



RESEARCH ARTICLE

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DETERMINATION OF THE TOXICITY OF PHYTOTHERAPIC FORMULATIONS USED AS ENERGISERS MARKED IN ESTABLISHMENTS OF VICTORY – CONQUEST NATURAL PRODUCTS

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ARTICLE INFO

Article History:

Received 07th August, 2019
Received in revised form
29th September, 2019
Accepted 03rd October, 2019
Published online 30th November, 2019

Key Words:

Allium cepa.; Weight loss;
Herbal medicines; Toxicity.

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ABSTRACT

Obesity control is of public health interest in Brazil and the use of herbal formulations is an acceptable therapeutic resource as they are considered safe, effective and less harmful to health. In this context, the objective of the study was to evaluate the toxicity of six phytotherapeutic formulations with weight loss potential commercialized in the city of Vitória da Conquista - Bahia, using the bioassay *Allium cepa*. Formulations marketed in capsules from six different manufacturers and the methodology performed in quintuplicate were analyzed. The treatments were compared with the negative control for root growth, which were submitted to variance analysis and compared by Tukey test at 5% probability. The results showed significant effect for root length phytotherapeutic formulations of the selected bulbs for toxicity analysis by the F test at 5% probability. Among the evaluated formulations, a shorter root length was observed for formulation A3, with an average growth of 0.38 cm. The toxic potential of this formulation may be related to its composition, however more studies are needed to ensure the use of these slimming herbal medicines by consumers.

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Citation: Larissa de Araújo Moura, Stela Maria Pires Matos, Beatriz Rocha Sousa, Rafael Cerqueira Campos Luna, Stenio Fernando Pimentel Duarte, Adriana Vanderlei do Amorim, Davi Novaes Ladeia Fogaça, 2019. "Determination of the toxicity of phytotherapeutic formulations used as energisers marked in establishments of victory – conquest natural products", *International Journal of Development Research*, 09, (11), 32053-32056.

INTRODUCTION

Obesity control is of public health interest, since in Brazil and worldwide there is a constant growth in the obesity population (Santana; Pires; Schuengue, 2018) and this is associated with the risk of development of diseases such as diabetes, heart disease, cancer and other clinical complications (Araújo; Maynard, 2019 and Verbinen; Oliveira, 2018). For such there are several forms of therapeutic resource such as dietary reeducation with balanced diet, increase in daily practice of physical activities, use of medicines and in some cases intervention through surgical procedures (Vieira; Medeiros, 2019). The drug is currently one of the most used resources,

acting as a helper during the weight loss process through the action of appetite suppressant, metabolism accelerator, antioxidant activity and diuretic and lipolytic action (Rodrigues; Miceli, 2017). Among the medicines available for weight reduction purposes, herbal formulations are well accepted in the population because they are known as natural giving a perception of a safe, effective and less harmful to health (Campos *et al.*, 2016) thus justifying the fact that about 82% of the Brazilian population uses some herbal medicine (Siepe, 2019). Herbal medicines are named by RDC No. 26, of May 13, 2014, as those obtained exclusively from active raw materials and may come from part of the plant such as leaves, stem, flowers and roots or from the whole vegetable. In 2006

the Ministry of Health published the Program of Integrative and Complementary Practices (PNPIC) where it includes herbal medicine as an alternative in the treatment of different pathologies and thus herbal medicines have been applied in various treatments in order to prevent and recover health. patient through natural resources (Brazil, 2006). Phytotherapy, which is defined as the therapy of diseases with the use of plants (Rodrigues, 2014) is a good option to choose a method to aid in weight reduction and obesity control because they have specific actions as appetite suppressant, metabolism accelerator, antioxidant activity and diuretic and lipolytic action, as well as those of synthetic origin and still have the advantage of being marketed in a more affordable value and have a low toxicological index (Rodrigues; Miceli, 2017 and VERBINEN; OLIVEIRA, 2018). The media has been a great incentive for the consumption of substances and formulations that help in weight reduction and consequent reach of a healthy, lean body (Araújo; Maynard, 2019, Louzano; Maleski; Lima, 2018 and Zambon, 2018). This becomes a worrying factor because this incentive coupled with the desire for short-term weight loss can trigger an exacerbated drug consumption and even if they are herbal they are passive of toxic effects and their use must be accompanied by a qualified health professional (Verbinen Oliveira, 2018 and Vieira; Medeiros, 2019).

Discussing the increasing acceptance and practice of use of herbal medicines toxicological tests are relevant to have a better knowledge of herbal medicine (Fernandes; Félix; Nobre, 2016). Within this context, the toxicity of six phytotherapeutic formulations, commercialized in natural products houses located in the city of Vitória da Conquista - Bahia, was evaluated, with potential weight loss through the bioassay methodology *Allium cepa*.

MATERIALS AND METHODS

The study was carried out in the Chemistry and Microbiology laboratories of the Independent Faculty of the Northeast - FAINOR, and six samples from different manufacturers of phytotherapeutic formulations sold in weight loss capsules were analyzed. As a criterion of choice the samples contained the minimum of two common substances in their composition that are described in figure 1. These samples were acquired in commercial establishments of natural products located in the commercial center of Vitória da Conquista - BA, in three different time periods. so that different lots were obtained, guaranteeing the repetition of the analyzes performed and providing an estimate of the experimental error. *Allium cepa* bulbs used in the bioassay were commercially purchased from

Figure 1. Composition of the samples tested

A1*	A2*	A3*	A4*
Avocado	Plum	Sacred Cascara	Safflower
Artichoke	Banana	Horsetail	Chia
Angelica	Eggplant	Vesicular Fucus	Goji berry
Chile Bilberry	Carrot	Gelatine	Green life
Cashew tree	Green tea	Passionflower powder	Linseed
Carobinha	Chia		Avocado Oil
Carqueja	Collagen		Chitosan
Holy shell	Golden Flaxseed Flour		
Horsetail	White bean		
Asian Centella	Gelatine		
Green tea	Goji berry		
Leather hat	Hibiscus		
Chia	Orange		
Collagen	Lemon		
Dandelion	Apple		
Douradinha	Papaya		
Buggy weed	Passion fruit		
Holy thorn	Oliveira		
Gelatine	Soy		
Goji berry	Grape		
Focus Soursop			
Hibiscus			
Purple IPE			
Jambolan			
Jatoba			
Jurubeba			
White mallow			
Passion fruit			
Melissa			
Iron stick			
Porongaba			
Stone breaker			
Parsley Parsley			
Senna			
Seven bleed			
Sucupira			
Suncho Lemon Balm			
Canopy			
Vesicles			
		A5*	A6*
		Eggplant	Carqueja
		Gelatine	Green tea
		Psyllium	
		Chitosan	
		Spirulina	

Source: information obtained from the sample packaging label.

* A1 (sample 1) * A2 (sample 2) * A3 (sample 3) * A4 (sample 4) * A5 (sample 5) * A6 (sample 6).

a single supplier at the Vitória da Conquista - BA Supply Center. The bulbs had similar sizes, healthy appearance, no signs of rot and other variations and were properly sanitized and thus considered appropriate for the experiment. The formulations selected for the determination of toxicity were identified as A1, A2, A3, A4, A5 and A6, to ensure the confidentiality of the brands involved in the study, all of them composed of 500 mg each capsule and with dosage recommended by the manufacturer of 6 capsules. per day. The phytotherapeutic formulations were diluted in distilled water at a concentration of 3 mg.mL⁻¹ and the negative control composed of distilled water. The capsules were cautiously opened manually and their internal contents transferred, without loss, to a 1 liter beaker containing distilled water where it was kept under magnetic stirring at room temperature. For each herbal medicine (A1, A2, A3, A4, A5 and A6) the procedure was repeated changing only the lot of the herbal formulation in order to obtain greater reliability in the study of toxicity determination. The obtained solution was transferred to 5 200 mL sedimentation chalices where the bulbs *Allium* previously prepared cepa were submerged with the aid of wooden sticks and the roots were immersed in the solution for a period of 48 hours, with replacement of volume after 24 hours when needed. After 48 hours, the roots of the bulbs were measured with the aid of a metric ruler to analyze their growth according to concentration and formulation, according to the methodology proposed by de Fiskesjo (1985) and adapted by Barbério (2011). Sample analyzes were performed in quintuplicate and each treatment was compared with the negative root growth control. The occurrence of toxicity was considered from the inhibition of root development. The results were analyzed by ANOVA and the means compared by Tukey test with 5% probability, using the SAEG 9.1 statistical programs.

RESULTS AND DISCUSSION

The results were statistically evaluated by the SAEG 9.1 program, and the summary analysis of variance is shown in Table 1. According to the evaluation performed, it was observed that there was a significant effect for phytotherapeutic formulations under root length of bulbs selected for toxicity analysis by the F test at 5% probability.

Table 1. Summary of variance analysis of root length in onion bulbs submitted to immersion in different drugs. Vitória da Conquista-BA, 2019

FV	GL	Medium Squares
		Root Length
Phytotherapeutic Formulations	6	0.050654 *
Residue	14	0.019067
CV		26.12

*significant ($p \leq 5\%$) by the "F" test.

Table 2. Average root length in onion bulbs immersed in solution with different herbal formulations. Vitória da Conquista-BA, 2019

Treatments	Root Length (cm)
Control	0.786 a
A1	0.446 ab
A2	0.506 ab
A3	0.380 b
A4	0.466 ab
A5	0.560 ab
A6	0.553 ab

Averages followed by the same letter in each column do not differ from each other, by the Tukey test ($p \leq 5\%$).

Phytotherapeutic formulations were compared for their toxicity (Table 2), determined by the root growth of the onion bulb, in which the formulation A3 was observed. obtained a shorter root length (0.38 cm) compared to the control treatment (0.786 cm), that is, they presented a higher phytotoxic potential than the other formulations. The other formulations did not differ from each other at 5% probability by Tukey test. Lower root lengths of onion bulb (Fiskesjö, 1985) when emerged in solutions indicate phytotoxic potential of the evaluated formulation (Palacio *et al.*, 2013). The toxicity found in the herbal formulation A3 may be related to the components present in this formulation. These include the Sacred Cascara (*Rhamnuspurshiana*) and Fucus (*Fucusvesiculosus*), which present imminent toxicity when offered at high doses (Lôbo, 2012; Ednatureza, 2019; Turolla and Nascimento, 2006), which corroborates with observed results. The Sacred Cascara (*Rhamnuspurshiana*) has laxative properties and its frequent use can lead to severe mineral and vitamin imbalance, as well as nutritional dysfunctions that can lead to severe cases of diarrhea, malnutrition and dehydration (Lôbo, 2012).

The Fucus (*Fucusvesiculosus*) present in formulation A3 is a seaweed able to aid in weight loss, as it has properties capable of reducing glycemic levels in addition to assisting in the process of body weight reduction for people with thyroid dysfunction. However, its uncontrolled use can lead to poisoning due to prolonged use of iodine present in its composition, due to thyroid hyperactivity, characterized by anxiety, insomnia, tachycardia and palpitation (Boorhem and Lage, 2013). In addition to the components mentioned above, Passiflora (*Passiflora sp.*), Also present in compound A3, has positive actions such as central nervous system action, antioxidant, anti-inflammatory and anxiolytic action, besides being a fiber-rich nutritional food (Arruda, 2015). On the other hand, a study by Coqueiro, Pereira and Galante (2016) shows that some components present in Passiflora leaves and fruits can be toxic in chronic use, resulting in respiratory changes, nausea, vomiting, vertigo, diarrhea and weakness.

Final considerations

The indiscriminate use of herbal formulations, clinging to the fact that they are natural medicines, can cause harm to the health of their consumers. Given the study, it was observed that only one of the samples evaluated could be considered toxic when compared to the negative control, composed of distilled water, through the methodology applied and intrinsic to this herbal medicine three substances present in its composition toxic relevance mainly in chronic use. Thus, the remaining five herbal medicines were considered safe as to the daily dose toxicity recommended by the manufacturer. Considering the wide availability in the market of herbal remedies for weight reduction or control purposes, it is feasible that further studies be applied to test the toxicity to ensure the consumer more safe consumption of herbal remedies. Further studies are also needed to gather more information about the ingredients disposed for therapeutic use allowing better clarification to users and health professionals about the safety of the use of herbal medicines in general.

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