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**ORIGINAL ARTICLE**

# EFFECT OF IRRIGATION WITH WASTEWATER SANDBLAST SHIRVAN CITY ON VEGETATIVE AND REPRODUCTIVE GROWTH OF SEASONAL FLOWERS WALLFLOWER

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**ABSTRACT:** To determine the effect sandblast waste on growth ofwallflower were administered pot test in a completely randomize design with three replications and five treatments. mixing ratio of water and sandblast waste treatments were including $T_1$=100% sandblast water, $T_2$=75% sandblast water + 25% sandblast waste, $T_3$= 50%sandblast water+50% sandblast waste, $T_4$=25% sandblast water+ 75% sandblast waste, $T_5$= 100% sandblast waste that was applied on mall flower seasonal flower. Parameters measured were plant height, number of leaf and flowers, first day of flowering, chlorophyll, and soil EC contentthatweremeasure in both vegetativeand reproductive growth stages. The result showed that effect of sandblast waste were significant on all parameters.Ingeneral, plants irrigated with 100% sandblast waste had higher growth than other treatments.

**KEYWORDS:** Irrigation, Seasonal Flowers, Sandblast Waste, Wall Flower**.**

## INTRODUCTION

Water as a major factor of human life is very important at drinking and other purpose related to human and nature (Esmaelian *et al.,* 2009), therefore, that now in most countries of world has become a crisis (karimkhoshte and kopahi, 2001), and thus, management of water resources is important. Water resources management has no complexity in the past (Abedikopaei *et al.,* 2003), but with the increasing demand and the increasing use of water for agriculture purposes, drink and industry, municipality are inevitable the need for investment and development in the water sector. Effect of water project should consider on environmental problems, because use of sandblast waste and development designs related to its can be effective different forms on environment. Stopping of sandblast waste water flow can be consider as a changeable factor on nature, if this changeable don't be at limit of tolerance and power of environment, effect of this appeared slowly and devastate factory purposes. In addition to, it is possible lead to industrial, agriculture and urban development and this has helped to increasing of industrial, urban and agriculture waste that at result of have provided a active and suitable environment for biological activities of microorganisms and reduce quality water (Parham *et al.,* 2008). With regard to water, central role at country development planning, control of running wasters always have considered from basic and infrastructural actions and for reach of economical self-sufficiency have special importance. Use of wastewaters will have dramatic effects on environment (Mostafapour and Sabetrafter, 2007).

## LITERATURE REVIEW

Malekian *et al.,* (2008) stated effect of surface and subsurface irrigation with refined effluent on characteristics of Iran grassmoda grass that for irrigation with waste water, grass performance was high significantly than to well water. Soroush *et al.,* (2008) showed effect of refined wastewater on absorb of some elements in soil different tissues that using of wastewater for grass irrigation increased absorb of nitrogen cadmium plants. Highest potassium, nickel and cobalt absorbed grass from irrigation soils with 50% waste. Matin, (1993) advised using of waste for industrial productions irrigation (cotton and in oil crops) and irrigation of forest trees in green waistband around cities. According to study of Mostafazadeh *et al.,* (2005) irrigation with wastewater, increased performance of sugar beet but at maize and sunflower do not observed significant difference. According to results of Erfani *et al.,* (2001) at tomato at potato, Najafi *et al.,* (2005) at potato, tomato and black eggplant, Afyoni and RezaeNejad, (1998) at lettuce and spinach, Feizi and Rezvanimoghadam, (2008) at wheat, barley and triticale, Esmaelian *et al.,* (2009) at Qaredagh, Alizadeh, (1996) at lettuce carrot and tomato, Zadhoush, (2001), Najafi *et al.,* (2007) and Ghanbari *et al.,* (2006) at wheat stated that using of sludge and waste water have increased performance due to nutrient of plant. However, Tadaian, (2008) at wheat, Shahabifar, (2001) at

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wheat, barley, and maize stated that using of wastewater lead to reduce performance due to reduce of nutrient percent of plant and reduce of elements transferring to seed and air organs.

## MATERIALS AND METHODS

This study administered for effect of irrigation with sandblast waste on growth of wallflower seasonal flower grown in green house of municipality green place in city Shirvan for 4 month in 1391. Test in pot administered in completely randomized design with three replications and five treatments. Treatments in studying were irrigation with sandblast waste that wasappliedon wallflower seasonal flower. Irrigationwater was containing of different proportions of sandblast well water and sandblast waste as followers:

$T_1$: irrigation with well water (100%)

$T_2$: irrigation with 75% well water +25% sandblast waste

$T_3$: irrigation with 50% well water +50% sandblast waste

$T_4$: irrigation with 25% well water +75% sandblast waste

$T_5$: irrigation with sandblastwaste (100%)

Soil in post was perlite and sand. First, for better drainage were putted few smile stone at the end of pots and then pots filled with sand and perlite mixing. Water in need for test weresandblast waste well water and sandblast waste related to sandblast waste factory.

Seedlings in use prepared from Shirvan municipality green house in early of month Dei and seedlings of the same size and the diagonal were planted in every pot and pots were irrigated with common water for 10 days to adapt to the new conditions Test. Started from mid- Dei and plants were irrigatingneedof them. With use of irrigation, pots soil moisture maintained at capacity limit of agriculture.

Irrigation was done in the evening, and one 5 liters container used for measurement of irrigation water and mixing proportions calculated. During to test, weeds in pots removed by hand and one turn spraying with diazinon was done for control of greenhouse insect. First, measurements factors record manually and then at computer excel. Factors measured in both stages of vegetative growth and flowering time, and the results analyzed. Measurements factors were including plant height, number of leaf and flower, date of first flowering, chlorophyll, and soil EC counted.

At vegetative stagemeasured plant height, number of leaf, chlorophyllcontent and at flowering time measured, number of leaf and flower, plant height, first day of flowering, chlorophyll, and soil EC content. Measurements took from mid – April month, every 20 days and at in the early morning.

As it, six series measured that is 3 times at vegetative growth stage and 3 times at flowering time. Measurements of factors of number of leaf, and flower were visually. Plant height from of pot to leaf tip measured by ruler and on the centimeter. That is one white leaf is placed on pot surface and height measured by ruler. For measurement of chlorophyll content use from device of chlorophyll meter that is every plant divided to 3 parts and every part record 3 numbers and then total of 9 numbers considered as plant chlorophyll content.

For determining of soil EC in post, first, flower plants removed from in the pots, Then perlite and sand and mixedin pot and it weight by scale,for every pot separated one 50 grams samples and were placed in disposal container.Soil45 samples were transported to laboratory. The samples were saturated withdistilledwaterand for 24 hours abandoned. Later, theirextract took by funnel and filter paper and post soil EC measured by device of EC meter. Soil EC measured in twostage that is before and after test.Measurement of soil EC did in the morning and its unit was ds/cm. After collected data used MSTAT-C software for computing of statistical and comparison of means were took by Dan can̓s multiple test at 50% and 1% level. For drawing of graphs used Excel software.

## RESULTS

Results of variance analytic show that effect of irrigation treatment with mixing different proportion of water and sandblast waste were effective on stage of wall flower vegetative growth, As number of leaf, chlorophyll content and also plant height is significant at 1% and 5% probability level, respectively (table 10). As with increasing of sandblast waste proportions have increased plant height, number of leaf and chlorophyll content. Maximum of plant height (18 cm) and minimum of its (11 cm) have observed at treatment of 100% and 0% sandblast waste, respectively (table 1, 2, 3). Maximum of number of leaf (28) and minimum of its (23) observed at treatment of 200% and 0% sandblast waste, respectively. (table1, 2, 3). Maximum of chlorophyll (48) and minimum of its (41) observed at treatment of 100% and 0% sandblast waste, respectively (table2, 1, 3).

**Table 1:** results of variance analyze of wallflower irrigation with sandblast waste on stage of vegetative growth

| Mean of qualities squares | | | class | Resource |
|---|---|---|---|---|
| Chlorophyll content (SPAd) | Number of leaf | Height(cm) | Freedom | variation |
| 19.561* | 61.428** | 2.846** | 4 | Treatment |
| 1.662 | 6.975 | 0.668 | 10 | error test |
| 3.081 | 8.995 | 6.857 | | Variation Coefficient (CV %) |

*And** significant is at 5% and 1% level respectively

**Tables2:** comparison of mean of mixing different proportions of water and sandblast waste on wallflower on stage of vegetative growth

| Chlorophyll content (SPAD) | Number of leaf | Height (cm) | Treatment of naste water | Kind of seasonal flower |
|---|---|---|---|---|
| 41C | 23B | 11C | 0% | |
| 43 B | 25 A | 13.5 B | 25% | |
| 44 B | 27 A | 15 B | 50% | wall flower |
| 47 A | 26 A | 16.5 C | 75% | |
| 48A | 28 A | 18 A | 100% | |

The mean of each column have the same letters that is significant at 5% probability level by Duncan test

The effect of treatment of mixing different proportions water with sandblast waste was significant at wallflower flowering time, as plant height, number of leaf and flower, chlorophyll content, soil and first day of flowering wasn't significant at 1% probability level (Table 3). maximum plant height (36 cm) and minimum of its (33 cm) have observed at treatments 75 % and 0% sandblast waste, respectively.(tables 1,2,3).maximum number of leaf (38 cm) and minimum of its (24 cm) observed at treatment 100% and 0% sandblast waste, respectively (tables 1,2,3). Maximum number of flower (11 cm) and minimum of its (3 cm) obtained with treatment 100% and 0%, 25% sandblast, respectively (Table 3). Maximum chlorophyll content (49 cm) and minimum of its (43 cm) observed with 100% and 0% sandblast waste, respectively (Table 3). Maximum of soil EC content (9 and 4 desizimens / centimeter) and minimum of its (1 and 4 desizimens / centimeter) observed at treatment 100% and 0% sandblast waste, respectively (table 3).

**Table 3:** Results of variance analyze of wall flower irrigation with sandblast waste at flowering time

| Mean of qualities | | | | | class | Resources |
|---|---|---|---|---|---|---|
| Soil EC content (ds/cm) | hlorophyll content (SPAD) | Number of flower | Number of leaf | Height (cm) | freedom | variation |
| 0.456 | 19.03* | 86.8 | 84.04** | 118.620** | 4 | Treatment(waste content) |
| 0.009 | 1.322 | 1.035 | 3.149 | 2.623 | 10 | Test error |
| 2.464 | 2.769 | 15.02 | 6.199 | 5.441 | | Confiscation of variation (CV%) |

Respectively,*And** at 5% and 1% probability level is significant and ns isn't significant.

## DISCUSSION

Measurements performed in sandblast waste shows that parameters of measurement at sandblast waste is higher than to sandblast well water. PH of 7 is at limit of neutral that it is suitable for irrigation.Another feature of irrigation water is salinity or EC that sandblast waste is at limit of permissible and also it is rich from nutrients of plant such as nitrogen, phosphorus , potassium and etc. with regard to resultsof this test, using of sandblast waste on measurement parameters was effective at stage of vegetative growth and at flowering time of seasonal flower and were significant at 1% and 5% probabilities level as with increasing of waste present have increase seasonal flower growth, this was true in many of factors but at some factors haven't been effective using of sandblast waste (tables 1,2,3). Results of researches of Shend, (1998) were showed using of better of refined waste than to chemical fertilizer about absorb of plant elements. Researches of Asno, (1994) have showed that high nitrogen have increased performance of plant.

High concentration of nutrition's elements nitrogen, phosphorus, potassium, calcium and magnesium at sand blast waste were due to entering of rain water along with desirable soil erosion. Irrigation with sandblast waste were increasing content of soil nutrients (Meli *et al.*, 2002; Bagheri, 2000; Safarisanjabi, 1995).

*5.1. Effect Of Treatments On Number Of Leaf*

Sandblast waste of irrigation water affected number of leaf at vegetative stage at flowering time at probability level of 1%(tables 1,2 and 3).Maximum of number of wall flower (28) leaf obtained with 100% sandblast waste at vegetative growth.(tables 1, 2,3). maximum number of wall flower leaf (38)observed with 100% sandblast waste at flowering time (tables 1,2,3). sandblast waste were increased performance of plant due to different nutrients

elements.number of high leaf increase photo synthesis and thus were increased plant performance. Rahimi, (2011) showed effect of irrigation with waste on growth of orange mint ornamental shrubs and new leaf that irrigation with waste were increased number of leaf at orange box – tree shrub with 100% waste. Danesh *et al.*, (1991) investigated effects of domestic refined waste on performance and quality sugar beet and fodder beet that increased number of leaf. In really, irrigation with waste facilitated growth of leaf and increasing of number of leaf at plant and will absorb more sunlight and thus increased plant growth (Myers *et al.*, 1996). Soleimani *et al.*, (2006) investigated effect of using waste on physiological indicators on growth of maze plant that irrigation with wastewaterhave provided special effect on production of surface leaf, total dry weight and speed growth than to common water.

*5.2. The Effect Of Treatments On Number Of Flower*

The effect of mixing different ratio of water and sandblast waste is significant at 1% probability level (table 3). Maximum number of flowerat wall flower (11) obtained with 100% sandblast waste. Shabanyan Brojeni et al., (2005) stated effect of wastewater and effluent of Iran polyacryl factory on some characteristics of morphological and elements concentration at grass, snapdragon, and sweet William that effect of effluent and waste water treatments on number of flower branch at plant snapdragon increased with increasing of effluent. As 100 tons,sandblast waste of per hectare increased about 50% snapdragon flower branch than to control.In addition, number of floret at snapdragon inflorescence increased from 13 floret at treatment to 16 and 19florets at treatments 100 and 50 ton effluentrespectively at effluent hectare. Increasing of number of floretsat 50 tons treatment can be due feature of effluents fertilizer. Nazari *et al.*, (2006) showed effects of effluent and industrialeffluent on soil and growth of agriculture plant (wheat, barley, and maze) and ornamental (grass, geranium, begonia, Atlas, calendula, parsley) that the number of flower at treatment water + effluent well was higher than to other treatments.

*5.3. The Effect Of Treatments On Chlorophyll Content*

The effect of mixing different ratios of water and sandblast waste on chlorophyll content is significant at stage of vegetative growth of wallflower at 1% probabilities level. Maximum of chlorophyll content obtained with 100% sandblast waste at stage of wallflower vegetative (48). Maximum of chlorophyll content at wallflower (49) obtained with 100% sandblast waste at flowering time (Tables 1, 2, 3). Increasingof chlorophyll content can be due to magnesium in consumption wastewater because magnesium consist chlorophyll central core. Rahimi, (2011) stated effect of irrigation with effluent on growth of ornamental shrubs of orange, mint box tree and new leaf that using of waste water have increased chlorophyll content at orange box tree with treatment 100% sandblast waste. Shabanyan Brojeni et al., (2005) showed effect of wastewater and sludge effluent of Iran polyacryl factory on some characteristics of morphological and elements concentration at grass, snapdragon and sweet William that chlorophyll high concentration was significant only at treatment of 50 tons effluent at hectare than to control treatment.The reason for this increase is high concentration of magnesium at wastewater.

*5.4. The Effect Of Treatment On Soil EC*

The effect of mixing different ratios ofwater and sandblast waste onsoil EC is significant at1% probability level (table 3).Maximum of soil EC in wall flower pots (9 and 4 ds / cm) obtained with 100% sandblast waste (table 3). It is obvious, increasing of soil electrical conductivity itself is a limit factor that must be considered time of using of wastewater. Fox and Ferguson, (2004) stated effect of irrigation with waste water to drip method on some green place plants such as geranium, maple, mountain cypress that soil EC have increased. Result of research Kasraeei and Saedi, (2010) showed that effect of effluent sludge of Tabriz petrochemical complex on growth of tomatoplant that high concentration of all solublesalts (EC) and aboutPH in tomato pots have changed with increasing of biological effluent at before and after of pot test; as this problem propose soil salinity and its damage in many of sensitive agriculture plants to salt.

## CONCLUSION

In general, comparison of indicators of wallflower plant show that treatment of sandblast waste has positive effect in many cases. Use of sandblast waste can increase planted plant growth due to nutrients suchas nitrogen, phosphorus and etc. with regard to results of this test and similar test can advise that sandblast waste can be as a suitable substitute for green place and flower irrigation because in addition to providing of irrigation water and also economizing at water consumption can use from fresh green place without concerning of effect of devasting its on

society health. of course, use of sandblast waste should be done with study and continues control of soil characteristics to adversely effects haven't on soil fertilizing. This can be tested on other flowers and ornamental shrubs in green place and agriculture andafforesting.

In inaddition to factors of this test that is, effect of mixing different ratio of water and sandblast waste and effect of its onstandards of vegetative growth and flowering time of seasonal flowers of calendula, violet and wall flower can investigate other factors such as soil kind, effect of using sandblast waste on soil and plant elements. This test, investigated effect of sandblast waste that can were investigate effects of sandblast waste at agriculture plants elements at other test.

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