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# Quality of *Myracrodruon urundeuva* seedlings in different container sizes and organic compost proportion

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**Abstract**

*Myracrodruon urundeuva,* commonly known as black aroeira is a species regularly found in diverse Brazilian biomes, especially in the Caatinga. The species is a timber tree with great quality wood used extensively to construct buildings. The species has chemical components which confer high resistance and protection against pests, thus being used to prepare insecticides as well as cosmetics. Due to its diverse utilization and predatory exploration, the species has become an endangered species. Thus, the objective of this work was to evaluate the influence of organic compost and the size of the containers in the development of *M. urundeuva* seedlings. The experiment was performed in greenhouse in a factorial scheme 5 x 3, represented by 5 proportions of organic compost: soil (80, 60, 40, 20 and 0% of compost) and 3 container sizes (20x30, 18x22 and 12x18 cm), under a completely randomized statistical design with 5 replicates. The variables evaluated were: neck diameter; seedling height; number of leaves; length of the roots; dry weight of leaves; dry weight of stems; dry weight of the aerial portion; dry weight of roots; height/diameter ratio and Dickson's quality index. There was significant interaction between treatments for all variables evaluated. When analyzing the containers individually or interacting with compost proportion, the container with volume of 1.335 dm³ was the most adequate for production of aroeira seedlings. Concerning compost proportion alone, the proportion of 40% proportioned the best results for all the evaluated parameters.

**Keywords:** aroeira; caatinga; Dickson's quality; organic substrate; seedling production.
**Abbreviations:** CR_Length of roots; DC_Neck diameter; IQD_Dickson's Quality Index; H_Height; H/DC_Height/diameter ratio; MSC_Dry weight of stems; MSF_dry weight of aerial; MSPA_dry weight of the aerial portion; MSR_Dry weight of roots; MST_Total dry weight; NF_Number of leaves.

**Introduction**

Expansion of agriculture allied to timber extraction characterizes the main treat for native forest conservation. Caatinga is the third most degraded biome in Brazil, after the Atlantic Forest and the Cerrado, this biome is exclusive to the Brazilian territory, constituting about 10% of the national area (Myers et al., 2000; Moura, 2007; Souza et al., 2015).
Among the species found in the Caatinga *Myracrodruon urundeuva,* commonly known as black aroeira, cerrado'saroeira orhinterland's aroeira, has a high quality wood, considered as hardwood with a high density (1.19 g cm$^{-3}$) with good elasticity and very durable, considered as the most natural resistant species within the Brazilian flora (Rodriguez et al., 2017).
Due to their mechanical and chemical properties black aroeira is regularly used for construction purposes, in addition to its uses as a medicinal and foraging plant in the Northeastern region of the country. However, its commercial exploitation has been done illegally, being declared as an endangered species and being characterized as a vulnerable species by the Ministry of Environment (Brasil, 2008). In addition to the mechanical properties which form a physical barricade against pests, there is a chemical barrier constituted by substances produced by the plant, with a high quantity of phenolic products which classifies this wood as very rich in secondary metabolites (Queiroz et al., 2002), being these metabolites responsible by the wide natural resistance against chemical and biological degradation.
If face of this reality the study of production of seedlings of endangered species, such as black aroeira, is being carried out aiming the dissemination of the species within the biome and therefore, safeguarding its stability in the ecosystem and ultimately reestablishing environmental equilibrium. The success of seedlings utilization depends on its production, which has to render quality seedling that may resist adverse environmental conditions (Venturin et al.,

2000). Such quality has been reached through an adequate fertilization and substrate excellence. This species is commonly found in rich soils, once it is a nutritional demanding species and requires soil fertility amendment for its establishment, as well as the addition of macro and micronutrients when aiming the production of seedlings (Venturin et al., 2000). Therefore, the study of substrates which may promote good quality of *M. urundeuva* seedlings is required. The most popular substrates used for seedlings production are: decomposing pine-tree barks, coconut bark, rice straw and organic compost. Kratka and Correia (2015) verified that cattle manure, just as the organic compost, promoted better growth indices in *M. urundeuva* seedlings. Lima, et al. (2017) while studying the development of seedlings of *M. urundeuva,* using different organic residues at different concentrations, verified that addition of organic matter is important for the development of the species, being cattle manure and earthworm excrements the organic residues which showed the best results. In a general way, the production of seedlings must consider the container used, targeting the most inexpensive one which at the sum time may provide good plant development. Thus, it is assumed that in order to save and produce good quality seedlings, the best approach is to use a correct combination of substrate and adequate size of container. Studies have evaluated the performance of forest species' seedlings growing in different size containers, such as Carvalho Filho et al. (2004), whom verified the size of plastic bags has direct influence over the development of *Andira fraxinifolia* Benth. seedlings, promoting significant differences for variables of leaves and stem dry matter weight. Thus, the objective of the present work is to evaluate the development of aroeira (*Myracrodruon urundeuva*) seedlings under different proportion of substrates in black polyethylene bags of various volumes.

**Results and discussion**

***Morphological evaluations of Myracrodruon urundeuva plants***

Results of the variance analysis showed significant difference for all evaluated parameters. There was significant interaction between the proportion of organic compost and the size of container for the variables: number of leaves (NF), Dickson's quality index (IQD), dry weight of roots, aerial portion, leaves and total dry weight (MSR, MSPA, MSF, MST respectively). On the other hand, no significant interaction was observed for variables: height (H), stem diameter (DC), length of roots (CR) and height:diameter ratio (H/DC), representing that factors act independently over these variables (Supplementary Table 3).

Regarding variables H and DC, the proportion of organic compost:soil of 40:60 promoted an increment of 68.34 and 53.07%, respectively when compared to the treatment with only soil (Figure 1A and 1B). Demonstrating that until the dosage of 40:60 the compost promoted an increment of seedling development, declining in further proportion. Lima et al. (2017), while evaluating the development of aroeira under different proportions of organic residues verified that cattle manure influenced negatively the development of seedlings, due to the toxicity from an excess of nutrients in the organic components. Thus, a similar situation may have occurred in treatments with proportion organic compost:soil above 40:60, where the excess of micronutrients such as manganese and the excess of sodium may have promoted a reduction of seedling's development (Supplemntary Table 1). A common parameter used to evaluate seedling quality regarding their distribution equilibrium, that is to say, to verify if the height of a determined seedling is proportional to the stem diameter is the H:DC ratio. The lowe the ratio, more lignified wuld be the plant, therefore promoting a better adaptation capacity and survival in the field (Gomes et al., 2002). In the present study the lowest ratio was veruified in the treatment with only soil (0:100, compost:soil). This may be explained by the plant's morphology, which shows a thin and long stem under apropriate fertility conditions (Figure 1C). Regarding CR and MSC, the dosage of organic compost which provided better development was correspondent to approximately the proportion of 42:58 (compost:soil), with an increment of 58.85 and 68.91% respectively, when compared to the treatment without organic compost (Figure 2A and B). This fact shows the importance of organic compost in the radicular development of seedlings and therefore, higher biomas production, once a well-developed radicular system has greater capacity for water and nutrient absorption. Ariguchi et al. (2015) also demonstrated the importance of the use of organic substrates for the production of forest seedlings, in which they verified a better development of *Pterogyne nitens* seedlings in substrates containing tree prunings and trash residues, even being able to replace the commercial substrate. Kratka and Correia (2015), while studying different proportions and substrates for production of aroeira seedling verified that organic compost proportion obtained from sheep manure, cattle and equine bed, fresh vegetal residues and pruned tree and milled bamboo leaves, at a 25% dosage, promoted the best development of seedlings based on stem diameter, number of leaves and Dickson's quality index. In addition, they verified that proportion of 50 and 75% of organic compost were statistically equal to the control, when no fertilization was used, showing a high organic fertilization may also be inadequate for seedling production. Thus, it is evidenced the importance for studies aiming to identify the most adequate dosage for a determined species, always targeting the nutritional equilibrium. While evaluating the dry weight of leaves, higher values were observed when using containers of 2.090; 1.335 and 0.854 $dm^3$ at proportion of 31, 33 and 39% of organic compost respectively. Concerning IQD, a significant interaction between proportion of compost used and the volume of containers was observed. The 2.090 $dm^3$ container, at a dosage of organic compost of 76:24 (soil/compost), rendered the best results with a IQD value of 0.49. In the container of 1.335 $dm^3$ the recommended dosage was of 64:36 (soil/compost), with IQD of 0.45. In the smallest container, of 0.854 $dm^3$ the best dosage was of 62:38 (soil/compost), with IQD of 0.20. The result show that both containers, with 2.090 and 1.335 $dm^3$ capacity, may be recommended for the production of aroeira seedlings, but when using the 1,335 $dm^3$ container the quality of the substrate must be improved. Similar results were observed by Kratka and Correia (2015) verifying that plants of *M. urundeuva* cultivated in cattle manure promoted higher values of IQD, with similar values (0.52) to the present work (Figure 2 D).

Regarding the effect of containers, it was verified that the highest volume container, with 2.090 dm³, resulted in seedlings with higher mean values for the majority of the evaluated characteristics such as H, DC and MSC (Table 1). These results are similar to Ferreira et al. (2017), whom observed higher values for stem diameter in seedlings of *Mezila urusitauba* and *Acrocomia aculeata*in containers of 1.75 $dm^3$ (20x25cm). Poorter et al. (2012) conducted a survey of 65 studies in the literature that analyzed the effect of vessel size on plant growth and found that vessel size doubling increased biomass production by 43% on average, suggesting that reduced vessel growth is mainly related to a reduction in photosynthesis per leaf area unit, and not due to changes in leaf morphology or biomass allocation. However, it is important to note that the very large volume increase of the container can economically impair the conduction and therefore, these studies are important.

Regarding CR and the H:DC ratio, containers with 2.090 dm³ and 1.335 dm³ did not statistically differed, however they were superior to the container with 0.854 dm³. The H:DC ratio is very important to infer the quality of seedlings, once this value is associated with plant equilibrium, in addition to reflect the gathering of reserves, enable better fixation to the soil and reduce plant tumble. Mariotti et al. (2015) also observed in their studies that the use of larger containers (> 4.5 dm³) favors the development of *Quercus robur* L. and *Juglans regia* L. Akpo et al. (2014) studying the growth dynamics of *Elaeis guineenses* seedlings under different container substrates and sizes, found that the growth rates were influenced mainly by the volume of the containers, presenting an exponential growth over time, followed by the effect of the substrates , thus demonstrating how in the present study the importance of the appropriate choice of container volume for the production of quality seedlings and later favor their development in the field.

Evaluating MSPA showed a significant interaction between the proportions of organic compost and the size of the container. In container I the soil:compost proioportion which promoted a higher MSA was of 68:32, with mean values of 2.9 g $planta^{-1}$, an increment of 53.10% when compared to dosage zero. In container II the soil:compost proportion of 63:37 promoted the best development of seedlings, with an increment of 53.33% when compared with the treatment without organic compost. In container III, an increment of 91.93% of dry weight was verified when using the soil:compost proportion of 62:38 (Figure 3A).

Our results demonstrate that the smaller the container, the higher compost is needed in the substrate. This may be related with nutrients availability, since, as the container size is reduced, the quantity of substrate must be increased, in order to make nutrients available in adequate quantities for the plant development.

Regarding MSR, the organic compost proportions from 30:70 to 35:65 (soil:compost) promoted better results in all three containers evaluated with an increase of 84.03%, 65.00% and 55.02% for containers with 2.090; 1.335 and 0.854 dm³, respectively. Although proportions of 30:70 and 35:65 (soil:compost) are very close to each other, in term of plant response, plants cultivated in polyethylene bags with higher volume showed higher MSR (Figure 3B).

Different behavior was observed for MST according to each container size evaluated. In containers with the highest volume (2.090 dm³) the soil:compost proportion of 71:29 promoted an increment of 58.86% when compared to the treatment with soil only. Seedlings showed a better development, concerning dry matter, with the proportion of 66:34 (soil:compost) in the 1.335 dm³ container, with a production increment of 29%. In the smallest container the proportion of 65:35 (soil:compost) is the most recommended for production, based in the observed parameters (Figure 3C). Studies by Vaknin et al. (2009) demonstrated that eucalyptus plants grown in pots with higher volumetric capacity showed higher heights, with larger stem and canopy diameter, with high number of branches, and produced more leaves and, consequently, larger masses of dry matter, corroborating with the present work.

In the 2.090 dm³ container, the dosage of organic compost of approximate zero promoted the best results regarding to the number of leaves. In containers of 1.335 dm³ and 0.854 dm³ the dosage of 64:36 and 58:42 (soil:compost) promoted better development achieving an increment of 56.14 and 62.70% in the number of leaves, respectively (Figure 3D).

While evaluating MSPA the highest mean value was observed in the container of 2.090 dm³ when no organic compost was used. This may be related with the low nutrient contents in the soil (Supplemntary Table 2), once when a higher soil volume is supplied, the area for root exploitation increases, thus conferring a higher capacity to obtain nutrients which is reflected in higher values for MSPA. A similar phenomenon was observed for the proportion of 20% of organic compost. For proportions of 60:40 (soil:compost) containers with 2.090 dm³ and 1.335 dm³ were statistically equal and superior to the container with the lowest volume. For proportion of 40:60 and 20:80 (soil:compost) there was no difference between the treatments (Table 2). Carvalho Filho et al. (2004) while evaluating *Dinizia excela* seedling's production in different environments, substrates and containers, verified that independently from the organic fertilizer dosage in the substrate, the container with the higher volume (15x30 cm), resulted in plants with higher dry weight of the aerial portion.

Evaluating MSR under different proportion of organic compost, it was verified that for proportions of 100:0, 40:60 and 20:80 (soil:compost) no significant difference was observed between containers. For the proportion of 80:20 (soil:compost) the container with the higher volume was superior to the others. At the proportion of 60:40 the container with the lowest volume resulted in the lowest MSR when compared with the other treatments (Table 3). Cruz et al. (2016), while evaluating the production of *Spondias tuberosa* seedlings in different containers and substrates, verified that containers with 5 dm³, incorporated with 20% cattle manure, 20% of washed sand and 60% of hillside soil, are best fitted for production of seedlings of this species. On the other hand, when the lowest volume container of 1.9 dm³ was used, the dosage of cattle manure in the substrate increased to 30%, corroborating with the results obtained in the present study, whereas the container volume decreased the nutritional quality of the substrate has to be improved.

**Table 1.** Means of evaluated variables by container type, compared by the Tukey's testat 5% probability.

| Containers | Evaluated variables | | | | |
|---|---|---|---|---|---|
| | H (cm) | DC (cm) | H/DC | CR (cm) | MSC (g) |
| 2.090 dm³ | 23.34 a | 1.75 a | 7.57 a | 31.77 a | 0.78 a |
| 1.335 dm³ | 19.71 b | 2.60 b | 7.19 ab | 28.22 a | 0.40 b |
| 0.854 dm³ | 11.66 c | 1.75 c | 6.47 b | 21.62 b | 0.20 b |

Means followed by the same letter within the column did not statistically differ by the Tukey's test at 5% probability.

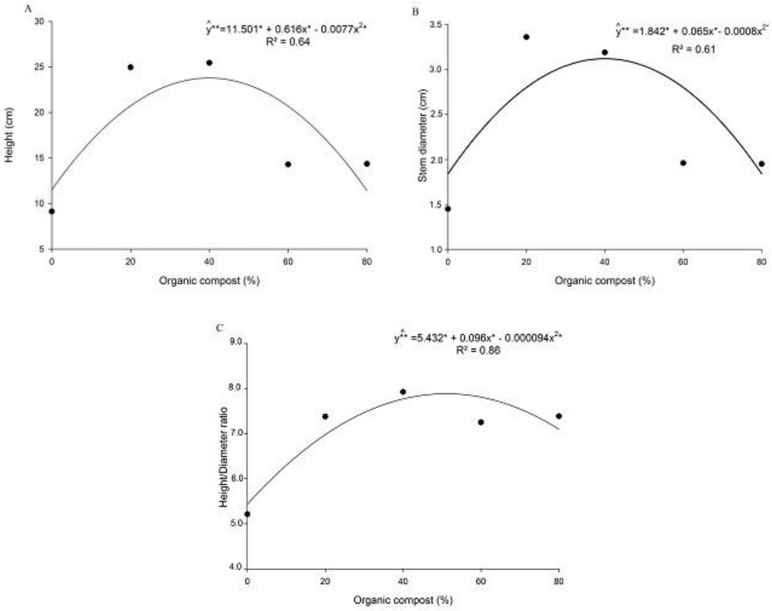


**Fig 1.** Morphological variables of *Myracrodruon urundeuva* plants under different proportions of organic compounds. (A) Plant height, (B) rod diameter and (C) height ratio: diameter.

**Table 2.** Mena values for dry weight of the aerial portion (g) evaluated under organic compost proportion by the Tukey é test at 5% probability.

| Containers | Proportion (%) | | | | |
|---|---|---|---|---|---|
| | 0 | 20 | 40 | 60 | 80 |
| 2.090 dm³ | 1.36 a | 3.92 a | 2.80 a | 0.87 a | 1.29 a |
| 1.335 dm³ | 0.57 ab | 2.72 b | 2.49 a | 0.82 a | 0.26 a |
| 0.854 dm³ | 0.075 b | 1.39 c | 0.80b | 0.38 a | 0.12 a |

Means followed by the same letter within the column are not statistically different by the Tukey's test at 5% de probability.

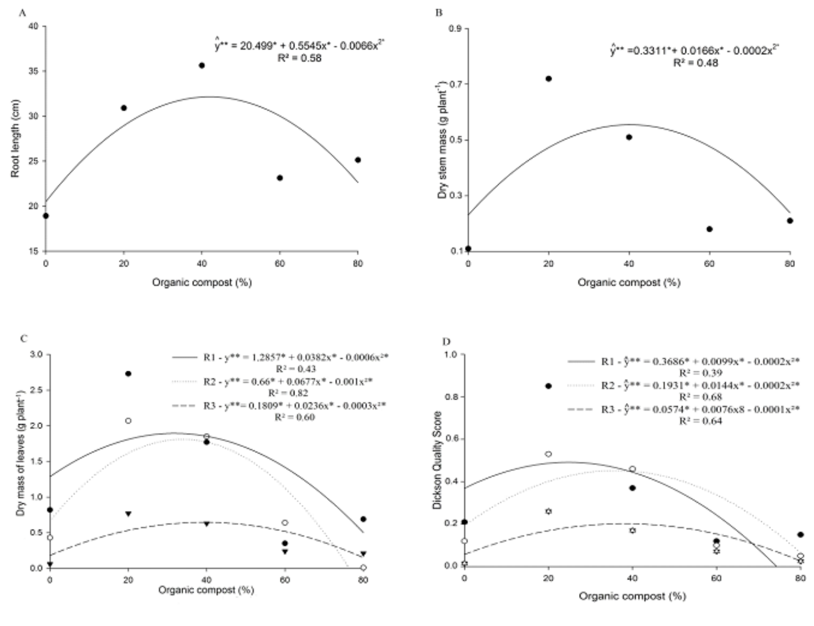


**Fig 2.** Morphological variables of *Myracrodruon urundeuva* plants under different proportions of organic compounds. (A) Root length, (B) dry weight of the stems, (C) dry weight of leaves and (D) Dickson quality score.

**Table 3.** Dry weight of roots under different organic compost proportion.

| Containers | Proportion (%) | | | | |
|---|---|---|---|---|---|
| | 0 | 20 | 40 | 60 | 80 |
| 2.090 dm³ | 0.60 a | 3.45 a | 1.25 ab | 0.35 a | 0.41 a |
| 1.335 dm³ | 0.57 a | 2.20 b | 1.61 a | 0.29 a | 0.29 a |
| 0.854 dm³ | 0.03 a | 0.91 c | 0.60 b | 0.24 a | 0.06 a |

Means followed by the same letter within the column are not statistically different by the Tukey's test at 5% de probability.

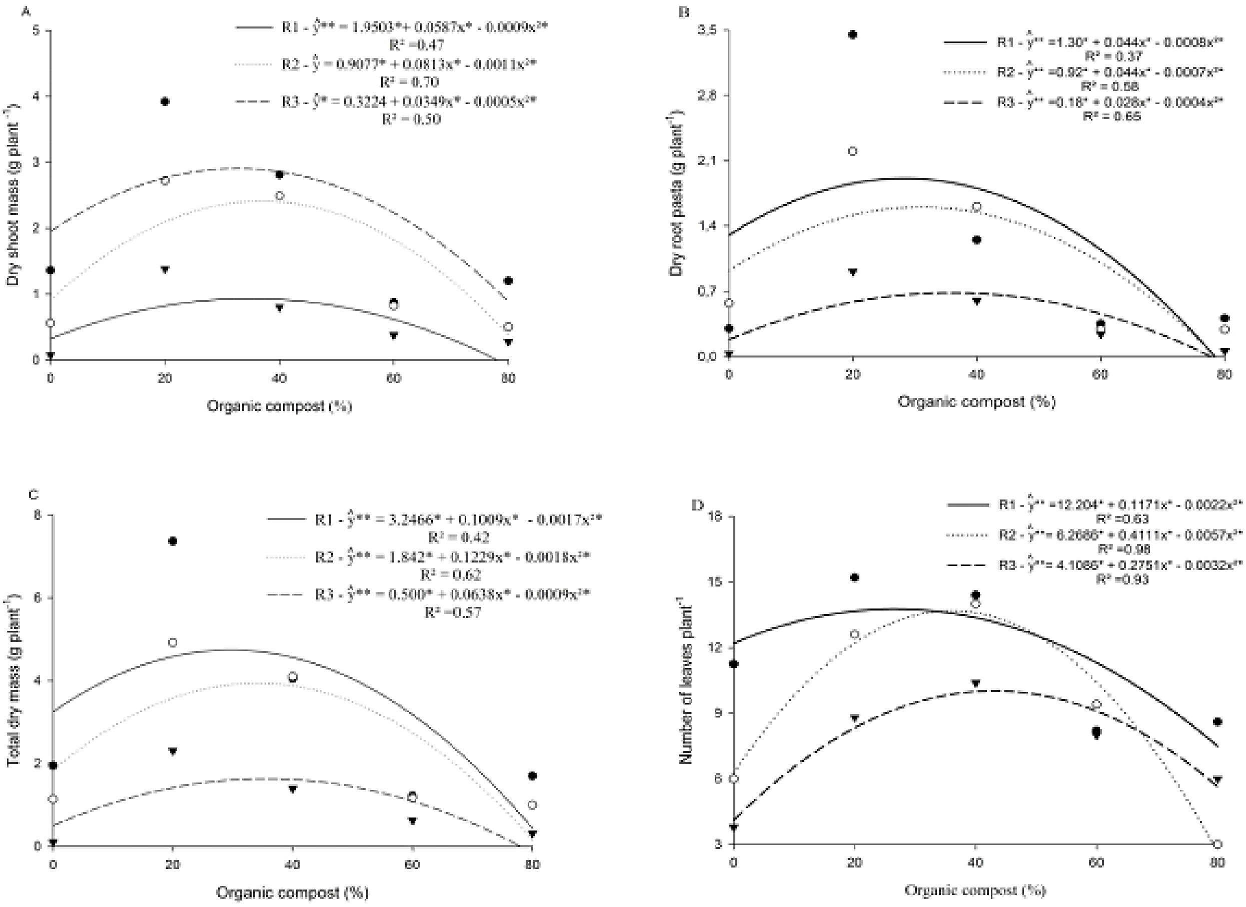


**Fig 3.** Morphological variables of *Myracrodruon urundeuva* plants under different proportions of organic compounds. (A) Aerial dry weight, (B) Root dry weight, (C) Total dry weight and (D) Number of leaves.

**Table 4.** Total dry weight under different organic compost proportion

| Containers | Proportion(%) | | | | |
|---|---|---|---|---|---|
| | 0 | 20 | 40 | 60 | 80 |
| 2.090 dm³ | 1.96 a | 7.37 a | 4.05 a | 1.11 a | 1.70 a |
| 1.335 dm³ | 1.14 ab | 4.92 b | 4.10 a | 1.22 a | 0.41a |
| 0.854 dm³ | 0.10 b | 2.31 c | 1.40 b | 0.62 a | 0.32a |

Means followed by the same letter within the column are not statistically different by the Tukey's test at 5% de probability.

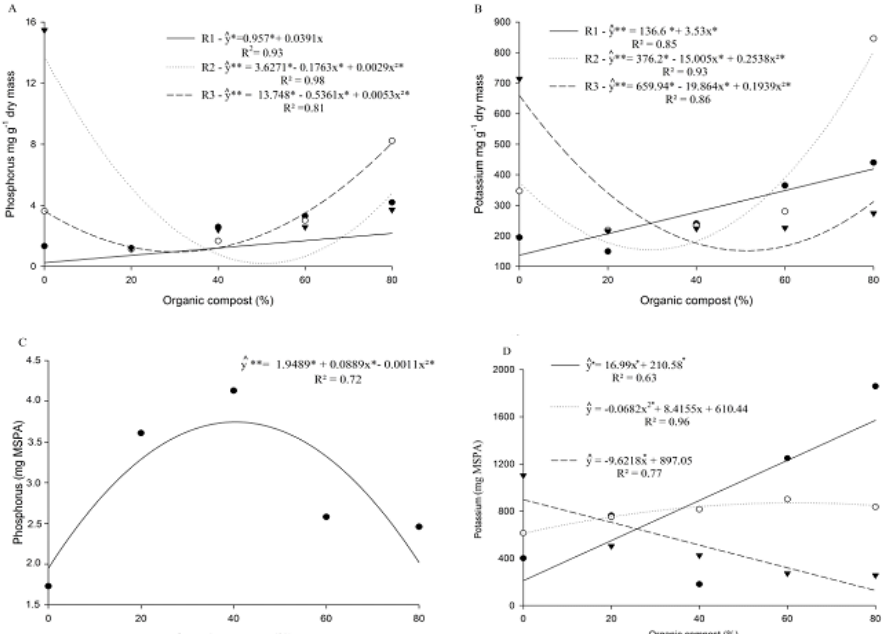


**Fig 4.** Nitrogen, phosphorus and potassium in *Myracrodruon urundeuva* plants under different proportions of organic compound. (A) Phosphorus theory in mg/g MSPA, (B) potassium content in mg/g MSPA, (C) phosphorus content in mg/MSPA and (D) potassium content in mg/MSPA.

**Table 5.** Number of leaves under different organic compost proportion.

| Containers | Proportion(%) | | | | |
|---|---|---|---|---|---|
| | 0 | 20 | 40 | 60 | 80 |
| 2.090 dm³ | 11.25 a | 15.20 a | 14.40 a | 8.20 a | 8.60 a |
| 1.335 dm³ | 6.00 b | 12.60 a | 14.00 a | 9.40 a | 3.00 b |
| 0.854 dm³ | 3.80 b | 8.80 b | 10.40 b | 8.00 a | 6.00 ab |

Means followed by the same letter within the column are not statistically different by the Tukey's test at 5% de probability.

**Table 6.** Mean values of total potassium and nitrogen contents, analyzed in different volume containers, compared by the Tukey's test at 5% probability.

| Containers | Evaluated Variables | |
|---|---|---|
| | Nitrogen | Phosphorus |
| | ---------------------------------- mg | -------------------------------------- |
| 2.090 dm³ | 57.50 a | 4.29 a |
| 1.335 dm³ | 38.04 b | 2.81 b |
| 0.854 dm³ | 15.67 c | 1.60 b |

Means followed by the same letter within the column are not statistically different by the Tukey's test at 5% de probability.

When comparing the container within each dosage, it was evidenced that the proportion of 0 and 20% the container with the highest volume promoted higher values of total dry weight. proportion of 40% showed no statistical difference between containers of 2.090 dm³ and 1.335 dm³. At proportion higher than 40% no sifferences were observed between containers (Table 4). The results obtained for MST arein agreement with Ferreira et al. (2017), when seedlings of Itaúba and Macacaúba, developed better in containers with higher volume, not being recommended the use of containers smaller than 20x25 cm.

The number of laves showed no significant difference between containers when using the soil:compost proportion of 40:60. For proportion of 80:20 and 60:40, the containers with 2.090 and 1.335 dm³ were not statistically different (Table 5). Carvalho Filho et al. (2004), while evaluating the production of *Dinizia excels* seedlings under different environments, substrates and containers, observed significant interaction between substrates and containers. In addition, it was verified that no significant difference occurred between the compositions of substrates when using small polyethylene backs (11x18 cm). However, the highest number of leaves was observed, when bigger polyethylene bags (15x20 cm) with substrates at the proportion of 1:2:1 (soil:sand:manure) were used. This suggests that the size of the container has not only limited the volume but also the quantity of nutrients available for the radicular system, influencing the distribution in the aerial portion, and consequently the number of leaves.

### *Determination of major macronutrients in Myracrodruon urundeuva plants*

While evaluating the contents of the main macronutrients (mg $g^{-1}$) in the dry weight of the aerial portion, a significant interaction for phosphorus and potassium was observed, different from nitrogen. With the increment of organic compost, an increment of phosphorus contents occurred in the highest volume container (2.090 dm³). In the other containers (1.335 dm³ and 0.854 dm³), a reduction in the content of this element was observed until close to the proportion of 60:40 (soil:compost), and an increase as the dosage was incremented (Figure 4A). A similar behavior was observed for the content of potassium (Figure 4B). This may be related to the higher production of dry weight of the aerial portion which occurred at the dosage where a reduction of the contents of these elements occurred, resulting in a dilution in the contents of these elements. Lustosa Filho et al. (2015) evaluating the use of organic substrates in the production of *Hymenaea stigonocarpa* seedlings, observed that accumulation of K in the aerial part of the seedlings increased linearly when increasing doses of bovine manure were added to the substrate, unlike the present study in which there was a decrease in the content of K, in the containers of 1.335 dm³ and 0.854 dm³, which may be related to the nutrient dilution effect, that is, the rapid growth response of the plant, promoted a dilution effect on the absorbed nutrient content, fact verified by increase in K content as a function of the proportion of organic compound.

When calculating the gathering of total phosphorus in the MSPA (mg MSPA), it was verified that while greater the dosage, greater the contents of this element in the containers of higher volumes (2.090 dm³ and 1.335 dm³) (Figure 4C). This may be explained due to the nutrients in the plant being expressive, besides having produced a quantity of biomass relatively pronounced, at higher proportion of organic compost. Regarding the total content of potassium in MSPA there was no significant interaction between the containers and proportion of organic compost. It is possible to verify, in Figure 4D, that the higher the dosage of organic compost in the composition of the substrate, the higher the content of total potassium in the aerial portion of the plant, in the higher volume container. Corroborating with Ghosh et al. (2015) in which they studied the use of biochar and organic compounds to improve soil attributes and tree growth (*Samanea saman* and *Surgeda multiflo*) in a tropical urban environment, verified that the combined use of biochar and organic compost in the soil exerted a (N, P, K), also reflecting higher leaf concentrations of N, P, and N, P and K, respectively, K in plants.

Higher mean values were observed for the total potassium content when using containers of 2.090 dm³ and 1.335 dm³. The negative effect of the 0.854 dm³ container may be related to a lower production of plant biomass (Table 6).

Regarding the effects of the containers, the highest volumetric capacity container (2.090 dm³) showed higher nitrogen contents in MSPA when compared to the others, which may be associated to a higher quantity of organic compost, and therefore facilitating the plants to acquire nutrients, in addition this element is highly instable and may be easily lost.

## Materials and methods

### *Study site description and climatological characteristics*

The experiment was accomplished in a greenhouse at the Agrarian, Biological and Environmental Center (CCAAB) from the Federal University of the Recôncavo da Bahia (UFRB), located in the county of Cruz das Almas-Ba, with geographical coordinates of 12°39'33.9" South 39°05'16.6" Westat 226 m of altitude. The climate, according to the Kopen’s classification, is typically hot humid tropical, with a dry summer seasons and mean annual precipitation of 1.224 mm, 80% of relative humidity and mean annual temperature of 24.5°C.

### *Experimental design*

The experiment lasted for 120 days, from July to December 2016, under a completely random design with five replicates. Treatments were constituted in a 5 x 3 factorial design, represented by the combination of five compost and soil proportions (80:20, 60:40, 40:60, 20:80 and 0:100 V/V), in black polyethylene bags with dimensions (diameter and length when closed bag) of: Container I =20 x 30cm, container II =18 x 22cmandcontainer III =12 x 18cm, and volumes of 2.090 dm³, 1.335 dm³ and 0.854 dm³ respectively. Every 15 days, the experimental parcels were alternated. The soil used to prepare the substrate was collected from the sub-superficial soil layer (0.20 to 0.40 m) form a dystrophic cohesive Yellow Latosol (Oxisol) (Supplemntary Table 1), under *Brachiaria decumbens*. The compost was started in November 2015, constituted by layers of 15 cm of residues from tree pruning and layers of 5 cm constituted by cattle and goat manure.

### *Substrate components*

The components of the evaluated substrates (soil and organic compost) were analyzed chemically according standard protocols in accredited laboratory (Supplemntary Table 2). The methods used to analyze the organic compost were: pH in $CaCl_2$ 0.01 M; total organic matter and mineral residue by combustion in a furnace; potassium ($K_2O$), calcium (Ca), magnesium (Mg) through atomic absorption spectrophotometer, extracted with HCl; total nitrogen, by sulfuric digestion (Kjeldahl); carbon by humid oxidation with $K_2Cr_2O_7$ in acid medium followed by titration; phosphorus ($P_2O_5$): by extraction with HCl and determination in spectrophotometer (wavelength of 430 nm) by the method with vanado molybdate solution; sulfur (S) through the gravimetric method with barium sulfate; manganese (Mn), copper (Cu), zinc (Zn), sodium (Na) through atomic absorption spectrophotometer extracted with HCl, boron (B) by spectrophotometer with Azomethine H monosodium.

The soil and the compost were previously sieved in a 4 mm mesh, and then mixed with the aid of a hoe according to the proportions of the established treatments. The containers were filled manually with the previously mixed materials.

***Acquisition and planting of aroeira seeds***

Seeds of *Myracrodruon urundeuva* were collected in the county of Guanambi, state of Bahia, Brazil, from aproximatelly 30 plants in June 2016. Seeds were sowed in the containers without any previously treatment, using five seeds for each container at 0.5 cm depth. Fifteen days after sowing plants were thinned in order to have just one plant per container. Irrigation was completed manually, once a day, always preserving the substrate near to 60% of the field capacity.

***Morphological assessments***

The variables evaluated were: neck diameter (DC); seedling height (H); number of leaves (NF); length of roots (CR); dry weight of leaves (MSF); dry weight of stems (MSC); dry weight of the aerial portion (MSPA); dry weight of roots (MSR); height/diameter ratio(H:DC); and Dickson's quality index(IQD). Additionally, the contents of nitrogen, phosphorus, potassium in the dry weight of the aerial portion of the *Myracrodruon urundeuva* were seedlings, were determined.

Seedlings were cut at neck height, separating leaves from the stem and the aerial portion from the roots. In order to obtain the dry weight, plants were conditioned in paper bags and then dried in a forced air oven for 72 hours at 65°C. Then, the materials were weighted to determine their respective dry weight.

In order to evaluate the quality of plants, the Dickson's Quality Index – IQD was calculated, according to the seedling height (H), neck diameter (DC), dry weight of the aerial portion (MSPA) dry weight of roots (MSR) and the total dry weight (MST).

***Statistical analysis***

Data was submitted to a Variance Analysis and mean values were compared by the Tukey test at 5% probability. For the proportion of organic compost a regression test was used. The analyses were completed with the aid of the software SISVAR 5.6 (Ferreira, 2011).

**Conclusion**

The use of different proportion of organic compost in the soil stimulated the growth of *Myracrodruon urundeuva* seedlings. The best dosage for the majority of variables evaluated was near to 60%. Polyethylene bags of 2.090 and 1.335 dm³ promoted the higher mean values for Height, Neck diameter, Length of roots, dry weight of stems, dry weight of leaves, Dickson's Quality Index and height/diameter ratio. Based on the Dickson's quality index, both, the 2.090 dm³ container and the 1.335 dm³container at the dosage of 66:34 (soil:compost), may be recommended for production of *Myracrodruon urundeuva* seedlings. However, concerning the relation cost-benefit the 1.335 dm³ container is the most appropriate. The higher the dosage of organic compost, the higher the nutrients content in the *Myracrodruon urundeuva* plants.

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