



Research Paper

## Emergence of seedlings of *Coriandrum sativum* L. submitted to different proportions of organic substrates

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**ABSTRACT:** The objective of this work was to evaluate the emergence of *Coriandrum sativum* L. seedlings based on manure and plant soil levels. The experiment was carried out in a greenhouse, in a completely randomized design, evaluating five proportions of fertilizer in three replications. For the preparation of the trays, vegetable soil (VS) and goat manure (GM) tanned were used. Four seeds of the cultivar Verdão were placed, per cell, at 0.5 cm depth. Seedlings were evaluated daily from the 6th day after sowing, where the emergence of the first cotyledon leaves was observed, and the percentage, emergence speed and the emergence speed index were calculated. It was observed that the use of 75% of vegetable soil added 25% of goat manure, promoted the best results in the parameters evaluated, indicating the best proportion for the emergence of coriander seedlings.

**KEYWORDS:** Horticulture; germination; manure.

Received 24 November, 2020; Accepted 08 December, 2020 © The author(s) 2020.

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### I. INTRODUCTION

Coriander (*Coriandrum sativum* L.) is a plant originating from the Mediterranean coast region (southern Europe, the Middle East and North Africa), adapted to regions with a hot climate, between 20 to 25 °C, and intolerant to low temperatures. This plant that reaches between 15 to 50 cm in height has leaves with a bright green color at the top [1].

It is a leafy vegetable grown and consumed almost everywhere in the world. In the northeast region of Brazil, it is exploited almost exclusively for the production of green leaves. It is rich in vitamin A, B1, B2, C, with little known medicinal value, where tea is indicated to relieve stomach pain and compresses made with its leaves give relief to inflammation and joint pain [2].

Even with the commercial prominence of this culture, few studies aim to improve its production techniques. Most of the plantations are carried out in home gardens, which are carried out by small producers, using family labor, empirically and with rudimentary technology, which contributes to a low yield and consequently discourages production [2].

In Brazil, coriander is widely consumed as a condiment. It is likely that, in market value, it will be the second leafy vegetable in importance to Brazil, second only to lettuce. In general, it is cultivated throughout the year and by a large number of producers, playing a very important social role, mainly in the North and Northeast regions of Brazil [3][4] where its cultivation is carried out predominantly in the peripheral areas of cities (community gardens), exclusively for the production of green pasta [5].

Considered one of the most influential factors, especially in the germination and emergence phase, special attention should be given to the choice of substrate, whose physical, chemical and biological characteristics must offer the best conditions so that there is an excellent germination and the best ones are favored conditions for excellent germination and favoring seedling development [6][7].

A good substrate provides sufficient water retention for germination, in addition to allowing seedlings to emerge, together with attributes of good aeration to allow diffusion of oxygen to the roots, low resistance to root penetration and good resistance to loss of structure [8].

According to [9] there is a need to scientifically verify which substrate or combinations of substrates makes it possible to obtain better quality seedlings for a given plant species.

In this context, the objective of this work was to evaluate different proportions of goat manure and vegetal soil, aiming at the emergence of coriander seedlings.

## II. MATERIAL AND METHODS

The experiment was carry out in a greenhouse with a sombrite cover with 50% light reduction, at the Aromatic and Medicinal Plants Nucleus of the Agricultural Sciences Center, of the Federal University of Piauí - UFPI, in Teresina - PI, Brazil, located at an altitude of 72m, located at 5 ° 5'11 "south latitude and 42 ° 48'42" west longitude of the Greenwich meridian [10].

The region's climate is Aw 'type, with summer and autumn rains and average annual rainfall around 1.330mm, according to [11].

The cultivar used in the experiment was Verdão. It is an early cultivar, with a cycle of 30 to 40 days. The plant is quite vigorous, with dark green leaves, with excellent rusticity and good resistance to foliage diseases.

The experimental design used was in randomized blocks, with 05 treatments and 03 repetitions. The treatments consisted of different levels of goat manure (GM) and vegetable soil (VS): 100% of vegetable soil (VS) + 0% of goat manure (GM); 75% vegetable soil (VS) + 25% goat manure (GM); 50% vegetable land (VS) + 50% goat manure (GM); 25% vegetable soil (VS)+ 75% goat manure (GM) and 0% vegetable soil (VS) and 100% goat manure (GM).

The experiment was install in expanded polystyrene trays with 72 cells. After preparing the trays, sowing proceeded, placing four seeds per cell at a depth of 1.5 cm. Irrigation is carried out using a manual watering can, twice a day, in the morning and afternoon shifts until the end of the research.

Seedlings were evaluate daily from the 1st day after emergence (which happened on the 6th day after planting), where the emergence of the first cotyledonary leaves was observed, with the number of emerged seedlings being counted daily, being carried out until the 12th day when no emergency was observed. Seedlings with totally free and normal cotyledons were considere emerged.

From this, the emergency percentage (PE) was calculate, with a formula suggested by [12].

$$P\% = (NP/NC) \times 100$$

Where:

P%: Percentage of emergency.

NP: Number of plants emerged.

NC: Number of cells planted.

The emergence speed (VE) and the emergence speed index (IVE) were calculated using the equations suggested by [13] and [14], respectively.

$$VE = (E1 \times N1) + (E2 \times N2) + \dots (En \times Nn) / E1 + E2 + \dots En;$$

Where:

VE: Emergency speed (days);

E1: Accumulated number of cells emerged on the first day;

N1: First counting day;

En: Accumulated number of cells emerged;

Nn: Number of days counted after sowing.

$$IVE = E1 / N1 + E2 / N2 + \dots En / Nn;$$

Where:

IVE: Emergency speed index

E1: Number of cells emerged on the first day;

N1: Accumulated number of cells emerged;

En: Accumulated number of cells emerged;

Nn: Number of days counted after sowing.

Statistical analyzes were performed using the statistical program ESTAT.

### III. RESULTS AND DISCUSSIONS

Table 01 shows the averages of emergence percentage, emergence speed and emergence speed index of coriander seedlings as a function of different proportions of substrates. According to the F test ( $p \leq 0.05$ ), significant differences were found between the parameters studied and the proportions of substrates studied.

**Table 01.** Emergency percentage (E.P.), Emergency speed (E. S.) and Emergency speed index (E.S.I.) in coriander seedlings as a function of five substrate proportions. VS (vegetal soil); GM (goat manure)

SUBSTRATES	P.E. (%)	VE (Dias)	IVE
100% VS + 0% GM	76,27 a	9,23 c	4,04ab
75%VS+ 25% GM	71,17a	5,44 a	6,21a
50%VS + 50% GM	55,84 c	6,70 b	2,82b
25%VS + 75% GM	53,53 c	6,57 b	2,47b
0%VS+ 100%GM	65,90 b	8,74 c	3,40b
F	3,50 NS	0,77	9,78
CV (%)	14,00	1,09	12,6
MSD	5,20		2,31

CV: coefficient of variation; MSD: minimum significant difference. Means followed by the same letter in the column do not differ statistically from each other by the Tuckey test at 5% probability.

The percentage of emergence of coriander seedlings was statistically better in trays with 75% vegetable soil and 25% goat manure. [15], evaluating coriander seeds Verdão, observed a percentage of emergence of up to 62.5% in substrate black earth. According to the authors, greater amounts of organic vegetable matter are capable of accumulating greater humidity, which contributes to germination. The aeration caused by these materials, help in the emergence of the seedling, in less days.

For the emergence speed, variable that registers the maximum number of seedlings emerged in the shortest time, it was observe that the proportion of 75% of VS + 25% GM caused greater seedling emergence in less days. This stems from the same reasons already mentioned for the emergency percentage.

According to [16], the faster the seed germination and the immediate emergence of the seedlings, the shorter the time that they will be under adverse conditions, passing through the initial stages of development more quickly.

The seedling emergence speed index determines the maximum emergence per day. Thus, the emergency speed index observed in the study had a better performance in the proportion 75% VS + 25% GM, but it did not differ from the treatment 100% vegetal soil.

Different responses to the various types of substrates can be observed in [17] evaluating substrates for seed germination and development of moringa seedlings, observed that the use of sand was the best for seed germination. The mixture of 75% VS and 25% GM provided taller seedlings with a greater number of leaves, however, the mixture 75% VS and 25% GM caused a decrease in the number of leaves and root length, confirming the results obtained in this work.

### IV. CONCLUSION

For the percentage of emergency, emergency speed and emergency speed index of coriander seedlings, the use of 75% of vegetable soil plus 25% of goat manure is indicate as the best proportion.

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Mírya Grazielle Tôrres Portela. "Emergence of seedlings of *Coriandrum sativum* L. submitted to different proportions of organic substrates." *Quest Journal of Research in Agriculture and Animal Science*, vol. 07, no. 05, 2020, pp. 11-14.