

INFLUENCE OF TORSION FIELD ON *ARABIDOPSIS THALIANA* SEEDS GERMINATION

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Abstract. Col-0 line *Arabidopsis thaliana* seeds were exposed to left and right torsion field for 30, 60 and 90 minutes. The field was generated using the Comfort-7, a device that besides axial and radial components of axion field has also an azimuth component. After exposure the seeds were evaluated for energy and capacity of germination. Comparing the results obtained for seeds exposed to left and right torsion field and unexposed seeds, the influence of torsion fields improved the energy of germination by an overall difference of 36.6% and 39.33%. For the seeds exposed to left torsion field, the higher the time of exposure, the greater results were obtained; the energy of germination increased by 14% at 60 minutes and 28.33% for 90 minutes exposure comparing to the 30 minutes variant.

Keywords. Left torsion field, right torsion field, *Arabidopsis thaliana*, energy of germination.

INTRODUCTION

Torsion field theory is rooted in the discoveries and ideas formulated by Einstein's colleague, Eli Cartan, who in 1913 first used the term torsion force referring to its twisting motion, at the same time establishing clearly the momentum density spin angular fields generated concept (Akimov A.E., 1997). As the electromagnetic field is produced by electric charge and the gravitational field by mass, rotation or spin of a mass generates torsion field. All these fields have effects on long distances. The term torsion may be defined as a variable which describes the rotation. Torsion field theory supporters scientists confirms that the interaction of spin - spin can be transmitted by, or through space like electromagnetic waves, except, however, that this does not possess energy and mass but only information. There are generators of torsion fields, electrical installations, the use of which allows us to modify the properties of material objects, such as liquids, metals and alloys. Explaining the nature of the torsion field, scientists have concluded that depending on the direction of rotation the torsion fields can be right or left. They have shown also that the right fields are beneficial to humans because they improve the fluidity of all environments, increase the conductivity of cell membranes and by increasing the fluidity they reduce the chance of blood clots, there is an improvement of metabolic processes, an improvement of human overall homeostasis (www.torser.com). In turn, the left fields have deleterious influence on humans. What is interesting is that just left torsion fields predominate if not all, then most electronic devices around us. Starting from this point, the main purpose of the carried out research was to check if torsion field action can affect the germination of *Arabidopsis thaliana* seeds.

Arabidopsis thaliana is an annual plant belonging to Brassicaceae family and a very common plant used for research in plant biology and genetics. The small genome, completely sequenced, makes it a model organism and generated a series of large scale

projects aimed at discovering the functions of the 25.000 genes identified in *Arabidopsis thaliana* (Bevan and Walsh, 2005).

MATERIAL AND METHOD

The research was carried out on Col-0 line *Arabidopsis thaliana* seeds received from the Institute for Plant Biology Szeged, Hungary. To generate torsion field, Comfort-7 was used, a device that has both axial and radial components of the axion field and an azimuth component. The device consists of four sections: the power supply, where a variable alternating current voltage is applied, two stator sections and a pulsed relay section (www.ussdiscovery.com). Spin field generator is shown in Fig.1 and consists of a rotating ferrite hollow cylinder (1) whose axis of rotation (3) coincides with the main axis of symmetry of the cylinder. In the cylinder are inserted, in the form of an oblique comb, four permanent magnets (2). The cylinder can be in the form of either a flat ring or a tube.

Seeds were arranged in variants, each variant with three replications of 100 seeds. The variants were exposed to left and right torsion field action and another one remained unexposed representing the control variant. For each torsion field three exposure times were studied, T1 = 30 minutes, T2 = 60 minutes and T3 = 90 minutes, in order to determine whether the duration of exposure to the torsion field action has an influence on seeds germination and on the future plant growth. After the *Arabidopsis thaliana* seeds were exposed to the torsion field produced by Comfort-7 generator, they were placed in Linhardt type germination dishes to determine the germination capacity and energy of germination (Fig. 2).

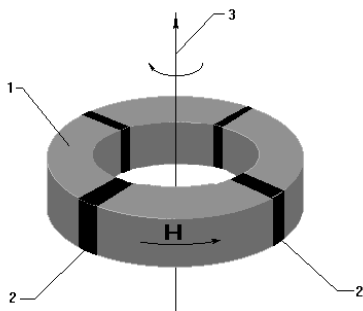


Fig.1 The diagram for the spin-field generator (source www.spinfield.idhost.kz -Alexander A. Shpilman)

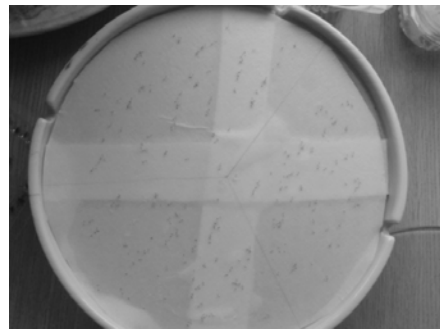


Fig. 2 Linhardt type germination dish with *Arabidopsis thaliana* seeds (original)

During the entire germination process conditions of humidity, light intensity and temperature were stable and favorable to the process, with 30% relative humidity and 23⁰C.

RESULTS AND DISCUSSION

The first seeds began to germinate at two days after their placing into germination dishes and until the sixth day the maximum percentage of seeds were germinated for all variants. The energy of germination (%) varied from one variant to another based on the

torsion field type action on which they have been subjected to and depending of the time of exposure (Table 1).

Table 1
Torsion field effect on the average energy of germination (%) of *Arabidopsis thaliana* seeds

Day	Left Torsion Field				Right Torsion Field			
	Exposure time				Exposure time			
	Control	30 min	60 min	90 min	Control	30 min	60 min	90 min
2	22.0	51.0	60.0	77.0	22.0	73.0	55.0	65.0
3	67.0	90.0	96.0	97.0	67.0	91.0	92.0	97.0
4	85.0	97.0	98.0	98.0	85.0	97.0	98.0	98.0
5	90.0	97.0	99.0	100.0	90.0	97.0	99.0	100.0
6	93.0	98.0	99.0	100.0	93.0	97.0	99.0	100.0

Using analysis of variance for the processing and interpretation of statistical data obtained after germination, the following results were drawn relevant:

To highlight the differences regarding the speed of germination, between seeds exposed to the torsion field action and witness seeds, comparison of the results of the three variants was performed. The influence of torsion field factor on the start of seeds germination was one positively stimulating. Between variants represented by the seeds that were not exposed to torsion field (C1), considered the control version, and seeds subjected to the action of left torsion field (C2) and right torsion field (C3), there were extremely significant difference according to Duncan significance test (Table 2).

Table 2
Influence of torsion field factor on germination process

Simbol	%	Difference	Signification	Duncan Test
C1	100,0	0,00	Mt.	A
C2	246,4	36,61	***	B
C3	257,3	39,33	***	B
			LD (p 5%)	4.44
			LD (p 1%)	6.45
			LD (p 0.1%)	9.68

In the case of left torsion field, exposure time has a direct effect on the speed of germination. The difference between the first exposure time T1 = 30 minutes considered as witness in this comparison, and exposure time T2 = 60 minutes, the difference is highly significant. Extremely significant difference was observed between T1 and T3 = 90 minutes (Table 3).

Table 3
Exposure time influence on seeds exposed to left torsion field action

Simbol	%	Difference	Signification	Duncan Test
T1 C2	100.0	0,00	Mt.	A
T2 C2	129.5	14.00	**	B
T3 C2	159.6	28.33	***	C
			LD (p 5%)	8.55
			LD (p 1%)	6.45
			LD (p 0.1%)	15.56
			11.62	

CONCLUSIONS

The effect of torsion fields proved to be stimulating for the germination process of *Arabidopsis thaliana* seeds and can be successfully used in the future to improve this process.

The seeds under the influence of torsion fields, both left and right, had an increased energy of germination comparing to the unexposed seeds, the improved germination ranged between 29 and 55% based on time of exposure.

For the seeds exposed to left torsion field, the time of exposure was an effective factor to the improvement of germination the differences increased along with time exposure and they were very significant, according to the results of statistical calculations performed.

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