



Research Paper

POTENTIAL OF THE CRUDE EXTRACT OF ALFAVACA LEAVES (*Ocimum gratissimum*) IN THE TREATMENT OF SEEDS OF ITS OWN SPECIES

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Abstract

This study aimed to evaluate the crude extract of Alfavaca leaves (*Ocimum gratissimum*) in the treatment of seeds of its own species. Two tests, the germination test on paper and the emergence test in sand were made. For each test conducted, from crude extracts of Alfavaca leaves, there was obtained five concentrations (0, 25, 50, 75 and 100%) by dilution with distilled water, addition of extract concentrations were obtained two treatments, water sanitary 2% and commercial fungicide (Captan, 2%), thus a total of seven treatments, each treatment consisted of four replicates. To perform both tests, the experimental design was completely randomized with four replicates containing 50 seeds each. The variables were: percentage and germination and emergence speed index. Data were submitted to analysis of variance, and the significant factors for the F test had their levels compared by Tukey test at 5%. For germination of seeds treated Alfavaca, it was observed that there was no statistical difference between treatments ranging from 27.5 to 31.5%, except treatment with 25% extract, which obtained 21.5% germination. Regarding the germination rate index, only the seeds treated with chemical fungicides different from the others, with slower germination. Regarding the percentage and emergence speed index, it was observed that the treatment 75% extract showed higher percentage and emergence speed index. But the water treatment did not differ statistically from the treatment 75% extract, showing also higher emergence rate, when compared with others. It follows that it was not possible to observe very effectively in the crude extract of Alfavaca leaves for treating seeds of the species itself, however, when compared to the commercial fungicide, the extract showed the best results.

Key words: *Ocimum gratissimum*, alternative fungicide, medicinal plant, early development, seed treatment.

INTRODUCTION

Ocimum gratissimum L. belonging to the Labiatae family and popularly known as Alfavaca, is a woody, erect subshrub, up to 1.0 m high and can be found throughout Brazil [1].

This species has great medicinal importance and so is widely used in Brazil as complementary to allopathy medicine, and its leaves are used in the preparation of cold

medicine baths, carminative, diuretic teas and sudorificos [2]. In addition, its leaves have bioactive compounds with inhibitory action on highly pathogenic organisms [3, 4].

With the advancement of studies and proof of the potential of this species, research on the productivity of the plant extract and essential oil have been found in the literature [5, 6, 7], however, it is not found the use of extract and oil of *Alfavaca* leaves for the treatment of their own seeds.

[8] Investigated the fungal occurrence of seeds of medicinal plants, aromatic and culinary plants of Lamiaceae family in 117 samples of seeds. [9] corroborate this information, they also found the incidence of fungal *Alfavaca* seeds. According to [10], the germination rate of seeds of this species from the nursery of medicinal plants Univap is very low, low germination verified these seeds may be due to fungal infection, as this is one of the factors that most influence the germination seeds.

In this sense, the present study sought to evaluate the crude extract of leaves *Ocimum gratissimum* to treat seeds of its own species.

MATERIALS AND METHODS

The experiment was conducted at the Seed Laboratory of the Federal University of Mato Grosso. Mature leaves of the species of *Alfavaca* were collected for preparation of the crude extract.

After collection, the leaves were placed for 5 minutes in containers with 20 ml of sodium hypochlorite diluted in 1000 ml of distilled water to be disinfected were then washed in pure distilled water to remove the sodium hypochlorite residue, and dry with paper towels. After the leaves washing procedure was initiated crude extract preparation process in which the sheets were ground in a blender at a ratio of 50g sheets to 500mL of distilled water. The extracts were filtered through filter paper and stored in glass containers (amber) until bioassays were assembled.

two tests, the pattern of germination and emergence test were made. For each test run from the crude extract was obtained five concentrations (0, 25, 50, 75 and 100%) by dilution with distilled water, these constitute five treatments, in addition to the extract concentrations were obtained two treatments, water sanitary 2% and commercial fungicide (Captan, 2%), thus a total of seven treatments, each treatment consisted of four replicates.

To perform both tests, the experimental design was completely randomized with four replicates containing 50 seeds each. The seeds from each treatment were immersed in respective solutions for a period of 10 minutes, after this period, were placed to dry on sterile filter paper. Later, the seeds were germinated in boxes like "gerbox".

For the germination test on paper, they were used two sterile pieces of filter paper, moistened with distilled water in the amount of two and half times the mass of the dry substrate; then the plates were sealed with plastic film, closed and maintained in the chamber BOD to 25 ° C and 12 hour photoperiod.

The evaluation of germination was performed daily for 30 days, considering germinated the seeds that presented radicle protrusion with 2 mm. The variables were: germination percentage and speed index, calculated by the formula [11] by the equation: $IVG = (G1 / G2 + N1 / N2 + \dots + Gn / Nn)$, where: IVG = index germination speed; G1, G2, Gn = number of seeds germinated in the first, the second ... and the last count; N1, N2, Nn = number of days from sowing to first, second ... and last count.

For emergency washed sand test was used because it has less interaction with the substances under test. The sand was sterilized in an oven at 200 ° C for 2 hours as

[12]. It was weighed amount of sand supported on gerbox and then was made to calculate the amount of water to be added in the sand. Was weighed 500 g of sand, it was placed on a filter paper, commercial coffee percolator type, then was added a predetermined amount of water. After 15 minutes, any excess water was drained, this volume was given to facilitate the calculation, by difference, the amount of water that was retained in the sand (100%). This quantity was calculated that 60% corresponded to the amount of water was added to 500 g of sand, then this amount was adjusted for the amount of sand in the germination boxes. After the packing sand in the container, planting of the treated seed has been performed, then the boxes were sealed with plastic film, closed and maintained in the chamber BOD to 25 ° C and 12 hour photoperiod.

daily readings of the number of emerged seedlings were held for 30 days, considering how the emerged that showed the cotyledon petiole above the substrate. After this period, it was determined the percentage and emergence speed index (ESI) calculated according to the formula [11] by the equation: $IVE = (E1 / E2 + N1 / N2 + \dots + En / Nn)$ where: IVE = emergency speed; E1, E2, En = number of emerged seedlings on the first, the second ... and the last count; N1, N2, Nn = number of days from sowing to first, second ... and last count.

Data were submitted to analysis of variance, and the significant factors for the F test had their levels compared by Tukey test at 5% probability in the computer program SISVAR [13].

RESULTS AND DISCUSSION

The germination of seeds Alfavaca started fifth and finished the twenty-eighth day after sowing the evaluated treatments.

According to [14] to evaluate the Alfavaca seed germination at different temperatures, it was found that the germination was initiated at 10 days and scored up to 35 days after sowing.

Table 1 shows the percentage and speed index (GSI) of germination Alfavacaseeds. There was no statistical difference between treatments ranging from 27.5 to 31.5% of germinated seeds, except treatment with 25% extract, which obtained 21.5% germination.

Table 1 - Percentage and speed index (GSI) of germination of seedlings Alfavaca (*Ocimum gratissimum*).

TREATMENT	GERMINATION (%)	IVG
Water	27,50* ab	1,93 ab
25% extract	21,50 b	1,75 ab
50% extract	29,00 ab	2,54 ab
75% extract	30,00 ab	2,61 ab
100% extract	31,00 ab	2,78 a
Hypochlorite (2%) fungicide	31,5 a	2,36 ab
	23,5 ab	1,67 b
DMS	9,63	1,04
CV (%)	14,87	20,01

*Means followed by the same letter in the column do not differ by Tukey test (P>0,05).

Superior results were found by [6] evaluated this new species harvested with 52%, but with time storage, the germination percentage increased to 60%. These authors report that the low percentage of germination in *O. gratissimum* has been

related to the large production of empty seeds, about 52%. [15] also report that low germination potential and viability of the seeds of this plant occur due to the deterioration and lack of internal tissues.

Regarding the germination rate index, only the seeds treated with chemical fungicides different from the others, with slower germination.

The emergence of Alfavaca seedlings started sixth and finished the seventeenth day after sowing the evaluated treatments.

Table 2 shows the percentage and emergence speed index of Alfavaca seedlings. It was observed that the treatment 75% extract showed higher percentage and emergence speed index. But the water treatment was not significantly different treatment 75%, with also higher speed compared to the others. There was no seedling emergence in the treatment 100% extract.

In this experiment, the highest percentage of emergency Alfavaca seedling was 27%, lower results found by the [15] evaluated the seedling emergence of this species. These authors are 19-42% of emerged seedlings.

Table 2 - Percentage and speed index (EVI) of seedling emergence of Alfavaca(*Ocimum gratissimum*)

TREATMENT	EMERGENCY (%)	IVE
Water	21,50 b	0,95 ab
25% extract	16,50 bc	0,69 bc
50% extract	16,00 c	0,57 cd
75% extract	27,00 a	1,09 a
100% extract	0,00 e	0,0 e
Hypochlorite (2%)	14,00 c	0,57 cd
Fungicide	7,00 d	0,32 d
DMS	5,04	0,29
CV (%)	14,80	20,98

*Means followed by the same letter in the column do not differ by Tukey test ($P>0,05$).

In this work it was observed that the Alfavaca leaf extract was not effective in treating seed of the plant itself, since there was a high incidence of fungi on non-germinated seeds. Different results were found by [16] to assess the extract and Alfavacaoil seed treatment in wheat. These authors reported the treatment efficiency of the seeds of this plant, either as the essential oil or as extract.

CONCLUSIONS

It follows that it was not possible to observe very effectively in the crude extract of Alfavaca(*Ocimum gratissimum*) leaves for treating seeds of its own species, however, when compared to the commercial fungicide, the extract showed the best results.

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