

## A Study on Storage of Major Herbal Medicine Materials, *Bupleurum falcatum* Radix

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### ABSTRACT

To develop optimal storage method of root of *Bupleurum falcatum* Radix grown on major cultural herbal medicine materials, root of *Bupleurum falcatum* Radix was stored for 10 months with different packing materials and sealing methods. The loss in dry weight as influenced by packing materials and sealing methods was the lowest at vacuum packing and followed by complete sealing methods with transparent polyethylene film. The ratio of root rot during the storage period was not significantly different between packing materials but was significantly different between sealing conditions. Conclusively, vacuum packing and complete sealing with polyethylene film appears to be optimal for storage of *Bupleurum falcatum* Radix.

**Key Words :** *Bupleurum falcatum* Radix, storage, herbal medicine materials, polyethylene film

### INTRODUCTION

*Bupleurum falcatum*, a perennial herbal medicinal plant, has been grown through all the Korean Peninsula. The plant started to sprout on the middle of April and bloom on July. *Bupleurum falcatum* is being cultivated at the middle southern area of Korea, it needs to have long growing period. Therefore, *Bupleurum falcatum* has been mainly produced at the west southern coast area, specially Yecheon region(Choi, 1996; Kim et al, 1997).

Main cultivar of *Bupleurum falcatum* "Samdo" produced at Yecheon are planted on late fall or early spring, and harvested on the middle of November(Kim et al, 1994)

After harvest, tertiary roots and shoot parts of the plant are removed by cutting and washed with fresh tap

water. The root parts were dried by natural sunshine, which usually used in farmer household. In case of drying by sunshine, even though there is a little difference according to weather, it takes 7 to 10 days to dry. After drying the materials were wrapped with polyethylene films, stored at well-ventilated place and finally shipped as major cultural herbal medicine materials.

Herbal medicine materials are generally stored until they were sold or used for medicine. During storage, temperature, humidity, and ventilation of room were very important factors to keep good quality of plants even they well dried and cleaned. The factors can influence damage in quality as well as aberration in the efficacy of chemicals(Choi, 1994; Choi et al, 1997). Several points must be considered during storage. It should be ventilated to lessen humidity, stored at

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cooling room, prevented from insects, and stored at airtight container. Choi (1994) reported in a previous study that herbal medicinal materials should be stored at the place where are well ventilated with low temperature, dry and prevented from insects. Roots of *Bupleurum falcatum* Radix have to be completely dried to prevent from decaying. Especially quality of goods might be lowered by fungus. This study was conducted to determine causes and their solution of loss in quantity as well as in quality during storage of *Bupleurum falcatum* Radix. Loss in amount and rotting rate at different harvest time were examined according to storage of different packing materials and sealing conditions.

## MATERIALS AND METHODS

Cultivar 'Samdo' of *Bupleurum falcatum* Radix was planted at herb garden of Department of Oriental Medicine Resources, Sunchon National University in April, 1998. Roots of one hundred plants were carefully sampled without damage by using agricultural spades at

60 cm high from soil surface. The roots were washed with tap water, dried under natural sunshine for 24 hours, and dried again with cold wind at 40°C for 7 days. After drying the roots were chopped into 10 cm in length of main root. Mean root weight a plant was about 10 grams. The collected roots of *Bupleurum falcatum* were separately wrapped in different polyethylene film envelops(15cm × 30cm × 0.05mm) with transparent, black, and green color. The envelops containing samples were treated with vacuum packing, complete sealing, and punching method. Vacuum packing of transparent polyethylene film was using Vacuum Packer (JW-500XL). Punching on polyethylene film was made into 5 mm in diameter and 10 punches an envelop were evenly given.

After packing the envelops were dried and stored at cooling room until investigated. Loss in weight and rotten rate after storage were measured with 6 times at 2 month-intervals from December 15, 1999 to October 15, 2000. All assessment was made according to RDA Standard Methods for Field Experiment(Rural Development Administration, 1989).

**Table 1.** Comparison of loss in weight as influenced by packing materials and sealing methods in root storage of *Bupleurum falcatum* Radix

Packing materials	Sealing degree	Investigating time					
		1999			1998		
		Dec. 15	Feb. 15	Apr. 15	Jun. 15	Aug. 15	Oct. 15
T. P.E <sup>y)</sup>	C.sealingz)	1,000(g)	885(g)b <sup>x)</sup>	878(g)b	869(g)b	860(g)b	855(g)b
	Punch	1,000	874b	866b	847b	809c	799c
B. P.E	C.sealing	1,000	887b	875b	869b	867b	858b
	Punch	1,000	877b	869b	849b	810c	796c
G. P.E	C.sealing	1,000	883b	873b	869b	868b	857b
	Punch	1,000	871b	865b	846b	812c	797c
T. P.E	V.P <sup>o)</sup>	1,000	967a	951a	947a	939a	920a

<sup>x)</sup> Mean separation within column by Duncan's multiple range test, 5% level of significance.

<sup>y)</sup> T. P.E : Transparent polyethylene film

B. P.E : Black color polyethylene film

G. P.E : Green color polyethylene film

<sup>z)</sup> C. sealing : Complete sealing

Punch : Punch( 5mm) on polyethylene film

<sup>o)</sup> V.P : Vacuum packing

## RESULTS AND DISCUSSION

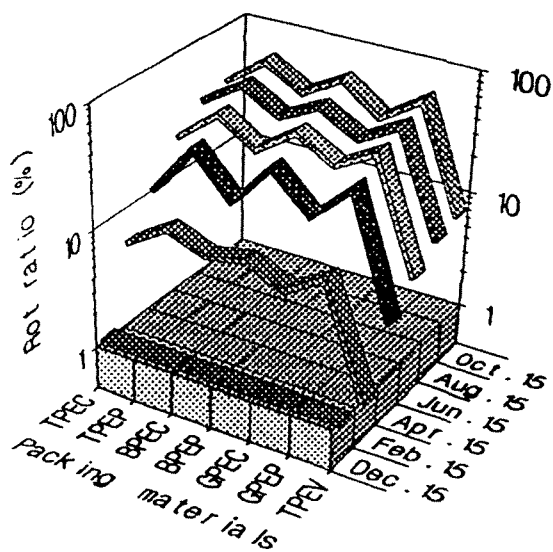
### 1. Dry Weight of *Bupleurum falcatum* Root during Storage

Dry weight of *Bupleurum falcatum* root during storage as affected by different packing materials and sealing methods was determined 6 times at 2 month-intervals in 1998 and 1999. No difference in dry weight among storage durations was observed, but complete sealing treatment affected dry weight of plant root. Dry weight of *Bupleurum falcatum* root was gradually reduced with time regardless of packing materials and sealing methods. In sealing treatment, dry weight of root stored with complete sealing with punch were more reduced than with vacuum packing.

It was thought that water from the dried roots could be naturally evaporated through complete sealing or punch with time during storage. Root dry weight of

*Bupleurum falcatum* sealed with punch was more reduced than complete sealing without punch. In packing materials, the colors of polyethylene film did not affect root dry weight. This result showed that storage with complete sealing without punch could be better than storage by sealing with punch for long term storage. Storage with vacuum packing did not affect root dry weight and was best among treatments. Dry weight of *Bupleurum falcatum* root was little bit changed by vacuum packing methods during storage. These results showed that storage methods with complete sealing or with vacuum did not affect dry weight of root because of restriction of air exchange.

Chung et al (1991) reported that complete sealing storage with polyethylene film sustained quality of kiwi-fruits for long term. Therefore, storage with complete sealing or with vacuum packing could be suitable for *Bupleurum falcatum* root, indicating no change in root weight, no humidity, and low infestation



**Fig. 2.** The change of rot ratio as influenced by packing materials and sealing methods in root storage of *Bupleurum falcatum*

T.P.E.C(Transparent Polyethylene film Complete sealing)    T.P.E.P(Transparent Polyethylene film Punch)  
 B.P.E.C( Black color Polyethylene film Complete sealing)    B.P.E.P(Black color Polyethylene film Punch)  
 G.P.E.C(Green color Polyethylene film Complete sealing)    G.P.E.P(Green color Polyethylene film Punch)  
 T.P.E.V(Transparent Polyethylene film Vacuum packing)

of insects and disease. However, more detail researches were needed for storage of other medicinal plant species.

## 2. Rotten Rate of *Bupleurum falcatum* Root during Storage

Rotten rate of *Bupleurum falcatum* root affected by different packing materials and sealing methods was examined (Fig. 1).

There was no significance in rotten rates among colors of packing materials, transparent, black, and green polyethylene film. Rotten rate of root packed with transparent P.E. film was slightly lower than with black or green P.E. film. Rotten rate of root was about 10% at 7 months after storage but was 58% at 11 months after storage, increasing with time. At 11 months after storage, rotting rate of root with vacuum packing was the least(10%) and the highest with punch storage(50-60%). The results indicates that storage by vacuum packing or by complete sealing appeared low rotting rate of *Bupleurum falcatum* root. However, storage with punched polyethylene film allowed diseases and insects to enter into packing or sealing materials through air punches, and so increased rotten rates. More researches on kinds of pests and infestation rate were required to better understand rotting mechanism.

Seong et al (1996) suggested that dry roots must be fumigated with chloroform and methylbromide when agricultural products were manufactured and stored to prevent from damaging of insects and weevil. The results of present study indicate that fumigates must be applied to control pests before storage with punched P.E. film for long term storage.

## CONCLUSION

This study was carried out obtain basic information for optimum storage method of root of *Bupleurum falcatum* Radix, which is being utilized as major

cultivated herbal medicine materials, root of *Bupleurum falcatum* was stored for 10 months in different packing materials and sealing methods, such as punched packing, sealing and vacuum packing. The results are summarized as follows. The loss in weight as influenced by packing materials and sealing degree was the lowest at vacuum packing and complete sealing condition with transparent polyethylene film. The ratio of root rot during the storage period was not significantly different between polyethylene films, but was significantly different between sealing conditions. Therefore, vacuum packing and complete sealing with polyethylene film are desirable storage condition for *Bupleurum falcatum* Radix.

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