

Original Article

Homeopathic repertorization in vegetables: a case study for the bell pepper culture (*Capsicum annuum* L, Solanaceae)

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Abstract

Background: Anamnesis and homeopathic repertorization are essential steps for collecting symptoms and selecting the suitable medicine to cure vegetables presenting pathologies or changes in homeostasis. **Aims:** The objective of this study was to carry out observation, anamnesis, and homeopathic repertorization of bell pepper plants and their cultivation environment and select the *simillimum* medicine for the culture. **Methods** The study was performed at the Research and Extension Center in Agroecology of Ressacada Experimental Farm - Center of Agrarian Sciences, Federal University of Santa Catarina, Florianópolis, Brazil. The selection of symptoms was based on the characteristics of the diseases observed in the plants and modalized by evidenced characteristics in the environment. Symptoms were chosen by the mechanical method without hierarchization and a master symptom, and after their analogy with the symptoms described in the Homeopathic Materia Medica. **Results** The choice for *Calcarea carbonica* and *Sulphur* drugs was based on the number of covered symptoms and the score obtained during the digital repertorization performed by the software HomeoPro®. The chosen dilution, 30 CH, was based on the miasmatic magnitude presented by the symptoms. **Conclusion:** The analogy of symptoms found in the agricultural organism with the symptoms described in the Homeopathic Materia Medica presents a promising path for choosing medicine to cure diseases in vegetables. The choice of the appropriate homeopathic medicine for crops must represent the symptomatic totality presented by the plant and by the environment in the homeopathic repertorization.

Keywords: Agricultural Homeopathy; Symptoms in vegetables; Plants

Introduction

Homeopathy stimulates the vital force of plants through the equilibrium achieved by the plant with the environment and works in the permanent solution of diseases and pests through a systemic approach and without causing side effects [1]. Applications of homeopathic remedies in plants validate the benefits of this method in stimulating plant growth, its behavior in producing secondary defense compounds, the amount and form of fruits, leaf abundance, and the ability to control and reduce the incidence of most known insects and diseases [2]. To find out the appropriate remedy for plants, it is necessary that the symptoms that appear during the plant cultivation are recorded and repertorized.

Homeopathic repertorization can be defined as the search for the *simillimum* remedy, singular remedy, or its approximation based on the totality of the symptoms manifested by the diseased organism. This denomination refers to the patient's central remedy, which reflects the individual's



bulk of symptoms [3]. For Hahnemann [4], *simillimum* is the medicine through which the general symptoms of the diseased organism find a correspondence in the respective pathogenesis or the effects released by an illness and is the only one capable of curing homeopathically a patient with chronic diseases and acute pathologies.

There are three repertorization methods: 1-mechanical method, without selecting the master symptom and not arranged in hierarchical order, where all symptoms expressed by the diseased organism are identified; 2-simple artistic method, by which the master symptom is chosen, not necessarily the one at the top of the hierarchy, but the most typical and striking symptom of the clinical case and; 3-truly artistic method or minimal syndrome of maximum value, through which, by elimination, a limited number of symptoms is selected in the repertory, arranged in hierarchical order and typical of the patient's individuality [5]. The master (or guiding) symptom can be understood as the chief symptom of a clinical case, which is the most typical and most prominent symptom observed. Hierarchization, in turn, consists of grouping the symptoms by order of importance according to the sum of scores [5].

During homeopathic repertorization, it is essential to find out the uncommon, peculiar, repetitive, rare, strange, and singular symptoms, basically classified into mental/behavioral, general, local, and modalized symptoms to the environment (ameliorated or aggravated) [6]. Human patients who report and show their potential diseases make it easier to collect the symptoms, but this task is not so simple for vegetables. A plant does not clearly show symptoms that are perceptible to the therapist's eyes, which, in many cases, can lead to erroneous or limited prognosis.

Considered simpler organisms when compared to animals – a plant does not speak, walk, think, or demonstrates emotions – plants do not precisely manifest their clinical condition. For example, the appearance of a pathogen can be the result of an increase or decrease in the nutrient uptake by the plant [7] or can emerge due to environmental conditions, such as dry air or high air humidity [8], which thus show the complexity of understanding the case.

The search for symptoms in vegetables is directly related to the homeopath perception. The prognosis of the case depends on knowledge about the plant: morphology, physiology, and phenology, i.e., typical characteristics of the culture [9], and on the properties of the environment where this vegetable is grown, such as soil nutrition, temperature, moisture, photoperiod, among others [10]. These are some of the characteristics to be examined to proceed to the plant symptomatology.

By assigning scores to the symptoms during repertorization, the practitioner can obtain an overall picture of the diseased organism, and, for this purpose, related symptoms, typical of each individual, should be scored. In the practice of homeopathy in vegetables, a repertory of imbalances manifested by the group of plants of the same culture can be built. Individualization of each plant is not a simple task. It is time-consuming and because an imbalance is relatively identical for the same group of plants affected.

Given the little knowledge of agronomists and other agricultural professionals on how to collect and repertorize plant symptoms, the selection of homeopathic remedies has been mostly based on the principle of isopathy and orderly treatment of the disease using the causal agent or a product of the same disease, the nosodes. This method does not involve observation of striking, peculiar signs and typical symptoms of the case, as required for homeopathic practice [11].

Thus, this study aimed to conduct observation, anamnesis, and homeopathic repertorization of bell pepper (*Capsicum annuum* L.) plants and the environment and select the *simillimum* remedy for this culture.

Materials and methods

The study was conducted in 2018 at the Research and Extension Center in Agroecology of Ressacada Experimental Farm - Center of Agrarian Sciences, Federal University of Santa Catarina, Florianópolis, Brazil. The history of usage of this land comprises annual cultivation of agroecological vegetables, sheep farming using the Voisin Rational Grazing system, and areas of native forest being naturally regenerated since 2014. The soil in the experimental area is classified as Typical Hydromorphic Quartzarenic Neosol [12]. Five soil samples were collected at 0 - 20 cm depths, with the aid of an auger, after they were homogenized and sent to the Laboratory of Soil Analysis/ EPAGRI/Ituporanga, SC, Brazil. Plants of bell pepper cultivar CASCA DURA IKEDA were studied, with seeds obtained from the company FELTRIM®, RS/BR.

For sowing, polystyrene seed trays containing 126 cells filled with organic compost substrate with one seed per cell were used. The seedlings were maintained in the oven for 30 days until being transplanted to the field site. A set of 14 plants were transplanted in the field, a number that was justified by the vegetable autogamy, with no extreme genetic differences between the individuals. Anamnesis (symptomatic characterization) of the plants was conducted from planting the seeds to harvesting the fruits, a period that took around four months, and studying the evolutionary and ancestral process of the culture.

The symptoms were collected in the group of plants grown in the experimental area exclusively for repertorization. The choice for possible symptoms, the characteristics of the plants were observed, such as growth, weight, fruit production, among others of phenological nature. In addition, environmental conditions were also observed, such as humidity, water shortage, temperature, soil nutrition, and the presence of insects and pathogens throughout the crop cycle.

The symptoms were chosen using the mechanical method without hierarchization and master symptoms before performing an analogy of these symptoms with those already described in the *Matéria Médica Homeopática* [6] [Homeopathic Materia Medica]. The medicines were selected based on the number of symptoms and the scores obtained during digital repertorization. The dilution chosen was based on the miasmatic magnitude of the symptoms. The HomeoPro® software was used to perform the digital repertorization.

RESULTS

Homeopathic repertorization

During the seedlings' emergence and production, no symptoms expressed by the plants and the environment were observed. After being transplanted in the field, the plant development was slow. Defoliation by leaf-cutting ants (*Atta* sp. - Formicidae) was observed in some plants, which died later. Forty-five days after transplantation, the bell pepper crop was at the flowering stage, with an average height of 40.8 cm and 5.2 flowers per plant. The plants exhibited growth delay and early reproductive stage in these conditions, with individuals with low yields, and did not express their full genetic potential. These characteristics harmed fruit production, exhibiting few fruits per plant (5.9 fruits) with length (6.4 cm) and diameter (4.7 mm) below the sizes recommended for this crop [13], as well as soft rot disease (*Pectobacterium* sp.) and necroses (*Colletotrichum* sp.).

Along with the symptoms observed, the environment had a significant interference in the plant development. Relative air humidity was between 47 and 95% (12 UTC) [14], which is considered high, becoming an aggravating factor for flowering and fruit production [15]. Thus, there was an



aggravation of the disease and the development of symptoms caused by humidity. Table 1 shows the soil chemical characteristics. It can be seen that there is a medium concentration of potassium (K) and phosphorus (P) as well as a low pH value, indicating a lack of nutrients in the soil that are necessary for the plants' growth. The soil in the experimental area is sandy, with a high supply of organic matter, which can remain unavailable to the plants due to metals in the soil, such as aluminum.

Table 1. Chemical characterization of the soil in the experimental area at the Research and Extension Center in Agroecology of Ressacada Experimental Farm, 2018, collected at the 0-20 cm depth (Laboratory of Soil Analysis/ EPAGRI/Ituporanga, SC, Brazil).

% Clay m/v	pH Water 1:1	*SMP index	P mg/dm ³	K mg/dm ³	O.M. %	Al cmolc/dm	Ca cmolc/dm	Mg cmolc/dm
10	5.3	5.7	17.0	84.0	4.8	0.4	9.6	1.5
-	Low	Medium	Medium	Medium	High	High	High	High

*Index SMP: method Shoemaker, Mac Lean and Pratt

The average temperature during this period was between 20 and 27° C, with maximum values close dot 33° C, similar to the ones recommended for bell pepper crops [18]. The average approximate rainfall was 160 mm [14], added to controlled irrigation (362 mm) in drought periods. These parameters did not represent a development of disease in the vegetable.

Based on the initial collection of the symptoms described above, it was possible to proceed to the homeopathic repertorization. The symptoms selected by the software were defined by analogy, that is, the symptoms that exhibited more similarity with those observed at the culture anamnesis (Table 2).

Table 2. Analogy between the symptoms observed during the plant anamnesis and the environment and the symptoms described in the Homeopathy Materia Medica during digital repertorization,

Symptom collected during anamnesis	Symptom found at the HomeoPro® software
Loss of identity	Mental confusion; Alteration or confusion of body identity
Lack of naturalness	Discontentment with environment;
Early reproduction	Overall precocity; Subinvolution
Growth delay	Development delay
Lack of nutrients	Increased appetite (hunger in general)
Defoliation by insects	Insect bites, stings
Aggravates with humidity	Humidity aggravates in general

Even though there is a remarkable difference between plants and the human body, homeopathy is just one, and the symptoms that are classified for human beings (or animals) can be adopted for plants [10]. Based on the observation of symptoms and its subsequent analogy with the ones found

in the software, it could be possible to arrange the medicines in an order that represents the symptomatic totality of plants and the environment (Table 3).

Table 3. Symptoms selected in the digital repertorization and the number of remedies indicated for the symptom (A). List of the main remedies selected by the digital repertorization technique and the respective scores for the symptom, total scores and number of symptoms covered (B).

A	SYMPTOM	No. of medicines
	Mental CONFUSION	395
	Body IDENTITY	181
	DISCONTENTEMENT, environment	9
	Insect BITES, STINGS	49
	DELAYED development	88
	PRECOCITY	41
	SUBINVOLUTIN, female genitalia	51
	Increased APETITE	298
	HUMIDITY, agg	110

B	Remedy	Scores for the symptom	No. of symptoms covered/ total scores
	Sulph	4 2 - 1 3 1 3 4 2	08/020
	Bell	4 3 - 2 1 1 2 3 3	08/019
	Merc	4 1 3 1 3 4 - 2 1	08/019
	Sep	4 1 - 1 1 1 3 3 1	08/015
	Calc	4 2 - - 5 1 2 4 4	07/022
	Sil	4 2 - 1 4 2 - 3 1	07/017

Choice of homeopathic medicines

To determine which of homeopathic medicines would likely be the *simillimum* of the culture, their descriptions were confirmed in the Homeopathy Materia Medica [6]. Those that came closer to the characteristics observed during anamnesis were selected, *Sulphur* and *Calcarea carbonica*. These medicines covered the most significant number of symptoms (*Sulphur*) and higher scores (*Calcarea carbonica*), especially for the symptoms that were more striking during anamnesis. The dilution of the homeopathic medicines for this study was 30CH.

DISCUSSION

Anamnesis and repertorization

Symptomatic characterization of the evolutionary and ancestral process of Capsicum annuum

During domestication, selection, and evolution of bell pepper (*Capsicum annuum* var *annuum*), various notable changes in its architecture occurred, resulting in short, erect plants with larger leaves, aiming to obtain fruits with longitudinal shapes sweet and with lower levels of pungency [16]. Such perceptible plant transmutations could be diagnosed as structural alterations, behavioral changes, or even a loss of the original identity of the plant. In order for the *C. annuum* ancestors to achieve the present traits, their essence, i.e., their organic ordering, they had to modify and evolve, thus exhibiting distinct traits from the primitive ones.



Added to the individual's structural changes, the environmental conditions of various cultivation sites where these plants were conditioned to adapt themselves indicate a lack of naturalness. Dry, high altitude lands were replaced by plains and lowlands, humid lands, varying and oscillating temperatures, precipitation, and humidity during most of the year [17, 18].

These changes that occurred during the culture evolution triggered internal processes in the individuals, making that native, original and specific traits of the plants disappeared, diminishing their resistance and leading to diseases under non-ideal conditions. Current varieties are fragile, dependent on rigorous conditions to express their genetic potential, and are susceptible to numerous biotic and abiotic factors.

Characterization of these symptoms is important when one seeks to understand the successional symptomatic picture of the culture. It is not expected that these plants return to their original state or adapt themselves to the most diverse environments, but rather to validate that there is an epigenetic trait in their cell memory, which can be taken as a typical symptom of the culture during its evolutionary process.

Phenological, agronomic, and environmental characterization

From the homeopathic perspective, the culture's diseased picture can be considered chronic in syphilitic condition, probably also combined with psora. The syphilitic miasma occupies the inner and structural tissues and continues until appearing rashes and ulcers in the human body [19]. This condition was remarkable in the crop, especially after being transplanted to the field, initially exhibiting a delayed development, then followed by a fragile condition and prone to other symptoms. The production of small, weak fruits and the emergence of rot spots is nothing else than the response of the diseased organism in the symptomatic succession.

Likewise, the symptoms found in the culture also came from the environment where it was grown. A deep analysis of the environmental characteristics, symptoms such as lack of nutrients, typical of low fertility soils, and poorly managed at some time during the occupation, were observed. Although these symptoms are local and acute and can be improved with routine fertilization and liming, it accompanies the environment and plant cultivation for many years, followed by erroneous management operations, which temporarily solved the problem expense of aggravating the environmental status of the area.

Homeopathic medicines

Calcarea carbonica is found in the middle layer of oyster shells. Human functional signs include slow digestion, decreased metabolism, slow lymphatic circulation, calcium metabolism disorders (calcium distribution to the bones), water metabolism disorders, presenting behavioral signs with a tendency to apathetic responses, and slow-acting [20].

Application of *Calcarea carbonica* in vegetables is connected with plant deficiencies related to soil acidity problems, which cause atrophy in the root system, first observable in new shoots which are curled and chlorotic, exhibiting roots with a lack of fiber and a gelatinous appearance [21].

Experimentation with *Calcarea carbonica* would have potential use to reduce apical rot disease in tomato plants [22]. In a pilot study, the authors found that plants sprayed with this drug at a dilution of 50CH exhibited higher contents of potassium compared to non-sprayed plants, which can be

beneficial to this plant, considering the importance of this element to the plant's ion balance and water state, ripening and quality of fruits. This medicine can also affect calcium physiology, improving the firmness of tomato fruits [23].

Calcarea carbonica in 24CH dynamization can be associated with a decreased production of ethylene in tomatoes, which makes them take more time to reach the fully ripened point for tomato sauce [24]. Increases in lettuce seed germination with a certain toxic level of aluminum were also found using this medicine [25].

Sulphur is a mineral of the metalloid family combined with metals such as sulfide or sulfate and found in significant amounts in environments close to some volcanoes. *Sulphur* is related to behavioral signs in individuals that eat little but have a strong appetite. As general signs, these individuals tend to skin disorders, thinness, and weakness even with a good appetite. Functional signs indicate a disturbed assimilation metabolism [20].

Sulphur medicine has a similarity with various diseases and is recommended for all types of eruptions and weakened tissues, being more efficient in controlling weed plants, pests, and diseases [26]. However, in experiments using this remedy in vegetables, it was possible to observe its effect, especially in plant growth.

Studies carried out with *Lycopersicon esculentum* Mill (cherry tomato) with the application of *Sulphur* in 24CH dynamization enabled a significant increase in plant height compared to the control group [27]. In an experiment conducted with this drug at 6CH and 30CH dynamization in a broccoli (*Brassica oleraceae* L. var. *italica*) crop, the 6CH dynamization enabled an increase of dry matter and root sizes and in the shoot diameter [28]. The positive effect of *Sulphur* in the plant height of radish (*Raphanus sativus* L.) was found with the application of 12CH dynamization [29]. *Sulphur* application also exhibited benefits in the plant height of lettuce (*Lactuca sativa* L.) [30] and goldenberry (*Physalis peruviana* L.) [31].

Dilution

In order to ensure homeopathicity between the diseased organism and the remedy, it is necessary that the symptoms produced by the remedy not only represent the organism symptoms but also reveal asymmetry with the level of vital energy and the activity of the morbid state [32]. The chosen dilution (30CH) was based on the scale of pathologies of the symptoms manifested by the vegetables and the environment, which were found to vary between acute and chronic symptoms.

During bell pepper cultivation, the most evident acute symptoms were general precocity, subinvolution, discontentment with the environment, growth delay, and defoliation by insects. Later it was observed rot injuries and ulcerations in the fruits. Apparently, these symptoms emerged in the plants during cultivation at a specific time and location, influenced by the cultivation environment. For the chronic symptoms, it was possible to establish a relationship with the plant epigenetic characteristics, such as body identity confusion and others manifested by the environment, such as an increased appetite (lack of soil nutrients) and aggravation of the symptoms by humidity.

Determining the degree of vital energy corresponding to the period when the plants were cultivated, old and new symptoms were revealed. Therefore, the dilution of 30CH was selected, considered transitional. In acute cases and lesion injury, a moderate stimulation is convenient, between 6CH and 12CH potencies, and for chronic, functional, and psychic cases, potencies over 30CH. The choice of the best dilution is a matter of experience and observation and not of "law", strengthening the

assumption that the greater the certainty about the similitude of the remedy selected for the therapy, the higher its dilution should be. [33].

CONCLUSIONS

The analogy of the symptoms observed in vegetables with those described in the Homeopathy Materia Medica and homeopathic repertorization seems to be a promising pathway for curing plant diseases with homeopathy. The choice of the adequate homeopathic remedy for agricultural cultivations must represent the symptomatic totality of the plants being cultivated and the environment.

The authors declare that there is no conflict of interest.

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