

A survey study to raise the awareness about the importance of the plant tissue culture technology

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Abstract: The plant tissue culture technology is considered as one of the latest and most significant agricultural disciplines in the worldwide that relies, fundamentally, on the green biotechnology concepts. It is one of the most advanced technologies currently in use with great benefits for mankind. During the past few years, this technology has provided great financial benefits and agricultural achievements on both quantitative and qualitative prospects. Also, it contributed to the genetic improvement and crossbreeding, and provided benefits have never been achieved previously using the traditional methods. Furthermore, the green biotechnology offers an important and useful supplement in accomplishing food security and environmental protection. The objective of the Study: to investigate the extent to which college students and nursery owners aware about the importance of plant tissue cultivation, and how to implement this technology to develop the agriculture. Data collection was conducted in Diyala governorate, Iraq, and it included 140 participants who were divided into three groups. The first group included 50 male and female students from the College of Education for Pure Sciences / Department of Life Sciences. The second group included 50 male and female students from the third stage of the College of Agriculture, Horticulture department while the last group included 40 nursery owners. The study outcomes pointed that the nursery owners have poor awareness about the plant tissues culturing technique and about its importance and applications. However, the highest level of awareness was recognized among the College of Agriculture students.

Keywords: plant tissue culture, survey study

1. INTRODUCTION

The term plant tissue culture is defined as a cultivation process where seeds or plant parts taken from organs fetal tissues, single cells and protoplasts are cultured outside the living body in nutrient media in a special environment under free of pollutants conditions [1]. This technique is an important method to multiply many plants in large quantities within short period of time [2]. Basically, this technique is used to multiply plants that are difficult to multiply using traditional methods, also to multiply plants at any time of the year without having to stick to the growing season [3]. It has become one of the significant life technologies in the agricultural, industrial and medical fields [4]. Moreover, it is vital in rapid multiplying of good and rare species [5]. It is also efficient in producing useful compounds under controlled conditions, and in extracting of effective substances for medicinal uses from plant callus [6]. In addition to that, plant tissue culture technology has gain an important commercial application in recent years.

1. The statistical analysis

The data were collected from the survey forms, recorded, and then analyzed using the Statistical Analysis System (SAS) (2012) to investigate the targeted relation regarding the importance of plant tissue culture. The significant differences between the mean values were compared using the F and T tests. Further, the percentages significant differences were compared using chi-Square-x², the calculation was done by dividing the part by the total (50), and multiplying by 100.

The weights of each item was calculated by summing the products of multiplying the number of each answer by its mark, and then divide it by the sum of the importance marks (3). The importance marks were specified as Yes=1, No=2.

2. METHODOLOGY

2.1. Participants

The study included 140 participants; some of them were university students while the others were nursery owners. The participants were divided into three groups as following:

First group (Students of the College of Education for Pure Science)

Second group (Students of the Agriculture College)

Third group (nursery owners)

Form design

The form was designed to show the knowledge that the participants have about the plant tissues culturing technology, its importance, and how it is used. The form was evaluated by two academic staff members at the College of Education for Pure Science and the Agriculture College.

3. RESULTS

The study comprised 140 participants; some of them were university students (College of Education for Pure Science and the Agriculture College) while the others were nursery owners.

Table 1 Survey study about the importance of plant tissue culture for the College of Education for Pure Sciences students (50 students)

	Question	Yes	No	Significance	Weight	Rank
1	Do you have information about the plant tissue culture technique in the laboratory	15	35	**	21.67	7
2	Do you think that plant tissue culture shortens the time?	20	30	**	23.33	6
3	Does the plant tissue cultivation dispense seeds and seedlings importing from abroad?	35	15	**	28.33	2

4	Does the plant tissue culture help in producing large numbers of plants in limited area compared to traditional methods	30	20	**	26.67	4
5	Does the plant tissue culture produce plants throughout all the months of the year without being restricted to the growing season?	23	27	insignificant	24.33	5
6	Are the seedlings resulting from tissue culture free from pathogens and resistant to bad and difficult conditions?	15	35	**	21.67	7
7	Does the waste of the plant tissue cultivation in laboratory cause health issues to humans?	31	19	**	27.00	3
8	Can we produce medical and pharmaceutical materials through the plant tissue culture technology?	30	20	**	26.67	4
9	Is the plant tissue culture technique considered as one of the techniques that should receive more attention from the nursery owners?	45	5	**	31.67	1
	T-test value	--	--	--	2.69*	--
* ($P \leq 0.05$) significant, ** ($P \leq 0.01$) highly significant						

Table 2 Survey study about the importance of plant tissue culture for the Agriculture College students (50 students)

	Question	Yes	No	Significance	Weight	Rank
1	Do you have information about the plant tissue culture technique in the laboratory	44	6	**	41.00	2
2	Do you think that plant tissue culture shortens the time?	45	5	**	40.00	3
3	Does the plant tissue cultivation dispense seeds and seedlings importing from abroad?	46	4	**	35	6
4	Does the plant tissue culture help in producing large numbers of plants in limited area compared to traditional methods	50	0	**	40.00	3
5	Does the plant tissue culture produce plants throughout all the months of	46	4	**	39.67	4

	the year without being restricted to the growing season?					
6	Are the seedlings resulting from tissue culture free from pathogens and resistant to bad and difficult conditions?	45	5	**	41.67	1
7	Does the waste of the plant tissue cultivation in laboratory cause health issues to humans?	40	10	**	33.00	7
8	Can we produce medical and pharmaceutical materials through the plant tissue culture technology?	47	3	**	38.00	5
9	Is the plant tissue culture technique considered as one of the techniques that should receive more attention from the nursery owners?	48	2	**	33.00	7
	T-test value	--	--	--	3.54*	--
* (P≤0.05) significant, ** (P≤0.01) highly significant						

Table 3 (nurseries), the quantity 40

	Question	Yes	No	Significance	Weight	Rank
1	Do you have information about the plant tissue culture technique in the laboratory	12	28	**	17.33	8
2	Do you think that plant tissue culture shortens the time?	20	20	insignificant	20.00	4
3	Does the plant tissue cultivation dispense seeds and seedlings importing from abroad?	15	25	**	18.33	7
4	Does the plant tissue culture help in producing large numbers of plants in limited area compared to traditional methods	30	10	**	23.33	1
5	Does the plant tissue culture produce plants throughout all the months of the year without being restricted to the growing season?	24	16	**	21.33	3
6	Are the seedlings resulting from tissue culture free from pathogens and resistant to bad and difficult conditions?	12	28	**	17.33	8

7	Does the waste of the plant tissue cultivation in laboratory cause health issues to humans?	18	22	insignificant	19.33	6
8	Can we produce medical and pharmaceutical materials through the plant tissue culture technology?	19	21	insignificant	19.67	5
9	Is the plant tissue culture technique considered as one of the techniques that should receive more attention from the nursery owners?	25	15	**	21.67	2
	T-test value	--	--	--		--
* (P≤0.05) significant, ** (P≤0.01) highly significant						

The results showed in tables 1,2, and 3 demonstrated that, for the first item (Do you have information about the technique of cultivating plant tissues in the laboratory?), the College of Agriculture has the highest weight (41.67). Though, the nurseries owners have the lowest weight (17.33), the weight of the College of Education for Pure Sciences is 21.67.

For the second item (Do you think that plant tissue culture shortens the time?), the weight was 40.00, 20.00, and 23.33 for the Agriculture College, nursery owners, and the College of Education for pure sciences respectively.

Moreover, for the third item (Does the plant tissue cultivation dispense seeds and seedlings importing from abroad?), the highest weight (35.00) is in the Agriculture College. However, the weight of the nursery owners has the lowest weight (18.33) while the weight of the College of Education for Pure Sciences is 28.33.

Item number four, Does the plant tissue culture help in producing large numbers of plants in limited area compared to traditional methods, shows that the highest weight (40.00) is for the Agriculture College. The lowest weight (23.33) is for the nursery owners, and the College of Education for Pure Sciences the weight is 26.67.

The results of item number five (Does the plant tissue culture produce plants throughout all the months of the year without being restricted to the growing season?) indicated that the highest weight (39.67) is for the College of Agriculture. Though, the nursery owners have the lowest weight of 21.33, the weight of the College of Education for Pure Sciences is 24.33. The highest weight (41.00) of the sixth item (Are the seedlings resulting from tissue culture free from pathogens and resistant to bad and difficult conditions?) goes to the Agriculture College students. The nursery owners showed the lowest weight of 17.33, and for the College of Education for Pure Sciences the weight was 21.67.

The results of item number seven (Does the waste of the plant tissue cultivation in laboratory cause health issues to humans?) indicated that the highest weight (33.00) is for the College of Agriculture. Though, the nursery owners have the lowest weight of 19.33, the weight of the College of Education for Pure Sciences is 27.00.

For the item number eight (Can we produce medical and pharmaceutical materials through the plant tissue culture technology?), the weight was 38.00, 19.67, and 26.67 for the Agriculture College, nursery owners, and the College of Education for pure sciences respectively.

The highest weight (33.00) of the ninth item, is the plant tissue culture technique considered as one of the techniques that should receive more attention from the nursery owners?, goes to the

Agriculture College students. The nursery owners showed the lowest weight of 21.67, and for the College of Education for Pure Sciences the weight was 31.67.

Table 4 Correlation coefficient between samples source

	Correlation coefficient-r
College of Education for Pure Sciences and Agriculture College	0.74**
College of Education for Pure Sciences and nursery owners	0.68**
Agriculture College	0.86**
** (P ≤ 0.01) high significant indication	

Table 4 revealed significant differences between the samples source, the highest percentage difference (0.86) was between the College of Agriculture and the nursery owners. Though, the percentage difference between the College of Education for Pure Sciences and the College of Agriculture was 0.74. Finally, difference between the College of Education for Pure Sciences and the nursery owners was 0.68.

4. DISCUSSIONS

This is a novel study to assess the awareness levels about the importance of plant tissue culture technology among college students and nursery owners in Diyala governorate. The results revealed that the students of the Faculty of Agriculture have the highest awareness percentage. This is due to the existence of a study material about the technique in their syllabus and a laboratory for plant tissue culture in their faculty. On the other hand, less knowledge about the importance and applications of the technique has been recognized among the nursery owners. This is due to their lack of interest to develop agricultural techniques. Also, because of the lack of seminars and courses that required to develop the knowledge about the technique. This awareness development is anticipated to contribute to wide range of applications that benefit the community. For the College of Education for Pure Sciences, the students don not academic courses that related to the plant tissue culture technology. Therefore, they have also shown lack of knowledge about the importance and applications of the technology. However, few students, from stage four who are doing their graduation project in plant tissue culture technology, have shown good awareness about the technique, there were significant differences between the groups at the (P<0.01).

5. REFERENCE

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