STUDIES ON GERMINATION OF JOJOBA *(SIMMONDSIA CHINENSIS)* SEEDS IN VARIOUS SALT CONCENTRATIONS AND SOIL TYPES

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Effect of various NaCl salinity levels (5,000, 10,000, 15,000 and 20,000 ppm) and soil types on germination of Jojoba was studied. The increasing salinity delayed and reduced the germination of seeds. Maximum germination was observed in clay loam soil followed by sandy loam and saline soil.

INTRODUCTION

Jojoba *(Simmondsia chinensis)* is rapidly attracting the attention of research workers throughout the world due to its various merits. Its importance has been mainly due to its rapid saturated seed oil waxes (about 52%) which are used in floor varnishes, carbon paper manufacture and polishes for furniture, shoes and automobile. Besides being known for superior lubricating properties of its oil, jojoba plants can also be utilised for land scaping and soil conservation. Its deep and extensive root system helps tap the available moisture from the surrounding areas, thus allowing jojoba plant to survive and grow where most of the other plants wither and die (Begg, 1977). Its grey-green leathery leaves are adapted to withstand heat and aridity. A wide range of ecological environment of arid areas needs such type of landscaping material which could give beauty as well as good commercial return.

Begg (1977) stated that when number of plantings of jojoba were established in controlled environments and compared with other drought tolerant xerophytes *(Acacia aneura, Triodia basedowic* and *Acacia arophylla)*, these showed greater resistance to desiccation. Hogan (1979) cultivated the jojoba seed in different sites to study its germination and found that jojoba was tolerant to fairly high salinity levels but a coarse, high or medium textured soil was found to be the most desirable. Yermanos (1979) studied the germination of jojoba seed in semi-arid regions and stated that jojoba could grow satisfactorily in areas of marginal soil fertility with high salinity and atmospheric temperature. Meagre research work has been conducted on jojoba. The objective of the present project was to study germination of jojoba seeds in various salt concentrations and soil types.

MATERIALS AND METHODS

Germination tests of jojoba seeds in different NaCl concentrations were laid out in petridishes (100 x 20 mm) having moist filter paper underneath. Five seeds were sown in each petridish. Salinity levels of 5,000, 10,000, 15,000, 20,000 and a control were developed with NaCl salt. A completely randomised design with 4 repeats was used. Solution of different salt concentrations (25 ml) was poured in each

petridish except the control which were filled with distilled water. These were kept in laboratory at a room temperature of 30 ± 2 ° C. The data on number of seeds germinated per treatment per day were recorded up to 20 days after sowing.

of the saturated extract of these soils was determined and was found 1.1, 3.4 and 9.3 dS m^{-1}, respectively. These soils were put in the polyethylene bags to germinate seeds. A completely randomised design was used with 4 repeats. One seed was sown in each

Table 1. Number of jojoba seeds germinated in various NaCl concentrations (20 seeds in each treatment)

Days after germination	NaCl concentration (ppm)				
	Control	5,000	10,000	15,000	20,000
1	-	-	-	-	-
2	-	-	-	-	-
3	-	-	-	-	-
4	-	-	-	-	-
5	3	-	-	-	-
6	8	5	3	-	-
7	12	8	5	-	-
8	17	12	5	1	-
9	20	14	8	3	-
10	20	16	7	3	-
11	20	18	10	4	-
12	20	18	12	4	-
13	20	19	12	8	2
14	20	19	13	7	2
15	20	20	15	9	3
16	20	20	15	10	5
17	20	20	17	10	5
18	20	20	18	11	8
19	20	20	20	11	8
20	20	20	20	11	6
Average	5.0 a	5.0 a	5.0 a	2.75 b	1.5 c
Germination	100	100	100	55	30

Mean values sharing same letter(s) are non-significantly different at P = 0.05.

Germination test in sandy loam, clay loam and saline soils was laid out. The EC_e polyethylene bag. The data were recorded on number of germinated seeds per treat-

ment after 20 days. The data recorded were analysed statistically by ANOVA technique (Steel and Torrie, 1980).

Table 2. Number of jojoba seeds germinated in various soils (25 seeds/replication)

Soil type		EC_e dS m^{-1}	Number of seeds germinated	Germination (%)
Sandy loam	(S_1)	1.1	15.25 b	61
Clay loam	(S_2)	3.4	19.75 a	79
Saline	(S_3)	9.3	8.25 c	33

Mean values sharing same letter(s) are non-significantly different at P = 0.05.

RESULTS AND DISCUSSION

In the control, the germination started on the 5th day after sowing of seeds in petridishes (Table 1). Germination started on the 6th day in 5,000 and 10,000 ppm concentrations while in 15,000 and 20,000 ppm concentrations, germination started on the 8th and 13th day, respectively. This indicated that as the salt concentration increased, germination was delayed. The control, 5,000 and 10,000 ppm salt concentration treatments compared 100% germination on 9th, 15th and 19th day, respectively, whereas 15,000 and 20,000 ppm concentrations showed 55% and 30% germination up to 20th day.

Although the germination percentage reduced with increasing the salt concentrations, yet it was observed that jojoba has the inherent capacity to germinate at 20,000 ppm of NaCl concentration and that jojoba is highly salt tolerant plant. This is in close conformity with the observation of Hogan (1979).

This study indicated that the clay loam soil (S_1) having EC_e 3.4 dS m^{-1} was the most suitable for the jojoba seed germination (Table 2). In sandy loam soil (S_2) having EC_e 1.1 dS m^{-1}, the germination was better compared with saline soil (S_3) having EC_e 9.3 dS m^{-1}. It was observed that the difference in germination in S_1 (61%) and S_2 (79%), though statistically significant, is not of that degree as between S_2 and S_3 where the germination fell to 33%. Similar results were noted by Yermanos (1979).

From the above studies, it is clearly indicated that jojoba seeds can be germinated in a wide range of soil types and severe environments including saline soils.

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