


INSULATED PACKAGES- LINERS & COVERS

Introduction: When fresh produce can be cooled on the farm after harvest, it should be transported either via refrigerated truck or if this is not possible, in an insulated package that will help hold the cold. The insulation can be added to the inside or the outside of the package. This practice will extend the shelf life of the produce and assist the shipment to reach the local market, direct market buyer or the airport or seaport for export while maintaining its best possible quality.

Design Options & Materials Needed-- Package Liners An insulated individual package sized unit can be constructed using simple materials. The insulation materials used to line the inner surfaces of the package can be locally identified (such as foam pads or insulated fabrics) or purchased in sheets (thin foam or a metal foil bubble material such as Reflectix™.) The size of the insulation liner will depend upon the size of the package to be lined. To make a liner, cut the insulation material to a few mm smaller than the inner dimensions of the container. Reflective bubble insulation and foam sheets do not need to be finished after cutting, but fabric based insulation (a sandwich of fabric and foam) will need to be sewn around all the edges to prevent unraveling.

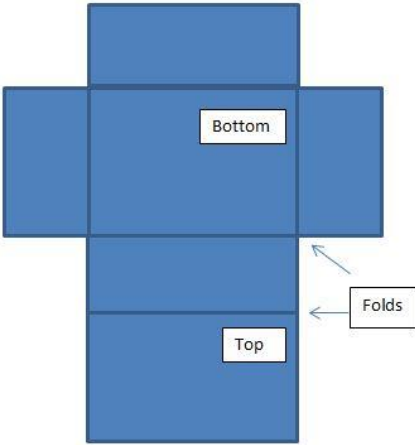
Individual insulated packages can be purchased ready-made but can be expensive (\$10 to \$15 each).



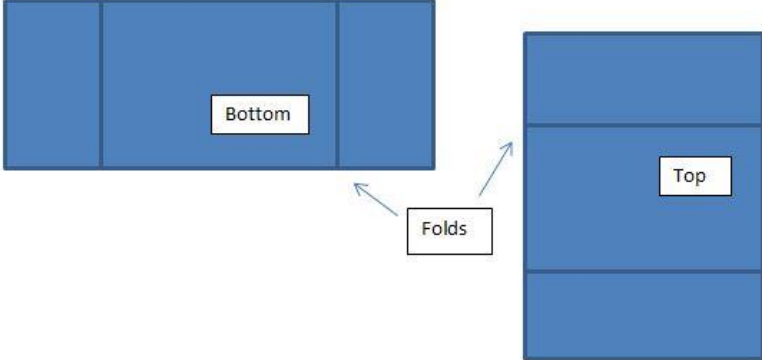

Two types of insulation: bubble foil roll, foam sheeting

Patterns for liner construction:

Design #1 (1 piece)



Design #2 (2 pieces)



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Low cost, small-scale practices for reducing postharvest food losses

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Package Covers: An insulated package covering made of quilted fabric, a thick blanket or a pallet cover can be used to add even more insulation during long distance journeys.



Costs and benefits

The costs of using insulated packages for transport of fresh pre-cooled produce will be only slightly higher than the cost for transportation of regular packages using the same vehicle. Once the insulated liner for the container has been constructed (at a cost of \$1 to \$10, depending upon the size and materials) it can be reused hundreds of times. Each use will help reduce postharvest losses and assist to maintain market value for a longer period of time as compared to ambient temperature transport.

Crop (1000 kg)	Typical package or container shipped under ambient conditions	Insulated package liners for containers shipped under ambient conditions	Potential increase in profits
Guava fruits	Market price \$1.50 per kg 83 cartons @ \$1.00 (holds 12kg) 15% weight loss, discards due to shrivel Market value = 850 kg x \$1.50 = \$1275 \$1275 - \$83 = \$1192	Market price \$1.75 per kg 100 cartons @ \$1.00 (holds 10 kg) 100 reusable liners @ \$4.00 2% weight loss, no shrivel Market value = 980 kg x \$1.75 = \$1715 \$1715 - \$100 = \$1615	\$1615- 1192 = \$423 The first use of the insulated liners will repay the total cost of \$400 plus provide an added profit of \$23. Use with each subsequent load of 1000 kg will result in an increased profit of \$423
Chili peppers	Market price \$3.00 per kg 166 cartons @ \$1.00 (holds 6kg) 15% weight loss, discards due to shrivel Market value = 850 kg x \$3.00 = \$2550 \$2550 - \$166 = \$2384	Market price \$3.50 per kg 200 cartons @ \$1.00 (holds 5 kg) 200 reusable liners @ \$4.00 2% weight loss, no shrivel Market value = 980 kg x \$3.50 = \$3430 \$3430 - \$200 = \$3230	\$3230- 2384 = \$1046 The first use of the insulated liners will repay the total cost of \$800 plus provide an added profit of \$246. Use with each subsequent load of 1000 kg will result in an increased profit of \$1046

For further information on insulation types and sources

<http://www.refrigiwear.com/shop-products/>

<https://www.reflectixinc.com/products/double-reflective-insulation/>

Small-scale postharvest handling practices: A manual for horticultural crops (Chapter 8; 5th edition 2015)

http://ucanr.edu/sites/Postharvest_Technology_Center_/files/231952.pdf

Postharvest Technology Center (UC Davis) <http://postharvest.ucdavis.edu>

The Postharvest Education Foundation <http://www.postharvest.org>

Postharvest Innovations LLC <http://www.postharvestinnovations.com>

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