

The Effect of Differences in Culture Media on Callus Formation

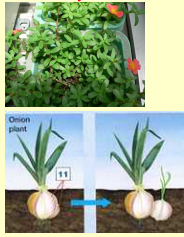
Ryuto Aoba

Kurashiki Amaki Senior High School 2nd year Class R

Introduction, Equipment, and Method

【Reproduction Method】

- ①Sexual reproduction
 - Making the seeds
- ②Asexual reproduction
 - Separating stems
 - Grafting
 - Tissue culture used in the field of biotechnology



【Tissue Culture Method】

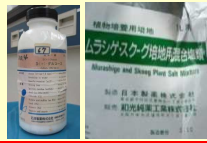
Important→Avoid mold and bacteria contamination

- ①At home
 - Use pressure cooker and a handmade sterilized box
 - Room temperature
- ②In the lab
 - Autoclave and Clean bench
 - Set temperature from 25 to 30℃



【Conditions】

- ①Samples
 - Carrot
 - Portulaca
- ②Culture media
 - banana
 - d-glucose
 - MS culture media



Experiments

【Experiment1】

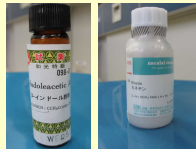
- Searching for possible callus formation at home
- Use pressure cooker and a handmade sterilized box
 - Keep at room temperature
 - Carrot and portulaca
 - Culture media with banana



【Experiment2】

Observing the stages of callus formation on culture media

- Use autoclave and clean bench
- Set temperature from 25℃ to 30℃
- Carrot and portulaca
- MS culture media
- MS+Auxin, MS+Auxin+Cytokinin



【Experiment3】

Observing the stages of callus formation on culture media

- Use autoclave and clean bench
- Set temperature from 25℃ to 30℃
- Carrot and portulaca
- Culture media with banana
- Banana+Auxin, Banana+Auxin+Cytokinin

【Experiment4】

Observing the stages of callus formation on culture media

- Use autoclave and clean bench
- Set temperature from 25℃ to 30℃
- Carrot and portulaca
- Culture media with D-glucose
- D-glucose+Auxin, D-glucose+Auxin+Cytokinin

Conclusion

	Hormones	Carrot callus	Portulaca Callus
MS	Auxin	○	○
	Auxin and Cytokinin	○	○
Banana	Auxin	×	×
	Auxin and Cytokinin	×	×
D-glucose	Auxin	×	○
	Auxin and Cytokinin	○	○

※○ means success, × means mistakes

- Adding the plant hormones is necessary
- Keeping a bacteria-free state is important
- Murashige&Skoog culture media work much more effectively
- The culture media with D-glucose is the most favorable

Sample Pictures



Purpose

- 1.To make plant Tissue culture at home and in the lab
- 2.To make cheap and effective culture

Results

【Experiment1】

	Conditions	Percent
Carrot	Mold contamination	0%
Portulaca	Mold contamination	0%

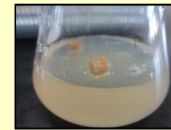


【Experiment2】

+Auxin	Conditions	Percent
Carrot	Callus	100%
Portulaca	Callus	100%
Carnation	Callus	100%



+Auxin and Cytokinin	Conditions	Percent
Carrot	Callus	100%
Portulaca	Callus	100%



【Experiment3】

+Auxin	Conditions	Percent
Carrot	Nothing	0%
Portulaca	Nothing	0%



+Auxin and Cytokinin	Conditions	Percent
Carrot	Nothing	0%
Portulaca	Mold	0%



【Experiment4】

+Auxin	Conditions	Percent
Carrot	Bacteria	0%
Portulaca	Callus	100%



+Auxin and Cytokinin	Conditions	Percent
Carrot	Callus	100%
Portulaca	Callus	100%



References

Books:

- 1)Actual Tissue Culture Planting Biotechnology. 2003.235p
- 2)Basic Knowledge of Plant Biotechnology. 2005. 254p
- 3)A Guide to Planting Tissue Culture. 1985. 138p
- 4)Biology II (Textbook). 2008.344p
- 5)Tissue Culture of Portulaca. 1998.174p

Websites:

- 6)http://www.pref.shiga.jp/g/nogyo/biomanual.html(2012.12.20)
- 7)www.noden.or.jp/look/0408vaio.html(2012.12.20)

Acknowledgement

Discussions with Mr. T. Nozu

at Kurashiki Amaki Senior High School about this research were very helpful.