The Effect of mechanical Scarification and combination with Gibberelic acid and Potasium nitrate(Kno3) on Germination of *Zizyphus Nummularia* Seed

Kourosh Zandifar[1*], Hassanali Naghdi Badi[2], Ali Mehrafarin[2]*, Majid Ghorbani Nohooji[2]

[1] Department of Horticulture, Science and Research Branch, Islamic Azad University, Tehran, Iran

[2] Medicinal Plants Research Center, Institute of Medicinal Plants, ACECR, Karaj, Iran

[*]*Corresponding Author: k.zandifar88@gmail.com*

Abstract

Zizyphus nummularia tree is one of the tropical fruits which its appearance is in the south of central Asia. This paper is done for surveying the effective methods in germinations and improvements of germinated seed characteristic. For this purpose, a test is done as a random scheme on seed germination of this tree with 5 cares in 4 iterations. Cares are consisting of distilled water, mechanical Scarification with rasper for 15 minutes and the care's combinatory effects was with Gibberelic acid (100, 500 and 1000ppm) and Potasium nitrate. results obtained from number of germinated seeds, germination percent, speed of leg growth, speed of stem growth has shown that combinatory cares are more effective that mechanical scratch care cause 24 % germination and mechanical and Gibberelic acid combinatory scratch care5 caused 500 ppm and Potassium nitrate caused 0.2% 44% germination and improvement in leg and stem growth. Increasing in Gibberelic acid caused in intense decrease in germination. But without any outstanding effect in leg and stem growth. Therefore, we can mention that in lotus seed besides scratching and lowering the crust thickness, using the hormones is effective in increasing of germination power.

Keywords: *zizyphus nummularia*, germination, mechanical Scarification

Introduction

Zizyphus nummularia has big trunk with red and small fruit by sugary and pleasant sour taste. This tree usually found in Khouzestan, south of Fars, Boushehr, Hormozgan, Sistan and baloochestan, and some regions of Kerman (bordbar, 2005). a small prickly tree and highly branches, 1-2-meter height, with divergent branches, one-year-old branches are white or brown, thistledown, new branches in new year and past year are ashy, dingy or brown. Eardrop thrones 1-1.5 cm length, thorny, thin, alternate taller, circle, red color (mozafarian, 1999). Fruits are drupes of red and round. The lotus can widespread from iran to india. The bush of this plant grows in sandy and stony lands in dry and semi dry area. It is always green but some of it's leafs would fall in hot seasons. This eared feature will suit plant for animal's food. Due to it's main roots system it has high ability for further growth (Mahishwar and Bhandari, 1963). *Zizyphus Nummularia* is multiobjective, which is valuable for it' s eatable fruit, feedstuff leafs, suitable branches for fencing, suitable wood for burning and finally as a local drug. Lotus seed would germinate only after recessive period. One or two month after derivation, germination will increase. And one year seeds have better germination. Soaking the core in water will cause better germination. Germination of derivate seed would start in a week by fracture of core (daghighi, 2005).

Rigid seeds usually need mechanical, chemical,phisical scratch, overwhelming in boiling water and ventilation for easiness in absorbing water and germination. Gibberelic acid is one of the important hormones for growing which has an important role in exhilarate of the seed, replacing frost in rigid crust seeds and finally in germination of plant's seeds (pirbaloti *et al*, 2007). It is reported that the cassia seeds showed the highest percent of germination in mechanical Scarification cares,and cares such as soaking the seed in hot water and chemical Scarification don't have eminent difference with distilled water.

Materials and Methods

This survey is implemented with random scheme with 5 cares and 4 iterations for each care. These cares were consisting of distilled water care, mechanical scratching, Combinatory cares such as mechanical scratching with Gibberelic acid 100, 500, 1000 ppm and potassium nitrate 2%. Before the survey, the seeds were soaked in 18 % saltwater that rotten and drawn seeds be separated. Then they disinfected in hypochlorite and washed with distilled water. For mechanical scratch care the seeds were rubbed out for 15 minutes. The seeds which were as combinatory cares, were soaked for 72 hours in Gibberelic acid 100, 500, 1000 ppm. For keeping the petridish wet, we use benomil 0.002. The floor dampening across the study.

Temperature of laboratory was set on 25 and this condition fixed until ending of examination. During the test, the changes of the seeds such as germination, germination speed, stem and leg growth checked and noted in a specific period.

Results and discussions:

This study showed that because of rigid and impervious crust lotus seed can't germinate in usual condition. So use of methods that makes permeable this rigid crust can facilitate the germination. There were 1% significant differences in statistical level among germination stimulators.

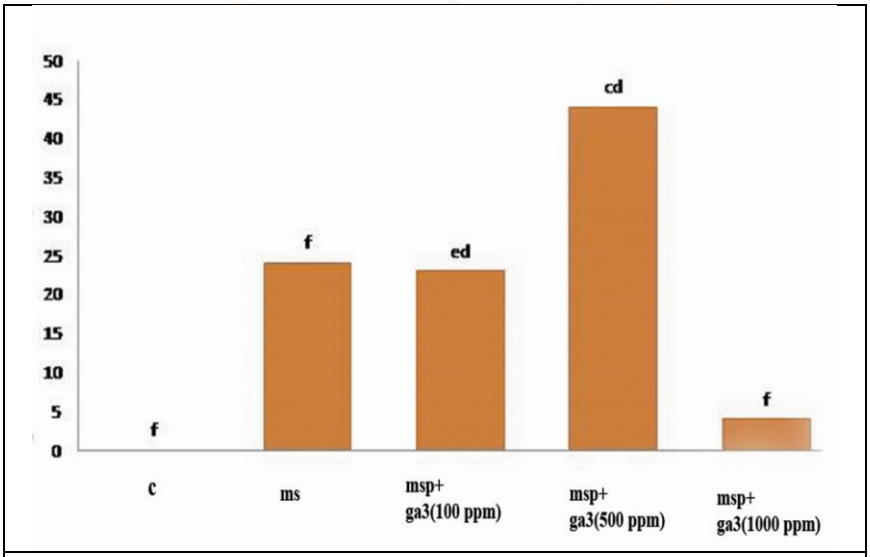

Fig 1: percent Germination(C=control,MS= Mechanical Scarification,MSp+GA3=Mechanical Scarification+Ga3)

Mechanical Scratching treatment significantly increase the lotus seed germination compare with control treatment. Also in combinatory treatment we see significant differences with distilled water and all other treatment. Using mechanical scratching treatment alone or with Gibberelic acid and potassium nitrate was effective in stimulation to germination, stem and root growth, germination speed. So it seems decreasing in thickness of seed crust led to increase the germination. In drug sort gardenia, Echinacea angustitolia and Myrtus commanis the highest percent of germination in mechanical scarification treatment will obtain with sand paper. This study showed that this plant's seed crust act as a physical barrier by preventing the germ spread and also limit the water absorption and gas interchanges (makizadeh *et al*, 2005). It seems that pressure induced by water absorption and embryo emergent plants growth isn't sufficient for break of lotus seed, and mechanical scarification makes thinning seed crust, therefore germination physical resistance would decrease (Fig1).

Ghadamyari (2008) illustrated that contemporary use of Gibberelic acid and potassium nitrate with concentration between 100-ppm, on Scarification datura seed has the results in germination and growing the root and stem of plant and concluded that Scarification seeds which are under combinatory care of potassium nitrate and acid Gibberelic, have higher germination power. In combination with various concentration of gibberlic acid the result shows different result, so the mechanical scarification treatment with gibberlik acid (100 ppm) indicated significant difference compare the distilled water but not toward the mechanical scarification treatment (Table 1).

Table 1. Comparision on intermediate The Effect of mechanical Scarification and combination with Gibberelic acid and Potasium nitrate on Germination of *Zizyphus Nummularia* Seed

Treatments	Max of stem growth	Stem length growth speed	Percent Germination	Germination
Control	0h	0h	0f	0f
Mechanical Scarification	26.5e	13.603de	24cd	6cd
Mechanical Scarification+Ga3(100ppm)+ potasium nitrate	17.75fg	10.32f	12cd	5.75cd
Mechanical Scarification+Ga3(500ppm)+ potasium nitrate	28e	15.113d	44b	11b
Mechanical Scarification+Ga3(1000ppm)+ potasium nitrate	25.5e	13.848de	4f	1f

Increasing the acid Gibberelic concentration to 500 ppm, led to 44% improvement in germination. It showed significant difference either toward disttiled water (control) and mechanical Scarification treatment alone or treatment with Gibberelic acid 100 ppm. In combine treatment with gibberlic acid 100 ppm or potassium nitrate0.2%, the percent of

germination sharply decreased so that this treatment obtained any significant differences with control but in contrast with other treatment it had significant difference. So we conclude that studied treatment are effective on mount lotus seed germination percent. In this synthesized Gibberlic acid and Potassium nitrate act as chemical motivators (Table 2).

Table 2. Comparision on intermediate The Effect of mechanical Scarification and combination with Gibberelic acid and Potasium nitrate on Germination of *Zizyphus Nummularia* Seed

Treatments	Seed strength index	Seedling length	Germination speed	inter madiat Germination time
Control	0h	0h	0e	0f
Mechanical Scarification	14.4cd	60f	0.05c	18.45ed
Mechanical Scarification+Ga3(100ppm)+ potasium nitrate	11.36fed	52.25g	0.07ab	14.94e
Mechanical Scarification+Ga3(500ppm)+ potasium nitrate	28.83b	65.5e	0.06cb	15.93e
Mechanical Scarification+Ga3(1000ppm)+ potasium nitrate	2.53hg	63ef	0.05c	11.375e

Sirak (2004) reported that Gibberelic acid would increase hydraulic enzymes synthesis which are in alorooni layer. And santezed enzymes transfer to endosperm and cause dissection of saved nutrition and supplying necessary energy for germination. Khan (1999) mentioned that potassium nitrate cause biosynthesise oxine and start regrowth of emergent plant reperted that. (pirbalooti *et al*, 2007) using gibberelic acid and potassium nitrate cause balancing in seed hormones and decreasing of growth disincentive material such as Abscisic acid and finally positive effect on germina tion process.Effective concentration of gibberelic acid is different for various species. So that his (2008) colleges have used 300 ppm, Mahmood zade and Bagheri (2005) 500 ppm.

In present paper 500 ppm has good effect. Mahmood zade and bagheri (2005) have mentioned that some plan ie of potassium nitrate which are recommended by ISTA for motivating the germination and is used in most of researches is 0.1 and 0.2 % and using higher concentration in some cases led to germination decrease. It's recommended that while surveying and doing complementary tests on gross lotus, hormone cares in combination with Scarification treatment must be used for germination of mount lotus seed.

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