

Effect of Soaking and Sowing of Lentil Seeds (*Lens culinaris* Med.) With or Without Seedcoats on Seedling Growth

Water-soluble exudates from many seeds contain substances which inhibit or retard germination¹⁻⁵. This communication reports some effects of water-soluble diffusates from seeds of *Lens culinaris* Med. on seedling growth and tries to determine whether these effects are due to the seedcoat or to the embryo.

Diffusates were prepared by soaking 60 commercial seeds, with (WC) or without (WOC) coats (special care was taken not to separate the 2 cotyledons or to damage the radicle and plumule, all damaged seeds were discarded) in 30 ml of distilled water for 4 or 16 h at 26 °C. WC and WOC seeds were then germinated in the dark at 26 °C in Petri dishes, on cottonwool and filter paper imbibed with distilled or soaking water.

Seven batches of seedlings were prepared following the scheme presented with the results in the Table. The results will be compared in the following series. Lots II/I and IV/III: the seedling growth is better on distilled water than on soaking water. Lots III-IV/I-II: it is better when the seedcoats are removed before sowing. The acceleration effect diminishes with time of cultivation (300-400% activation after 24 h, 200-300% after 48 h, 0-50% after 120 h). These results clearly demonstrate the presence of root inhibiting substances in the seedcoats.

Lots VI/V: the root growth of WOC soaked embryos is better on distilled than on soaking water, which indicates that root growth inhibitors are also in the cotyledons. Lots V-VI/I-II: soaking WOC embryos has a root growth promoting effect during the first hours (up to 48) of germination, a negative effect later. Lots

V-VI/III-IV: the root growth of embryos whose coats were removed before sowing is better during the first 24 h than that of embryos decoated before soaking. A root growth factor from coats or cotyledons is probably lost during soaking. Lots VII/VI: such a factor must exist in the seedcoats and pass through the embryo during soaking. Embryos growing on soaking water have a better root growth after 120 h.

The protective effect of seedcoats against osmotic processes⁶ between soaking water and embryos however must be kept in mind; the best growth is obtained when seeds are soaked with the coats and sown without them (batch IV).

Comparison between short (4 h) and long (16 h) time soaking in the different batches confirms the 2 last facts: the roots are longer in III and IV when the intact seeds have been soaking for 16 h; they are shorter in V and VI when decoated embryos were soaked for this longer time. General similar conclusions may be drawn for the stem growth.

The results presented here show that both seedcoats and embryos of lentil seeds contain water-soluble substances which retard and promote growth. Phenolic compounds, such as anthocyanins^{7,8} and coumarins^{9,10}, frequently mentioned in seeds and soils¹¹, affect germination and growth. Correlation between their growth effect and auxin catabolism has been discussed¹².

Because the lentil diffusates also contain substances of a phenolic nature, further experiments will be made to identify them and study their respective action in relation to auxin metabolism.

Root and stem growth of lentil seedlings in relation to the presence or absence of seedcoats in soaking and/or sowing

Batches	Treatment		Root length (mm) after h			Stem length (mm) after h
	Soaking	Sowing	24	48	120	120
I	WC	WC/SW	2.1	7.1 ^a / 6.1	36.1 ^a /46.2	12.0 ^a /20.4
II	WC	WC/DW	2.5	7.3 / 8.7	38.8 /55.1	12.6 /20.8
III	WC	WOC/SW	6.0	13.6 /17.2	35.5 /54.9	11.5 /22.2
IV	WC	WOC/DW	8.9	21.3 /26.9	53.4 /68.1	19.9 /17.5
V	WOC	WOC/SW	5.1	16.9 /12.0	24.9 /19.8	14.0 / 7.5
VI	WOC	WOC/DW	8.2	18.4 /16.4	27.0 /21.1	13.3 /12.5
VII	WOC	WOC/SW ^b	6.7	17.2 /14.2	28.7 /26.9	13.6 /16.8

^a The first number is for 4 h soaking, the second is for 16 h. ^b Coats separately. WC, with coats; WOC, without coats; DW, distilled water; SW, soaking water.

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Résumé. Des substances inhibitrices de la croissance racinaire sont présentées dans les téguments et les cotylédons des graines de Lentille. Leurs effets sont mis en évidence dans des germinations de graines préalablement imbibées et (ou) semées avec ou sans téguments.

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