

Germination improvement using chemicals in naturally aged seeds of sunflower cv. Morden

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Abstract : Nine month old seeds of sunflower cv. Morden were soaked in different chemicals viz., ferrous sulphate, borax, cobaltous chloride, ammonium molybdate, potassium dihydrogen orthophosphate and calcium chloride at different concentrations as well as at different seed to solution ratio. The treated seeds after drying to their original moisture content were evaluated for germination and vigour. The results showed that seeds soaked in one per cent calcium chloride solution for 6h in 1:1 seed to solution ratio improved the germination by 18 per cent with increased vigour over control.

Key words : Sunflower seeds, chemicals, germination, vigour.

Introduction

High quality seeds is the key to successful agriculture. Rapid rate of germination, uniformity in stand and capacity to do well over a wide range of environmental conditions in field are considered to be important as far as seed yield is concerned. Seed treatment has been considered as one of the methods of improving germination, seedling emergence and ultimately crop productivity.

Oilseeds are generally poor storer and lose their viability very rapidly under storage. The loss of viability is inevitable, irreversible and inexorable. Its rate and extent could be slowed down to some extent by seed invigouration treatments as those treatments are basically physiological in nature (Basu, 1984). Sunflower is a protein rich oilseed crop which of great demand in the market because of the non-cholesterol and anti-cholesterol properties of its oil. Seed dealers are confronted with poor germination of sunflower seeds especially with carryover seeds and if such seeds are invigourated it may increase the storability and may be a boon to them. The beneficial effects of chemical soaking treatments has been reported by Pandey and Sinha (1999) in groundnut, Renugadevi *et al.* (2001) in cowpea and Balamurugan *et al.* (2003) in sunflower.

The present investigation was taken up with the seeds of sunflower cv. Morden to evaluate the efficacy of seed treatments using chemicals in improving germination and vigour.

Materials and Methods

Seeds of sunflower cv. Morden formed the material for the present study. The nine month old seeds after initial seed quality evaluation were soaked in ferrous sulphate (0.1, 0.2 and 0.3 per cent), borax (0.1, 0.2 and 0.3 per cent), cobaltous chloride (0.1, 0.2 and 0.3 per cent), ammonium molybdate (0.1, 0.2 and 0.3 per cent), potassium dihydrogen orthophosphate (1, 2 and 3 per cent) and calcium chloride (0.5, 1.0 and 1.5 per cent) and water. The treatments were imposed for 3 h and 6h; at three different seed to solution ratio (w/v) viz., 1:0, 1:1 and 1:2. After the treatment, the seeds were dried to their original moisture content. The dried seeds were evaluated along with control (dry seeds) for their germinability in paper medium (ISTA, 1999) and vigour index values were computed as per Abdul-Baki and Anderson (1973).

Results and Discussion

The seed viability in terms of germination showed significant difference among the treatment

Table 2. Effect of seed invigouration treatments on root length (cm)

Location	Concentration (%)	3 hrs			6 hrs			Mean
		1:0.5 W/N	1:1 W/N	1:2 W/N	1:0.5 W/N	1:1 W/N	1:2 W/N	
Control	-	21.1	21.1	21.1	21.1	21.1	21.1	21.1
Water soaking	-	21.1	20.8	19.9	23.2	24.1	24.0	22.2
Ferrous sulphate	0.1	20.1	19.3	19.6	24.5	25.5	23.0	22.1
	0.2	20.6	23.2	21.3	20.2	21.9	19.6	
	0.3	23.0	23.7	23.1	20.3	24.6	23.6	
Cobaltous chloride	0.1	20.2	23.8	21.6	18.6	19.6	19.0	18.1
	0.2	23.2	23.2	23.0	16.2	17.6	16.3	
	0.3	13.0	13.7	16.5	13.0	13.2	14.2	
Borax	0.1	20.6	23.2	23.1	20.2	24.9	23.1	21.4
	0.2	22.0	22.6	22.3	20.4	21.8	19.5	
	0.3	19.8	20.5	17.3	21.6	21.2	20.7	
Ammonium molybdate	0.1	19.8	21.8	18.9	18.3	19.8	18.8	21.3
	0.2	25.6	25.1	25.0	20.9	22.6	21.0	
	0.3	21.0	20.7	19.2	21.5	22.5	20.9	
Potassium dihydrogen phosphate	1	21.5	21.7	20.3	19.6	21.5	19.7	20.7
	2	21.0	22.2	23.6	15.2	16.0	16.1	
	3	20.5	21.5	19.3	21.3	26.8	24.6	
Calcium chloride	0.5	18.2	22.9	19.0	24.0	25.6	25.2	22.5
	1	20.7	24.2	23.1	26.2	28.9	28.1	
	1.5	20.1	21.9	21.5	18.1	18.6	18.2	
Mean	C ₁	C ₂	C ₃	V ₁	V ₂	V ₃	D ₁	D ₂
	21.4	21.7	20.5	20.7	21.9	21.0	21.1	21.3

(Figures in parantheses indicate arcsine values)

T	C	V	D	TxC	TxV	TxD	CxV	CxD	VxD	TxCxV	TxCxD	TxVxD	CxVxD	TxCxVxD
0.048	NS	0.029	0.024	0.083	0.083	0.068	NS	NS	NS	0.144	0.117	0.117	NS	0.203

(T: Treatments, C: Concentration, V: W/N, D: Duration)

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