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THE REUSE OF PEANUT ORGANIC WASTES AS A GROWTH MEDIUM FOR MARIGOLD, VIOLA TRICOLOR AND DRACAENA MARGINATA PLANTS

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Вивчено ефективність застосування компосту, виготовленого з відходів арахісу, в умовах закритого ґрунту під декоративними культурами. У дослідженнях використовували торф + перліт у співвідношенні 2 : 1, а в контрольному варіанті – компост з відходів арахісу. В інших варіантах торф замінений 25-, 50-, 75- і 100%-вим компостом з відходів арахісу. Найкращим був варіант при заміні торфу 75%-вим компостом з відходів арахісу. Отриманими результатами доведено, що збільшення співвідношення компосту, а також скорочення торфу на 75 % було ефективним способом для зростання і розвитку декоративних рослин. Підтверджено, що використання компосту з арахісу є найефективнішим способом для вирощування декоративних рослин.

Ключові слова: *торф, перліт, компост з оболонок арахісу, ріст рослин.*

Introduction. Nearly one million tones of agricultural and industrial waste produced each year in Iran, That through recycling can become an organic source. Unfortunately, much of this waste burned or released that leading to pollution of the environment [1, 2, 12]. This waste by composting can use instead of peat in ornamental plants growing media. Today, most ornamental leaf plants can cultivate in soilless media, which peat is the basic medium of them [3]. The use of peat is dubious because of ecological damages to environmental and economical advantages for ornamental plant producers. Mentioned problems led researchers to look for high quality and affordable beds for replacing peat [11]. Because of increasing waste, environmental danger awareness and needing to recycle or sanitary landfill, suggested further use of composted bio-slide in farming [5, 16]. Some researchers' studies shown that peat can replaced by some organic wastes such as manure, paper, pruning residues, mushroom beds and other organic materials after composting [8]. Research showed Ficus benjamina in growing media consist of one part olive waste composts and one part peat (in volume) created maximum height during ten month growth period recommended 25, 50 and 75 % (by volume) of composted olive waste instead of peat in a potting mixture of Ficus benjamina, Cordyline and Syngonium Podophyllum [6, 13, 16]. Peanut shells

1. Composition of the growing media

Compost percent	Growing media
Control	Peat + perlite + peanut shells compost (volume ratio of 0 + 2 + 1)
25 % PSC	Peat + perlite + peanut shells compost (volume ratio of 0,5 + 1,5 + 1)
50 % PSC	Peat + perlite + peanut shells compost (volume ratio of 1 + 1 + 1)
75 % PSC	Peat + perlite + peanut shells compost (volume ratio of 1,5 +0,5 + 1)
100 % PSC	Peat + perlite + peanut shells compost (volume ratio of 2 + 0 + 1)
Abbreviations: Control: (2 peat +1 perlite in volume rate); PSC: peanut shells compost.	

as remained wastes of peanut cultivating has greater volume, which can composted as available sources for use in ornamental plant growth medium. Since peat limited and poor in Iran, and many it with high costs imported from overseas. Peanut shells as remained wastes of peanut cultivating has greater volume, which can composted as available sources for use in ornamental plant growth medium. The peanut shell composts using in replacement with peat studied for growing of Marigold, Viola tricolor and Dracaena marginata plant during this research. Successful production of ornamental plants in containers in the greenhouse and nursery largely dependent on the chemical and physical properties of growing media. Peat is a common part of the growth media mixture for plant production in both nursery and greenhouse. Peat usually included in the mixture for increased water holding capacity or reduce weight. Today, for producing fewer expensive ornamental plants, introduction of organic matter to replace peat is necessary.

Materials and Methods. This study, conducted in a greenhouse of flowers and Ornamental Plants Research Station of Lahijan, Iran. Composition of used the growing media listed in Table 1. After preparing media the marigold, Viola tricolor and Dracaena marginata plants transferred to four liter pots. Average of night and day temperature were 18 ± 2 °C and 27 ± 2 °C respectively, with relative humidity 65–75 % and light, between 75 to 150 – foot candles [17, 19]. Two hundred milliliter of nutrient solutions used for each pot every 10 days and irrigation applied as needed [6].

The plants are cut from the surface of the pot to find out the stem and leaf, fresh weight, then oven dried at 70 °C for two days for finding out their dry weight. PH determined by pH meter in the ratio of 1:5 (W/V) that had agitated mechanically for 30 min and filtered through What man filter paper No. 1. The same solution measured for electrical conductivity [20]. Total nitrogen measured by procedure [4]. For determination of other nutrients each ground sample ashed in a muffle furnace at 550 °C [9]. The white ash dissolved in 2N HCl and made up to 100 ml with distilled water. Total P analyzed using by spectrophotometer according [14]. Total K measured according procedure [10]. Total organic carbon measured by using the method of Nelson and Sommers [15]. The physical properties of growing media as bulk density, total porosity, water holding capacity and air volume gained [7]. Each recorded data analyzed by SAS software and data means compared with *Tokay's* multiple range tests (SAS Institute Inc.) [18].

Results and discussion. The result of table 2 showed the nutrients in composted peanut shells being more than peat and can used as a

2. Chemo-physical properties of substrate

Substrate	N, %	P, %	K, %	Ca, %	C: N	PH	EC (dS/m) 1:5
Peat	1,27	0,02	0.03	0,89	40,34	3,83	0,30
Peanut shells compost	2,43	0,67	1,19	33,6	9,80	6,08	1,57

3. Statistical comparison of plant growth characters

Percent of compost	Viola tricolor			Dracaena marginata			Marigold		
	Height, Cm	Stem and leaf fresh weight, g	Stem and leaf dry weight, g	Height, Cm	Stem and leaf fresh Weight, g	Stem and leaf dry weight, g	Height, Cm	Stem and leaf fresh weight, g	Stem and leaf dry weight, g
Control	17,30bc	26,30ad	6,60cd	19,10bc	33,06b	4,75 cd	31,00ab	129,28b	39,20ab
25% PSC	17,40bc	30,00ab	7,40bc	20,17b	42,39a	7,56 ab	30,60ab	123,24b	36,60c
50% PSC	21,20a	35,10a	8,90a	22,60a	41,21a	8,50 a	29,40ab	131,12b	38,70bc
75% PSC	19,40ab	24,30cd	5,60cd	18,60c	37,60ab	6,21 bc	31,10ab	148,38a	41,30a
100% PSC	14,80c	17,10d	5,30d	11,60d	10,62c	4,02 d	27,60b	105,62c	34,30c

Abbreviations: Control: (2 peat +1 perlite in volume rate); PSC: peanut shells compost.
Means followed by the same letters do not differ significantly (p = 0,05).

nutritious supply for the plant. EC and pH of the media were ideal and does not cause limits for plants.

The statistical comparison showed that, 50 % composted peanut shells in Viola tricolor and Dracaena marginata plant created highest height, stem and leaf fresh weight, stem and leaf dry weight (Table 3). The highest height, stem and leaf fresh weight, stem and leaf dry weight in marigold gained with the use of 75 % the peanut shells compost (Table 3). Treatment with 100 % peanut shells compost in height, stem and leaf fresh weight and stem and leaf dry weight of tricolor, Dracaena marginata and marigold plants did not differ significantly from control. Gayasinghe et al. (2010) reported that in cultivating Tagetes palate, used a combination of 40 % synthetic compounds and 60 % manure compost (V/V) increased plant height, shoot dry weight, root dry weight. Assessing of plant growth characters showed that growth of Viola tricolor and Dracaena marginata in 50 % and Marigold in 75 % peanut shells compost were more than control and 100 % composted peanut shells (Table 3).

It seems, part of peanut shells compost effects are the impacts of humus substance's presence claimed that part of the compost impact on the Ficus benjamina growth can be of the same role of growth regulators in plants [6]. Significant decrease of plant growth in the 100 % composted peanut shells may be because of high pores and decrease in water holding capacity (Table 4). Pool and Conover also found above issue when grown Dracaena in the organic beds with high pores and low water holding capacity [17].

4. Physical properties of used growing media

Percent of compost	Air porosity, %	Water holding capacity, %	Total porosity, %	Bulk density, g cm^{-3}
Control	21,65	38,35	43,40	0,64
25 % PSC	26,22	35,95	44,50	0,53
50 % PSC	37,91	35,65	44,90	0,48
75 % PSC	44,66	34,87	60,90	0,43
100 % PSC	53,83	33,06	86,90	0,32

Abbreviations: Control: (2 peat +1 perlite in volume rate); PSC: peanut shells compost.

In general, peanut shells compost increases the growth of the marigold, Viola tricolor and Dracaena marginata plants compared to control. But the higher levels of peanut shells compost not to suggested. It suggested that more assessments done about culturing peanut shells compost in term of reaching the best size of compost particles for the more favorable micro-organisms in the plant beds. Compost production of peanut shells with solving environmental problems of collection peanut shell waste, introduce cheap and high quality replacement for peat.

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