



# Improve the Seed Vigor of Bitter Gourd (*Momordica charantia* L.) by Ultrasonic & Dehydration Treatment



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## Introduction

Bitter melon is an important warm-season crop in Asia. In sub-tropical region, spring season cropping is practiced in order to avoid the disease and pest caused by the high temperature and humidity during summer season and to obtain better profits. The main obstacle of spring crop bitter melon is poor germination rate due to seed dormancy by hard seed coat and sub-optimal germination temperature (20-25 °C). In this study, ultrasonic treatment is tested to replace the mechanical scarification for physical dormancy breaking and discuss the seed vigor after dehydration and storage in order to facilitate transportation & storage and improve the seed value.

## Material and Methods

**Ultrasonic Treatment** Bitter melon 'Moon Shine' seeds are treated with 10, 20, 30 and 60 minutes ultrasonic treatment at 50, 55 and 60 °C then proceeded the germination test at 30 °C by sand (S).

**Dehydration Treatment** Bitter melon 'Pai Pi' seeds dehydrated at 20, 25 and 30 °C for 26 hours after 60 °C /10 minutes ultrasonic treatment to approximately 7% seed moisture content then proceeded the germination test at 20, 25 and 30 °C by sand (S).

**Storage** We stored treated bitter melon 'Pai Pi' seeds at room temperature for 6 months and test the germination rate per month.

## Result and Discussion

Ultrasonic treated bitter melon 'Moon Shine' seeds shows significant higher germination rate than control (Fig. 1). The highest germination rate is found in 55 °C /20 minutes treatment indicating that higher temperature (55-60 °C) and shorter duration (10-20 minutes) is proper treatment condition.

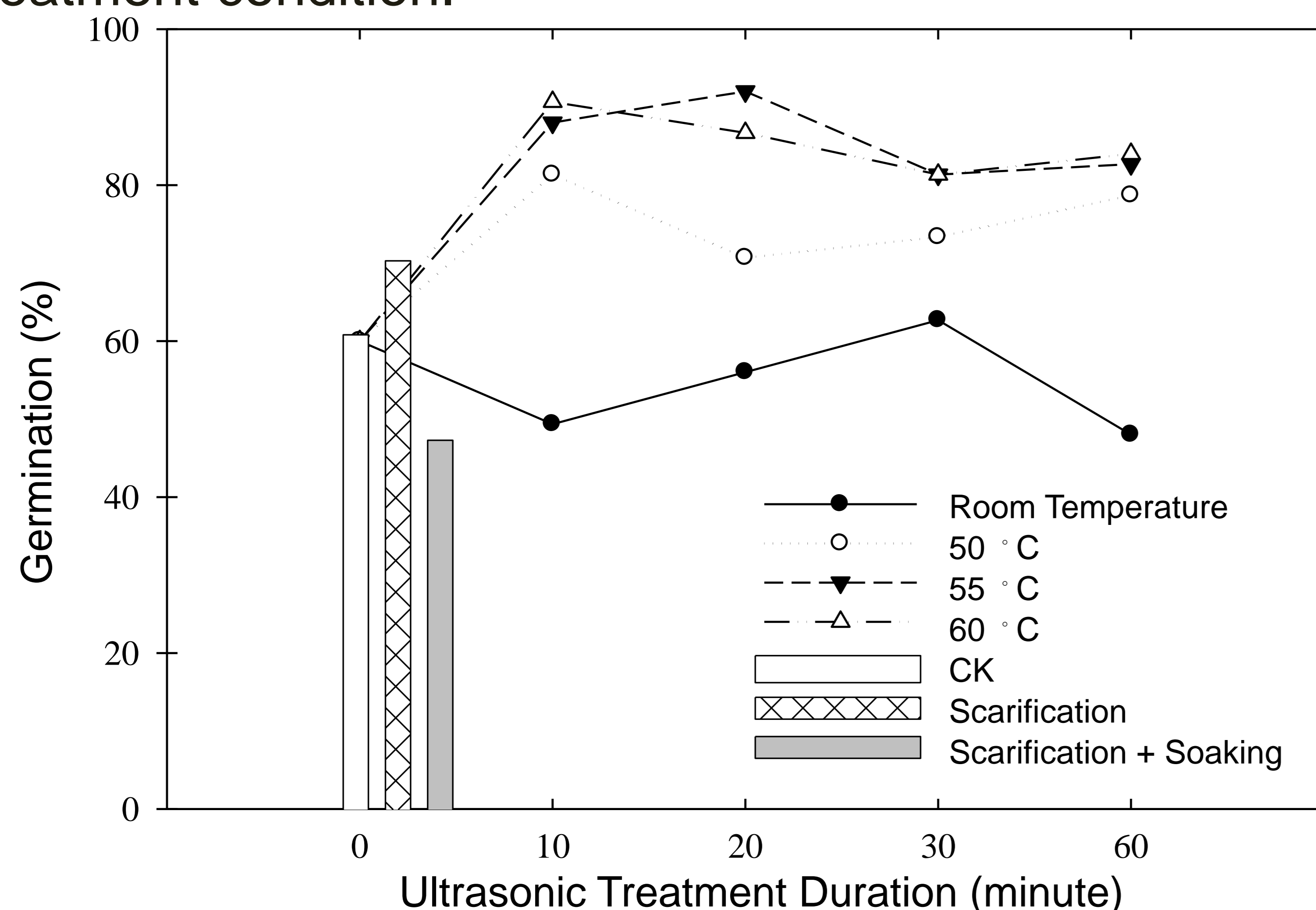


Figure 1. Effect of ultrasonic treatments on germination percentage of bitter melon seeds.

The 200X microscopic thin section of bitter melon 'Moon Shine' seed coat shows ultrasonic treated seeds with looser cell structure and larger intercellular space in seed coat section compared with untreated seeds (Fig. 2).

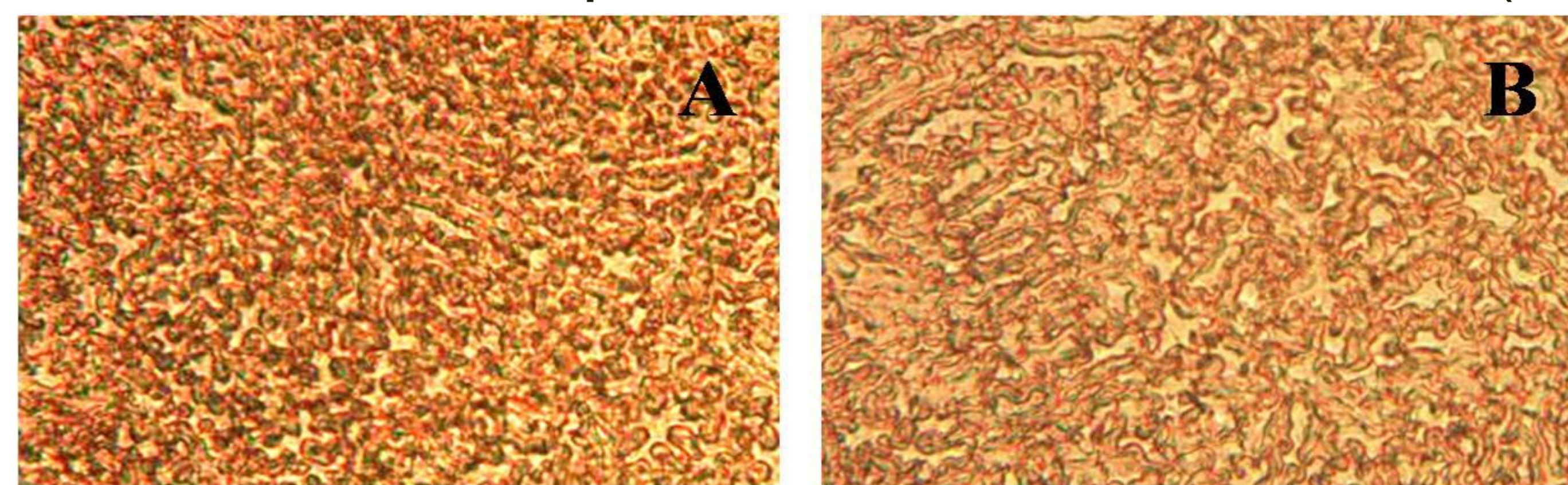


Figure 2. Comparison of micro-section of bitter melon 'Moon Shine' seed surface on control (A) and after treated at 60°C by ultrasound for 10 min (B)

Dehydration treatment reduced the seed moisture content and is beneficial for short-term storage. The result shows the ultrasonic treatment promoted the bitter melon 'Pai Pi' seeds germination rate at sub-optimal germination temperature and could be maintained after dehydration treatment (Table 1).

Table 1. Effect of dehydration temperatures on germination percentage of bitter melon 'Pai Pi' seeds after ultrasound treatment.

Dehydration	Germination (%)				LSD <sub>0.05</sub>
	25 °C	30 °C	35 °C		
CK	32	40	74		12.97
Without dehydration	80	83	72		--
20°C	83	78	74		--
25°C	85	83	74		--
30°C	87	77	69		13.86
LSD <sub>0.05</sub>	18.12	11.17	--		

The treatment is effective after short-term storage. The ultrasonic/dehydration treated bitter melon seeds shows higher germination rate compared with untreated ones during six months storage at 20 and 25 °C (Figure 3).

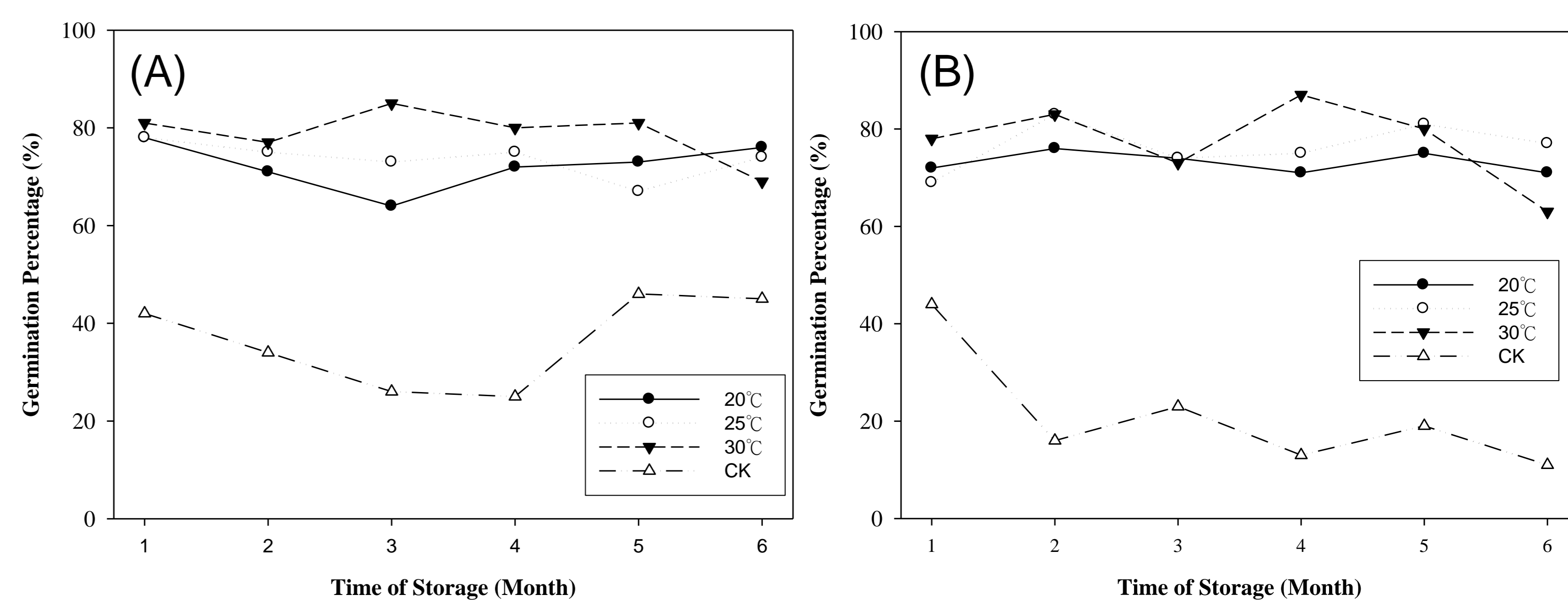


Figure 3. Effect of storage temperature on germination percentage at (A) 20 and (B) 25 °C of ultrasound & dehydration treated bitter melon 'Pai Pi' seeds.

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