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The effect of seed coating on seed germination and growth indices of *Thinopyrum elongatum* seedling under salinity stress

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Introduction: *Thynopyrum elongatum* (Tall wheatgrass) is one of the most important pasture plants that are planted in the pastures of Iran (Johnson, 1991; Shannon, 1987).Germination is a stage of plant growth that is strongly influenced by environmental factors (Seefeldt et al, 2002;Bewley et al, 2013). Salt stress is one of the factors that reduce germination and plant establishment (Misra & Dwivedi, 2004 Seed coating is the practice of covering seeds with external materials to improve handling, protection and, to a lesser extent, germination enhancement and plant establishment. (pedrini et al, 2017).

Materials and methods: The experiment was conducted based on a factorial, completely randomized design with four replicates. The experiment was performed at seed laboratory at Razavi Seeds and Seedlings Institute, Mashhad, Iran in 2024.

The first factor is the test of coating the seeds with moisture and nutrient absorbent materials (polymer, chitosan, humic acid, chitosan and humic acid and no coating (control)) and the second factor is different levels.

In the experiment, five salinity levels (0, 60, 120, 180 and 210 mili Molar), and five different coating (control, polymer, chitosan, humic acid and chitosan-humic acid) were applied. Imposing salinity stress Depending on the target germination temperatures, amount of sodium chloride (g/L) needed to induce salinity stress was calculated.
To perform the germination-related traits, four replicates of 25 seeds per treatment were placed in 15-cm Petri dishes lined with Whatman filter paper. The seeds were germinated at 25°C in a germinator for 7 d (ISTA,2011).Germination rate (GR) was calculated according to the following equation:

$$GR=\sum(\frac{n1}{t1}+\frac{n2}{t2}+\cdots\frac{ni}{ti}) \quad (1)$$

where n is the number of newly germinated seeds each day, and t is the number of days from the beginning of the germination test.
At the end of the germination period, mean germination time (MGT) was calculated according to the following Eq. (ISTA, 2011):

$$MGT=\sum n.t/\sum n \quad (2)$$

Where n: number of seeds newly germinated at each day, t: number of days from sowing
where n is the number of newly germinated seeds each day, and t is the number of days from the beginning of the germination test.
All experimental data were subjected to analysis of variance using SAS 9.3 software.

Table and Figure:

Analyses of variance for salinity and coating on germination and growth indices

Source of variation	Df	Mean squres		
		GP (%)	MGT	Seedling dry weight
Salinity(S)	4	63.44^{NS}	9.24**	0.0003^{NS}
Coating(C)	4	165.04**	3.52**	0.0002^{NS}
S×C	16	19.34^{NS}	0.23^{NS}	0.0004^{NS}
CV%		5.9036	13.510	110.36

*, ** Significant at P ≤ 0.05 and P ≤ 0.01, respectively. NS: Non-significant

Results and Discussion: The variation attributable to salinity levels greater than 120 mM and seed coating was significant for mean germination time (MGT) (Table 1)**.** Furthermore, the variation attributable to seed coating was significant for germination percentage (GP). According to Table 2, there was a significant for all indices, except for Seedling dry weight and the highest GP and MGT was related to polymer coat and humic acid coat (Table 3).

Conclusion: It can be concluded that salinity stress reduces the indicators of germination and seedling growth *Thynopyrum elongatum* and It seems that it is possible to use coating with polymer and humic acid to increase these indicators

Keywords: germination indicators, chitosan, humic acid, seedling growth, tall wheatgrass

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