Universitat Autònoma de Barcelona

EFFECT OF PRESSURE ON SEED GERMINATION

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INTRODUCTION AND OBJECTIVES

In recent years, the growth rates of world agricultural production and crop yields have declined. This has raised fears that the world is not able to increase enough food production (FAO, 2002). Meanwhile, promising technologies have emerged (HHP, hydrostatic pressure treatments) that combine increased production with greater environmental protection.

My objective is to combine the HHP with the growth factors of the seeds to improve their performance, decreasing dormancy and thus obtaining a new technology to face the new environmental conditions that the future holds.

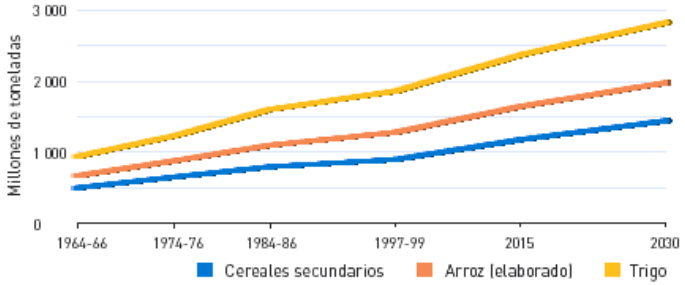

Figure 1. World demand for cereals from 1965 to 2030 (FAO, 2002)

Table 1. Observations of the germination rate of week 1 at 24 h of soaking					
Treatment time	Pressure (MPa)	24 h observation	48 h observation	72 h observation	% Germination
5 minutes	104	-	4	34	34%
	201	-	-	-	0%
	301	-	-	-	0%
10 minutes	103	-	1	20	20%
	200	-	-	-	0%
	301	-	-	-	0%
Control Group		29	62	80	80%

Table 2. Observations of the germination rate of week 3 at 24 h of soaking					
Treatment time	Pressure (MPa)	24 h observation	48 h observation	72 h observation	% Germination
5 minutes	52	3	12	15	15%
	101	4	4	9	9%
	152	-	-	-	0%
10 minutes	51	2	9	14	14%
	103	-	1	6	6%
	153	-	-	-	0%
Control Group		38	78	94	94%

MATERIALS AND METHODS

We treated rice seed at pla100, 200 and 300 MPa on first experiments and 50, 100 and 150 MPa on week 2 and 3 during 5 and 10 minutes in batches of 100 seed each.

All seed were soaked for 24h before being placed in trays for germination. Half the batches were soaked before and half after the HHP treatment. They were kept incubating under germination conditions and were observed at 24 h, 48 h and 72 h after all had completed the initial germination phase.

RESULTS

On the first trial, among the pressure treated ones, only pre-soaked ones germinated, and only for the lowest pressure level (Table 1).

On the second trial, the effect of pre-soaking was noticed again, and germinated for the lowest pressure (Table 2). However pressure treatment decreased germination rate and delayed germination.

DISCUSSION AND CONCLUSION

We find two articles in which they make use of the HHP, the first one makes reference to the fact that the use of this technology can cause an effect in the crystallization of the rice granules, being impossible its germination (Pérez, 2012). The second article uses this technology in Solanaceae seeds giving a positive effect on the germination rate, however in our case it does not help us because the Gramineous seeds (Islek, 2015).

Even so, the lack of prior documentation and the few experiments carried out in this regard, there are not enough resources to be able to draw an adequate comparison with our work and results.

In conclusion, we consider that high pressure treatments have been negative at their germination rate. This technology is not adequate to increase the yield in the fields.

REFERENCES

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