution, the non-solarized and solarized floral works.

Source: author's collection

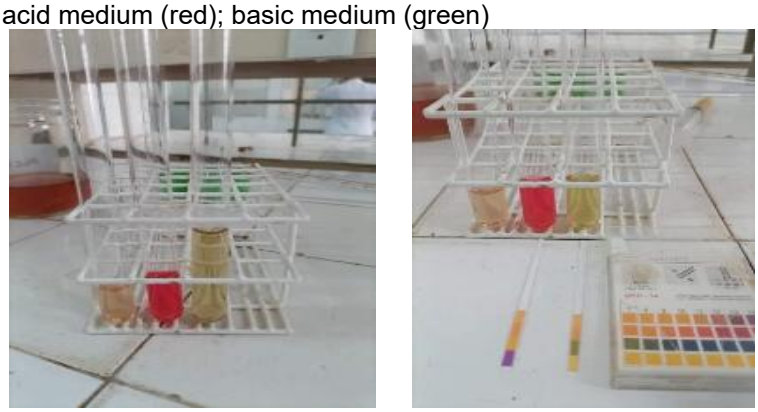
RESULTS

PHYTOCHEMICAL APPROACH, HISTOCHEMISTRY, CONDUCTIVITY ANALYSIS AND SPECTROMETRIC ANALYSIS

From the sample of *Alpinia zerumbet* flowers, it was possible to understand, in practice, how phytochemical tests can be carried out on plants, aware that these are classic analysis techniques.

It is important to emphasize that the phytochemical analysis showed a prominent presence of anthocyanins, demonstrating their amphoteric property (Figure 3).

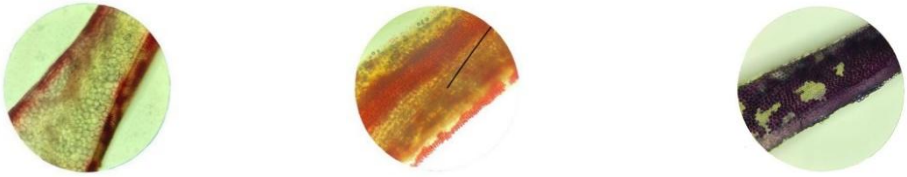
Figure 3 – Characterization of anthocyanins in the flowers of *Alpinia zerumbet*. Test-tube tests in sequence: neutral medium (pink); acid medium (red); basic medium (green)



Source: Prepared by the author.

Histochemical analyses showed color changes in the parenchyma, according to pH (Figure 4), also showing the presence of anthocyanins: pink color in neutral medium; 2- red coloration in acid medium and 3- violet coloration in basic medium.

Figure 4 – Microscopic observation of histological sections of Colonia (*Alpinia zerumbet*) flowers in neutral medium (1); acid medium (2) and basic



1 2 3

Source: Prepared by the author and collaborators

The prominent presence of anthocyanins and their high solubility in aqueous medium led the present study to verify their energy absorption (UV-Vis) and their possible vibrational influence on the Alpinia *zerumbet Floral*, according to the visualization of the coloration in the extracts prepared in different polarities. It is important to emphasize that, although the presence of flavonols has been characterized, they were not selected for quantification study, as they are not absorbed in the visible region (Bordignon, 2009).

The phytochemical approach demonstrated the presence of anthocyanins, flavonoids, triterpenoids, steroids and reducing sugars. The results are presented in Table 1.

Table 1 – Prospection of the chemical constituents present in the leaves of *Lippia alba* chemotype II

Tests	Findings	Tests	Findings
Alkaloids	0	Chalconas	0
Anthocyanins	+++	Coumarins	0
Flavonoids	+	Steroids	+
Anthranols	0	Reducing sugars	+
Auronas	0	Digitalis	0
Quaternary bases	0	Cyanogenetic heterosides	0
Catechins	0	Leukoanthocyanidins	0
Pyrogallonic tannins	0	Resins	0
Triterpenoids	+	Saponins	0
Xanthones	0	Condensed tannins	+
Anthraquinones	0		

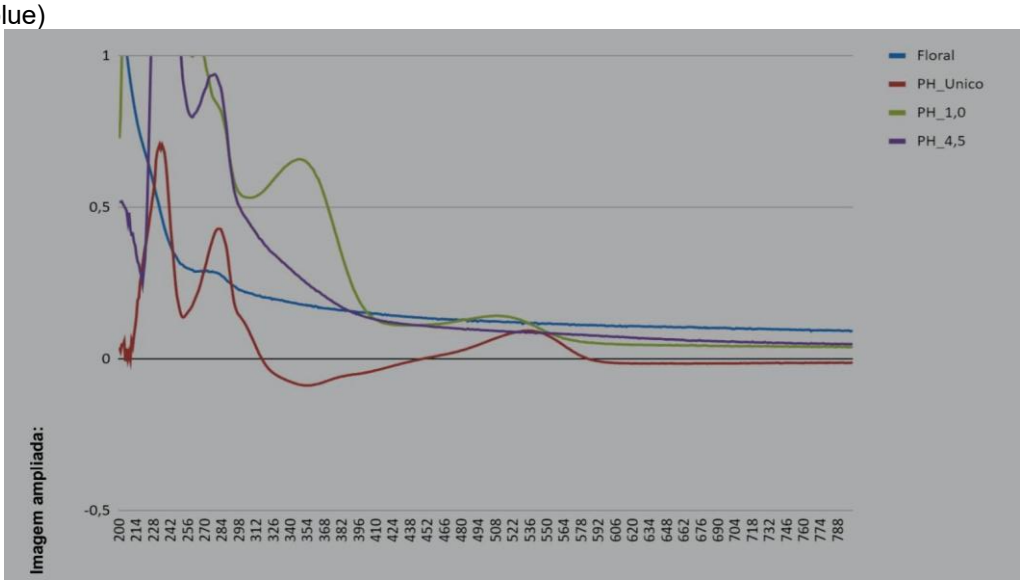
Source: Prepared by the author and collaborators. (0) negative; (+) positive.

QUALITATIVE AND QUANTITATIVE ANALYSIS OF ANTHOCYANINS BY SPECTROSCOPY (UV-VIS)

Initially, the UV-Vis scan analysis was performed. This analysis allows obtaining the spectrum of the substance, detection of peaks and calculations of the area, in the length range of 185 to 900 nm. It allows absorbance readings to be taken over time, with determined cycles. A peculiar characteristic of anthocyanins is that, due to their resonant structure, they are able to absorb radiation from the ultraviolet (UV) to the visible spectrum (vis), which is why UV-vis molecular absorption spectroscopy is used to study these compounds. In addition, solutions containing anthocyanins have the ability to present different shades, depending on the pH of the medium in which they are found (March; Scarminio, 2007).

In Figure 4, ultraviolet absorption curves can be observed at 228 and 284 nm at single pH (2.0) and pH 4.5, red and purple lines, respectively, while for pH 1.0 there was a prominent batochromic effect with two curves at 242 and 340 nm (green line). In addition, there was a slight absorption curve in the ultraviolet around 270 nm of *Alpinia zerumbet,* as well as an absorption in the visible, around 535 nm absorption for the single pH and Ph 1.0.

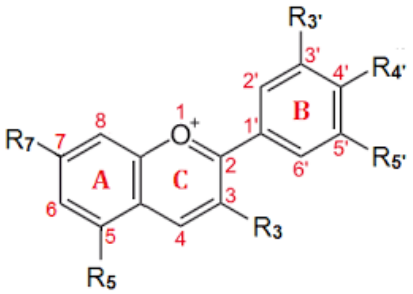
Figure 5 – Scanning spectra of *Alpinia zerumbet extracts* at single pH (red), pH 1.0 (green), pH 4.5 (purple) and floral (blue)



Source: Prepared by the researcher and collaborators

Color, in general, is characterized and evaluated by spectrometry. Isolated pigments were studied by UV-visible spectroscopy (Figure 5). All flavonoids show high absorbance in the range of 250 to 270 nm (UV region), and particularly anthocyanins have intense absorption in the range of 520 to 560 nm (visible region). This has suggested that UV absorption can be attributed mainly to ring A, while visible absorption is due to pyran and ring B, as shown in Figure 6 (Silva *et al*., 2019).

Figure 6 – Basic structure of anthocyanin



Source: Google *Images*

It is important to emphasize that absorption in the visible region is the best tool to observe the copigmentation effect: the visible spectra of anthocyanins show a hyperchromic effect, increasing the intensity of the observed maximum and resulting in more colorful samples, accompanied by a batochromic displacement (displacement of the position of the maximum absorbance to a shorter wavelength) caused by the solvation effect (Silva *et al*., 2019).

In the methodology adopted for the quantification of anthocyanins in visible light, the absorbance focused on 535 nm was used, which, according to the literature, is characteristic of the flavyl cation (Figure 7). The results achieved are described below in Table 2.

Table 2 – Quantification of anthocyanins by spectroscopy at 535 nm

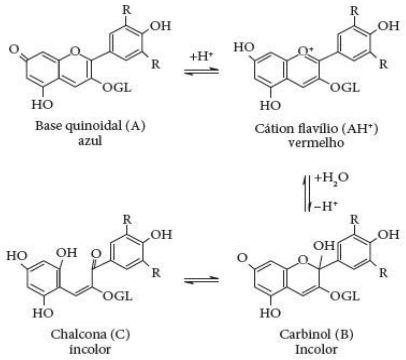
Samples	DO (Optical Density) nm	mg/100mg
*Single pH	0,0936	9,826
**Differential pH	0,0297	31,2
Floral (without brandy/solarized)	O,077	***
Floral (no brandy/no solarization/dark)	0,044	***

*Single pH (2.0); ** Differential pH DO (0.0297); DO of pH 1.0 (0.1178); DO of pH 4.5 = 0.0881; Considerations on the results (OD) of the Floral under discussion.
Source: Prepared by the author

It was observed that the anthocyanin content was higher at the differential pH than at the single pH (2), which can be understood according to the literature consulted. Around pH 2, anthocyanins occur primarily in the form of the flavillium cation (Figure 6). A slight

increase in the pH of the medium causes this cation to be deprotonated, forming the quinoidal base. When approaching the neutral pH, hydration of the flavillium cation is observed. In this configuration, positions 2 and 4 of the formed structure, the pseudobase carbinol, have a higher positive charge density than in the rest of the molecule, making them more susceptible to a nucleophilic attack by the water molecule. With the opening of the pyryllium ring, which can be favored by the increase in temperature, chalcone is formed (Bordignon, 2009).

Figure 7 – Molecular structures found in aqueous solution with different pH values. Flavulium cation (AH*), a) quinoidal base; b) carbinol or pseudobase; and c) chalcona

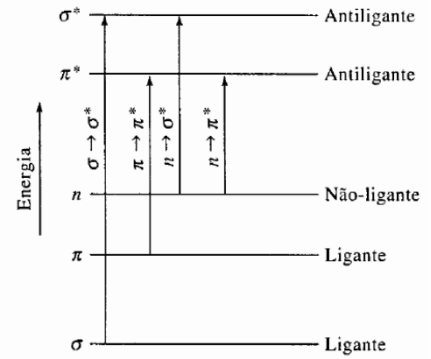


Source: Bordignon (2009)

In this context, how to understand the result of the absorption (Optical Density) of the Floral at 0.077 nanometers (Table 2), in the visible spectrum, when applied in a spectrophotometer at a wavelength of 535 nanometers? How can this absorption be justified if the flower was prepared with water, whole flower and sunlight?

In addition, it is known that the electron excitation process occurs when an electron absorbs energy from a radiation and jumps from an innermost shell (ligand) to an outermost one of an atom, moving to a higher energy level (Antiligand), Figure 8 (Pavia *et al*., 2010).

Figure 8 – Electron excitation process



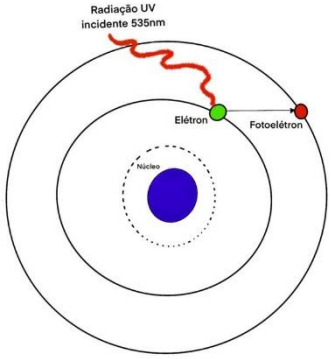
Source: Skoog (2006)

In most molecules, the lowest energy occupied orbitals are sigma orbitals (σ), which correspond to sigma bonds. The pi (π) orbitals are at slightly higher energy levels, and the isolated pairs, or non-binding (n) orbitals, are at higher energies. The unoccupied orbitals, or anti-bonding (π* and σ*), are those with the highest energy (Pavia *et al.,* 2010).

When an electron is excited, it becomes less stable and prone to react. To return to its initial state, the electron needs to lose the energy it has absorbed. In doing so, it releases energy in the form of photons or light (Pavia *et al.,* 2010).

Such an excited state is commonly called charge transfer or electron transfer. So, could solar radiation, when in contact with the preparation of the flower essence, excite the electrons of the flower constituents (anthocyanins) and these be conducted by the flower water? Would solar radiation (emitted radiation) lead to the production of photons in the floral that was absorbed in 535nm incident radiation (Figure 9)? Would there be in the floral the transmission of energy density?

Figure 9 – Schematic drawing demonstrating the production of photons from UV radiation



Source: Prepared by the author

The Scottish scientist James Clerk Maxwell (1831–1879) showed, through his Electromagnetic Theory, that light is an electromagnetic wave that propagates at a constant speed, thus consolidating the wave model of light (Oliveira *et al*., 2024).

In the twentieth century, the German scientist Albert Einstein (1879–1955) challenged the wave-like nature of light when analyzing the photoelectric effect. In his work, Einstein proposed the hypothesis that it was emitted and propagated in the form of discrete pulses, called quantum of light. Thus, it, which had been considered only as a wave, also came to be recognized as a particle. These findings led to the development of the Theory of Wave-Particle Duality of Light (Oliveira *et al*., 2024).

Sometimes, it is difficult to extract information from a UV-Vis spectrum alone for the analysis of the Alpinia *zerumbet Floral and* its energetic component. Complementing the data from the UV-Vis analyses at 535nm, it is observed that the floral produced with solarization (Table 2) presented absorbance of 0.077nm, while the floral produced without solarization (dark) presented absorbance of 0.44 nm, demonstrating that both presented the presence of anthocyanins and the ability to capture light in the visible, verifying that solarization enhances the process.

In this context, it is known that the cell wall of plants is permeable to water, which is capable of releasing anthocyanins from cell vacuoles (Oliveira, 2009, p. 89), after rupture of the membrane, exposing photosensitive ions. These ions could be captured in visible light (535 nm).

The electrical conductivity tests in the mineral water compared to the distilled water, *Alpinia zerumbet* (Cologne) solarized and without solarization (in the dark) (Table 3), showed electrical conductivity in the mineral water used for the preparation of the floral, while the solarized floral and the floral without solarization showed higher electrical conductivity than that of mineral water, confirming the presence of photosensitive particles in these floral essences.

The conductivity in an electrolyte solution depends on the number of ions in solution and the mobility of these ions. A solution that has no ions does not conduct electricity. Pure water has ions in a very low concentration, so it has a certain conductivity, on the order of μS cm-1. When electrolytes are added, conductivity naturally increases (ATKINS; JONES; LAVERMAN, 2018).

Table 3 – Electrical conductivity analyses in millisiemens per meter (mS/m) in mineral water compared to distilled water, alpinia floral *zerumbet* solarized and without solarization (in the dark)

Samples	Conductivity mS/m
Distilled water	16,51
Natural mineral water	150,3
Solarized floral	172,9
Non-Solarized Floral	161,7

Source: prepared by the researcher

The electrical conductivity of the mineral water used in the Alpinia *zerumbet Floral was* observed at 150.3 mS/m, justifying the use of spring or mineral water, according to (Bach, 2006). It is known that what transforms conductive water is the amount of minerals present in it (Soares *et al*., 2010). These minerals present are ionic compounds, such as chlorides, sulfates, potassium, sodium and magnesium (Oliveira, 2009, p. 68). The more mineral salts, the higher the conductivity of the water, as well as distilled water (with the absence of minerals), is not conductive (16.51 mS/m).

It was observed that the electrical conductivity presented by the solarized *Alpinia zerumbet* Floral (172.9 mS/m) is higher than the Alpinia *zerumbet Floral* prepared in the dark (161.7 mS/m), therefore, there are photosensitive and energetic particles, in addition to mineral water in these florals.

It is important to emphasize that we are made of 70% water, which is why the human body is conductive (Emoto, 2004, p.14). Thus, the conductivity of water and floral is fundamental for our brain. This is because it produces synapses, electrical signals responsible for our memory, thoughts, memories, vision, hearing, movements and body functioning and our organs.

DISCUSSION

The results found can stimulate other studies, as well as bring us information or contrasts from the energetic point of view of the flower essence. However, there is a need for more accurate techniques that can evaluate and confirm the presence of photosensitive ions. These data, when combined with the clinical follow-up of patients, can contribute to the understanding of the energetic action of the Colony Floral (*Alpinia zerumbet*).

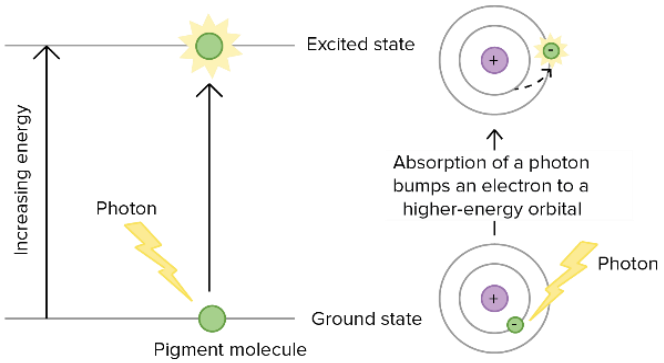
When a pigment absorbs a photon of light, it becomes excited, that is, it has extra energy and is no longer in its normal, or standard, state. At a subatomic level, excitation is when an electron is carried into a higher-energy orbital that is farther away from the

nucleus. Only a photon with just the right amount of energy to carry an electron to another orbital can excite a pigment. In fact, it is for this reason that different pigments absorb different wavelengths of light: the "energy gaps" between orbitals are different for each pigment, meaning that photons of different wavelengths are needed in each case to provide the energy that corresponds to the energy gap (Khan Academy, 2024, s. p.).

According to the agency responsible for the area of telecommunications and broadcasting in the United States, ionizing is considered any electromagnetic radiation that carries energy greater than 10eV (electron volts). This energy is equivalent to that carried by the far ultraviolet, one of the most energetic bands of ultraviolet, which extends between 122nm and 200nm in wavelength (Helerbrock, 2024).

Sunlight is composed of a continuous spectrum of electromagnetic radiation that is divided and named according to the wavelength range (λ): ultraviolet (UV) radiation of 100-400nm (Balogh, 2011). In addition, many anthocyanin pigments have characteristic absorption profiles in the UV-Vis spectral region (Alappat; Alappat, 2020).

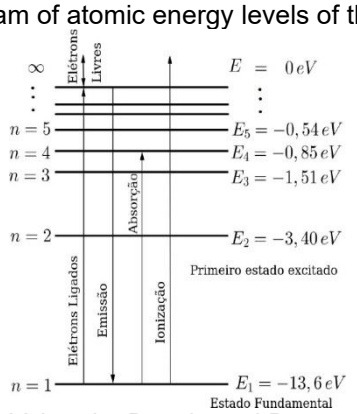
Figure 10 – Excitation state of an electron when receiving light



Source: Khan Academy (2024)

The atomic spectrum results from the set of energy levels that every atom has, varying from atom to atom. The excited atoms behave like antennas emitting electromagnetic waves. The representation of this ideal situation is of the type shown in (Figure 10), in the case of the Hydrogen atom (Figure 11), the simplest in nature: a proton and an electron (Valverde; Based; Bagnato, 2016).

Figure 11 – Diagram of atomic energy levels of the Hydrogen atom



Source: Valverde, Baseia and Bagnato (2016)

A better understanding of this action of electromagnetic energy comes from physics *(Quartuccio, 2016).* Bodies that absorb all the radiation that falls on their surface are called black bodies. When an object is heated, it begins to emit electromagnetic waves in a wide spectrum of frequencies. The investigation of this spectrum would culminate in the development of Quantum Theory.

Electrons have self-energy, which consists of the existence of a continuous emission and reabsorption of virtual photons by any electric charge. So the electron has to interact with a "cloud" of virtual photons produced by itself or, in other words, interact with its own field. The vacuum behaves, therefore, as a dielectric medium polarizable by the electric field, hence the name of the self-energy effect of the electron and the polarization of the vacuum (Bezerra, 2003).

When calculating the effects of electron self-energy and vacuum polarization, both effects are related to the creation of virtual particles from the vacuum, which, in the Quantum Field Theory, has a dynamic character (Bezerra, 2003).

In this thesis, it was verified the ability of the *Alpinia zerumbet* flower to conduct ultraviolet radiation, through UV spectrometry analysis, consequently there is the presence of photosensitive particles (photoelectrons) in the compound. Thus, it is necessary to associate this finding with the "Pumped System" Theory, first described by the German physicist, Professor Herbert Fronhlich, from Liverpool University, in England, whose studies contributed to describe superconductivity.

The "pumped system" is a system of electrical molecules, which vibrate (positive dipoles at one end and negative dipoles at the other). In this regard, Fronhlich's research

demonstrated that, by introducing any more energy into the system, this would cause the molecules of that system to vibrate in harmony with each other, reaching the most ordered form possible of condensed phase, resembling a "Bose-Einstein condensate" (Guerrini; Domene, 2020, p. 120).

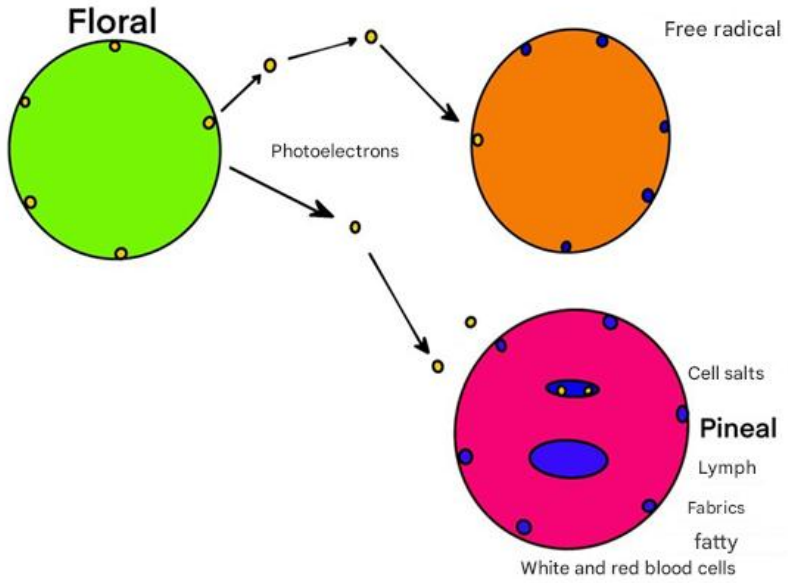
Among the characteristics cited in the Bose-Einstein Condensates, the one that indicates that the numerous constructive parts of an ordered system not only behave as a whole, but become a whole, their identities merge, or overlap in such a way that they completely lose their individuality. This concept is affirmed in a cellular medium using the studies of physicists Frohlich and Danah Zohar (Guerrini; Domene, 2020).

The effect described is a consequence of Quantum Physics, which states that any system can acquire energy in discrete quantities, leading to a state of "coherence" of the system (Guerrini; Domene, 2020, p. 120).

By correlating this information to the oxidation process of living organisms, it is possible to notice that the transfer of electrons from one atom to another occurs, with oxygen being the main receptor in the electron flow system, producing energy in the form of ATP. However, when electrons in this flux become unpaired, they can generate free radicals, molecules that are unstable due to their free valences (Moraes *et al.*, 2024).

A free radical is a highly reactive atom or molecule that contains an odd number of electrons in its last electron shell and seeks stability by looking for electrons in other molecules, atoms, or intact compounds in the human body. The accumulation of free radicals can actively react with other molecules, such as proteins, lipids, and DNA itself, destabilizing them, which can stimulate the emergence of various diseases in different parts of the body, such as Alzheimer's disease, Parkinson's, asthma, arthrosis, pancreatitis, hepatotoxicity, among others (Sułkowska-Ziaja; Muszyńska; Szewczyk, 2015; Moraes *et al.*, 2024).

Figure 12 – Antioxidant action of the *Alpinia zerumbet Floral* donating photoelectrons to free radicals, preventing oxidative stress and donating photoelectrons to structures of the physical body to promote quantum coherence.



Source: Adaptation of images from *Google* and Mundim, Mundim and Mundim (1997)

The action of the flower essences, through the precepts of Quantum Physics, postulates an exchange of energy seeking balance, that is, quantum coherence, in which the photoelectrons of the flower essences bind to free radicals, acting as antioxidants, and act on body structures, reducing the progression of diseases, promoting not only the reduction of oxidative stress (Figure 12), but also the best cellular balance in the face of quantum possibilities and coherence (Guerrini; Domene, 2020; Moraes *et al.*, 2024).

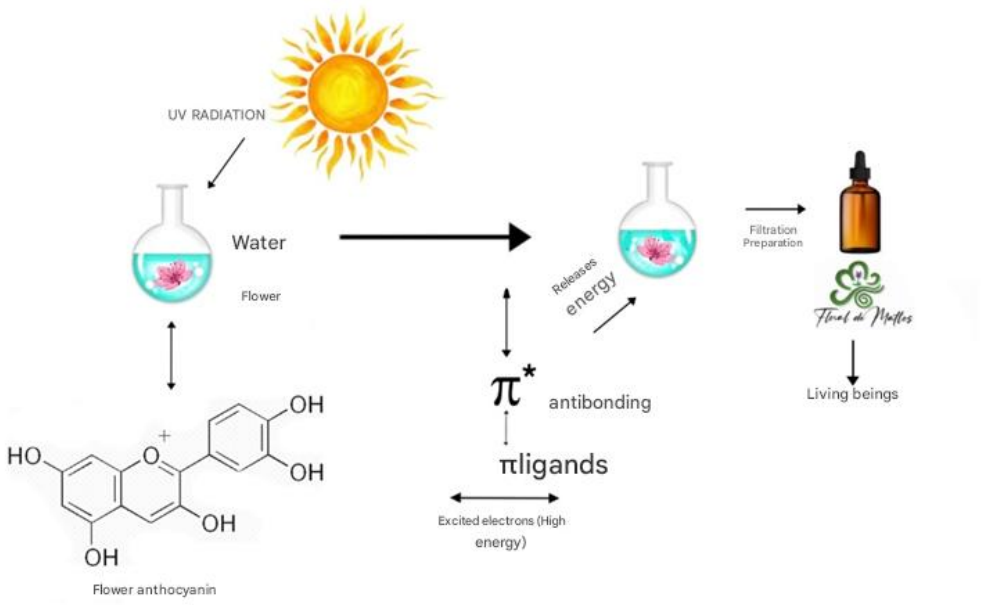
This action of anthocyanins was proven in an experiment carried out by Szostak (2014), which found greater irradiation from the Sun, combined with absorption, increasing the performance of the solar cell sensitized with anthocyanins in relation to other devices, proving the energy capture power of this pigment.

Anthocyanins were able to act as reducing agents in the electron transfer reaction pathway with the ability to donate electrons to free radicals with unpaired electrons (Alappat; Alappat, 2020).

In the action of the Floral, the free electrons, excited after exposure to UV rays, have chemical markers (Pacheco *et al.*, 2022), which bring information from the mother plant,

they also have the ability to eliminate free radicals in various areas of the body. This is the same process of defense of plants against environmental aggressions (Figure 13).

Figure 13 – Solarization scheme for the preparation of Matos Floral with *Alpinia zerumbet*



Source: Prepared by the author.

By eliminating free radicals, anthocyanins can provide action on various cells of the body, and if these are not in probable physical damage, a feeling of well-being can arise, improvement of the initial symptoms, which can justify the action of the flower in the physique of living organisms.

Anthocyanins are some of the strongest antioxidants due to their free radical scavenging capabilities. Two free radical scavenging pathways are possible due to the hydroxyl groups in the B ring as well as the oxonium ion in the C ring (Alappat; Alappat, 2020). This release of anthocyanin electrons is a relevant factor for the transfer of its action, already proven, to a remedy, aware that there are flower essences that act on the physical and others on the energy field with more intensity.

Perhaps another theory is the following: flower essences produced with flowers with a high anthocyanin content have a more amplified effect on the body, consequently, those with less of this pigment have action at more subtle levels.

The proof of the presence of chemical markers of the original plant (mother) in a floral plant makes it possible to verify the association of its effects with some scientific and popular pharmacological action, already studied, a fact that may help in future studies.

It was proven by Pacheco *et al.* (2022) the presence of chemical markers from the original flower of the Bach Floral, Impatiens. The method was applied to evaluate its authenticity, efficiently proving the presence of the chemical marker 2-hydroxy-1,4-naphthoquinone. And these compounds have electrons released through solarization.

The study of medicinal flowers and their preservation serves as a pharmacological key that can unlock valuable *insights* for the betterment of human society (Mohapatra; Induar; Parida, 2023).

Therefore, the thesis uses the following explanation of the Theory of Action of Flower Remedies with Quantum Physics: it is known that anthocyanins, this important chemical class, correspond to a pigment of flowers with a potent chromophoric grouping, that is, with several electrons π ligands and chemical markers. When exposed to UV light, they release anti-bonding electrons π* (Figure 12) or photoelectrons into the aqueous solution. These electrons can act in the floral as antioxidants, avoiding oxidative stress or performing quantum coherence, promoting the reestablishment of cells in certain parts of the body.

The healing potential of flowers has been highlighted by numerous therapies, including Homeopathy, Puspa, Ayurveda, Aromatherapy, BFR, Australian Bush Remedies, SAHIIIR and others. All of this emphasizes the ethereal "energy" or "vibration" of the flowers (Gayatri; Dolas, 2023).

CONCLUSION

The results found can stimulate other studies, as well as bring us information or contrasts from the energetic point of view of the flower essence. However, there is a need for more accurate techniques that can evaluate and confirm the presence of photosensitive ions. These data, when combined with the clinical follow-up of patients, can contribute to the understanding of the energetic action of the Colony Floral (*Alpinia zerumbet*).

These reflections led to the search for knowledge in botany, physics and chemistry, culminating in several discoveries, namely: the cellular composition of flowers, with their cells that capture UV rays, the release of ions, electrons, or even molecules in water,

bioenergetics and quantum physics, with their theories and calculations, proving the exchange of energy between plants and living beings, in this case, between plants and human beings.

This biomagnetic discharge also occurs in living organisms when the flower essence is ingested, so there is resonance of the body with the floral (plant energy). In view of this, the action of the flower remedy occurs exactly where there is imbalance, without discarding biophysical activity in the entire process.

By proving the electrical conductivity of flower essences prepared with solarization and in the dark, it is perceived that the flowers can release their healing potentials through water, being more powerful with the use of the sun, when we verify the electrical conductivity (172.9 mS/m) for solarized floral and without solarization (161.7 mS/m), so the conductivity of the solarized floral is greater, proving the excitation of photoelectrons during preparation, making evident the release of ions into the water and anthocyanins.

It is also important to use mineral water in the preparation of the flower essence, as the conductivity is increased. In addition, the natural mineral water, used in the preparation of the flower essences, presented 150.3mS/m, favoring physiological functions of the living beings that consume it. Following the same reasoning, the use of distilled water should be avoided because it has low conductivity (16.5 mS/m).

The phytochemical study of *Alpinia zerumbet flowers* also provided the expansion of knowledge to define the actions of floral essences in living organisms. A priori, its phytochemical composition was verified in the laboratory, which demonstrated the presence of saponins, steroids, reducing sugars and anthocyanins. Anthocyanins were highlighted for their amphoteric character.

In the evaluation by spectrometry (a method that measures the amount of light absorbed by a chemical substance), isolated pigments were studied in UV-visible. In this analysis, the scanning spectra of *Alpinia zerumbet extracts were observed* at single pH (red), pH 1.0 (green), pH 4.5 (purple) and floral (blue). The floral presented as a result, visible absorption, using wavelengths around 535 nm, absorption for a single pH and Ph 1.0. The flower remedies did not present the aforementioned ultraviolet (UV) absorptions in this analysis.

It was also possible to prove the presence of anthocyanins that have an intense absorption in the range of 520 to 560 nm (visible region), characteristic of the flavylic cation, because the absorption in the visible is due to the pyran and the B ring, present in the basic structure of the anthocyanin.

The anthocyanins, present in the flower essence, have a proven antioxidant and anti-inflammatory effect, as food, being able to act in various situations in the human body, to promote homeostatic balance. Several studies prove its ability to alleviate complications resulting from cancer, diabetes, and other metabolic disorders, being validated at the laboratory level.

The histochemical study of the flower verified color changes in the parenchyma, according to the pH used, proving the presence of anthocyanins, with the following results: in neutral medium, the sample showed a pink color; in acid media, the one presented was red; and, in basic medium, the color was violet. With the use of differential pH and single pH, a higher concentration of anthocyanins was observed; at pH 2, anthocyanins occur in the form of the flavillium cation.

Spectroscopy absorbance at 535 nm also proved the presence of anthocyanins in the two modes of floral preparation: floral without brandy/solarized, with 0.077 absorbance (Abs), floral without brandy/without solarization/dark, with 0.044 absorbance (Abs).

The results found intend to stimulate other studies, as well as to bring us information or contrasts from the energetic point of view of the flower essence. Researchers should look for more accurate techniques capable of evaluating and confirming the presence of photosensitive ions. These data, when combined with the clinical follow-up of patients, can contribute to the understanding of the energetic action of the Colony Flower (*Alpinia zerumbet*) and other flower essences in the very near future.

The findings of this research are relevant because they reveal a theory that states the probable presence of free photoelectrons within the floral, components capable of interacting with living organisms. This mechanism is supported by thermodynamics and Quantum Theory, in which electrons, when precipitated, move from the original molecule and are loose in the middle, being able to establish interaction anywhere, that is, they can walk inside organs, viscera, energy channels, chakras and consciousness, promoting the action of the flower essences themselves.

To obtain the chemical components and their concentrations, the flowers of *Alpinia zerumbet* were extracted by immersion in 70% acetone (24h). In addition, stigmasterol was quantified in the flowers, with levels of 1.46% (Brasil, 2014, p. 23). It should be noted that Dihydro-5,6-dehydrokavain (DDK) is the major constituent of the plant *Alpinia zerumbet* (Xuan; Teschke, 2015; Zara *et al.*, 2019).

Stigmasterol is an active compound of phytosterol, it has antitumor, anti-inflammatory and antioxidant properties, effects on inhibiting tumor cell growth and inducing apoptosis. Therefore, it expands the therapeutic potential for the treatment of hepatocellular carcinoma and may play a role in immune regulation through the gut microbiota. Studies conducted on mice have verified that it can restore the abundance of *Erysipelotrichaceae* and *Allobaculum* in the intestinal tract, when induced by high-fat diet, alleviating disorders of lipid metabolism and treating colitis (Huo *et al*., 2024).

In addition, it is worth noting that, in the preparation of the Floral, after exposure to UV rays, there is also the possibility of the presence of chemical markers, such as Dihydro-5,6-dehydrokavain (DDK), it is the largest constituent of the Alpinia *zerumbet plant,* capable of transmitting information from the mother plant. It is a new suggestion for the continuity of this research.

Therefore, as *Alpinia zerumbet* has a high concentration of anthocyanins, proven antioxidants, these may be able to eliminate free radicals in various areas of the body, resembling the same process of defense of plants against environmental aggressions.

Some studies reveal the action of anthocyanins on nerve cells, and, if these are not in probable physical damage, there is a feeling of well-being, which justifies the action of the flower essence in living organisms. With the presence of chemical markers from the original plant, we can associate them with actions similar to scientific and popular pharmacology, already proven, which can support future studies from this perspective.

The antioxidant action of the action of flower essences, as a precursor of bioactive compounds, occurs as a Bose-Einstein condensate, with the most orderly form possible in nature. This action acts as a mechanism capable of counteracting the second Law of Thermodynamics (entropy), which describes that systems tend to chaos (Guerrini; Domine, 2021).

The flower essences emerge as a potential aid in the recovery and prevention of health in a holistic way, promoting syntropy, reducing cellular wear, realizing that their action goes beyond vibrational activity, with potential wave activity to reach the entire system including consciousness.

According to Quantum Physics, electrons differ from ordinary waves, they are probability waves. The most likely to find this particle is the place where the greatest disturbances occur. According to the same science, there is the possibility of controlling the path followed by waves and particles, atoms, energy, electrons, molecules, but consciousness and desire are necessary to follow their path in the body (Goswami, 2021).

The elaboration of the thesis has several highlights, from the experience in preparing a flower essence, the technique used, the resources and necessary laboratory structures, serving as a new experience of the researcher's professional performance. It was possible to realize that there is much more than a simple process of preparing this flower essence.

To reach the result, reasoning and aggregation of theories were necessary to justify and understand the results. Therefore, in addition to the etheric impressions, this thesis conceives, in view of the various studies, that there is the presence of photoelectrons and possibly molecules of flowers in flower essences. This process of transferring the plant (flower) to the water occurs during preparation, when it receives the ionizing energy of UV rays, collaborating with most of the theories that explain the phenomenon of the action of the flower essences, according to which they have only vibrational energy.

THANKS

Dr. Mary Anne Medeiros Bandeira, the guardian of the legacy of Living Pharmacies, who 10 years ago envisioned this new phase of medicinal plants belonging to the collection of the Professor José de Abreu Matos Medicinal Plants Garden of the Federal University of Ceará, being used as flower essences – "Floral Essences of Mattos".

The Northeast Network in Family Health (RENASF) and the Federal University of Ceará, for the opportunity to carry out this study for the benefit of public health.

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