CUCUMBER GROWERS' ASSOCIATION

## Shrink wrap - necessary? - An investigation by the CGA February / March 2007

Following a comment about the need to reduce packaging waste, a leading supplier to a major multiple asked if the CGA could justify the use of shrink wrap on cucumbers. One supplier was able to provide some details from their own measurements of weight losses in QC checks. It was decided to carry out a more in depth investigation.

Fruit was taken from four sites over the period 12th to 14th February - two cutting fruit in the weight range 250 - 350 grammes and two cutting in the weight range 350 - 450 grammes.

Twenty fruits were taken from each site - half naked and half shrink wrapped. Each sample was then split into two sub samples and half was placed in plastic crates and kept at 7 - 9 C [equivalent to a commercial cold store] the other half was kept in a domestic fridge.

The fruit was measured daily for 14 days to measure weight losses and also amount of bend. The amount of bend was assessed by a simple measure of deflection of the flower end of the cucumber from half way down the fruit to the tip. A fresh cucumber [still attached to the plant] will deflect about 0.5 to 1.0 cm by this measure.

The major concern in not wrapping the fruit is quality losses from weight loss. Once the fruit starts to shrivel and bend it is no longer "fit to sell" and would be discarded. As cucumber fruit tend to be ribbed [even if only slightly] the ribs tend to dry out first and this gives a very obvious visual effect.

Weight losses were varied in terms of the two different sizes selected. The smaller fruit suffering the most [probably because of their greater surface area to volume ratio].

One important factor is the look and feel of the fruit - the naked cucumbers were very soft by day three and the skin was quite shrivelled by day five. There were problems with cold damage with the fruit in the domestic fridge [cold damage] - but interestingly the wrapped fruit was almost unaffected.

By the end of the period of measurement - 14 days - the fruit was turning pale but the wrapped fruit was still just about saleable but slightly soft. None of the naked fruit was saleable after day five and would not have been picked up by Mrs Public after day three.

Storage in a domestic fridge compared to a cool ambient environment of 7 - 9C had no effect on weight loss and did actually reduce storage life because of cold injury.

**WEIGHT LOSSES -** Weight losses in cool ambient storage were as follows:-

**NAKED FRUIT**

| Starting weight | | 3 days | percentage | 14 days | percentage |
|---|---|---|---|---|---|
| Sample A | 405g | 12.8g | 3.16% | 44.4g | 11% |
| Sample B | 370g | 6.8g | 1.9% | 35.6g | 9.8% |
| Sample C | 266g | 9.6g | 3.7% | 38.8g | 15% |
| Sample D | 270g | 9.6g | 3.5% | 39.2g | 14.8% |

Derek Hargreaves - Technical Officer ❑ Tel 07850 547885 ❑ Fax 01482 870436 ❑ Email cucumber@beeb.net

**WRAPPED FRUIT**

| Starting weight | | 3 days | percentage | 14 days | percentage |
|---|---|---|---|---|---|
| Sample A | 345g | 2.4g | 0.7% | 3.2g | 0.9% |
| Sample B | 390g | 1.6g | 0.4% | 3.2g | 0.8% |
| Sample C | 317g | 0.8g | 0.25% | 4g | 1.3% |
| Sample D | 272g | 2g | 0.7% | 3.2g | 1.2% |

Naked fruit was being colonised by fungal problems [unidentified] - this was more of a problem in the fruit stored in the domestic fridge - but all replicates of naked fruit were affected to some extent.

## FRUIT FIRMNESS

Fruit firmness - as mentioned earlier, the amount of bend on a normal fruit [before it is removed from the plant] is approximately 0.5 to 1cm movement when measured from half way down its length to the flower end.

The amount of bend was as follows:-

**NAKED FRUIT**

| Amount of bend [cm] | | 0 days | 2 days | 5 days |
|---|---|---|---|---|
| Sample A | 405g | 0.69cm | 1.36cm | 3.12cm |
| Sample B | 370g | 1.0cm | 1.34cm | 3.2cm |
| Sample C | 266g | 1.0cm | 1.66cm | 3.4cm |
| Sample D | 270g | 0.9cm | 1.74cm | 3.5cm |

**WRAPPED FRUIT**

| Amount of bend [cm] | | 0 days | 2 days | 5 days |
|---|---|---|---|---|
| Sample A | 345g | 0.5cm | 0.9cm | 1.22cm |
| Sample B | 390g | 1.0cm | 1.1cm | 1.4cm |
| Sample C | 317g | 0.6cm | 0.8cm | 1.64cm |
| Sample D | 272g | 0.7cm | 1.0cm | 1.6cm |

It did not get better!

This is a long way round to report that cucumbers need to be shrink wrapped to maintain their weight and quality. Where fruit was stored naked there were weight losses of between 10 and 15% resulting in

considerable reduction in quality. Weight losses of up to 5% were seen from naked fruits in the first 3 days and this increased the amount of bend and reduced the quality of the fruit.

This weight loss was not reduced by fridge storage.

Where fruit was shrink wrapped, the weight losses were considerably lower - between 0.8 - 1.3% - even after 16 days of storage. Fruit colour was deteriorating by this time but the fruit was still firm and of reasonable quality [but not saleable].

This comparison was carried out for an extreme period 14 to 16 days - to clarify the situation - but it does indicate the speed of deterioration of fruit when it is not protected from dehydration.

It is anticipated that moisture losses will be significantly higher in warmer periods - especially where fruit is coming out of the glasshouses with more field heat than in February.

## CONCLUSIONS

The use of shrink wrap has a major advantage in that it reduces moisture losses from the fruit. It also protects the fruit from some damage by scuffing etc in transport. In this trial there were no losses from disease infection on the wrapped fruit but many of the naked fruit became infected with fungal pathogens that would rapidly rot the affected fruit.

Use shrink wrap - at the present time this plastic material is not accepted by municipal waste collection for re-cycling.

Derek Hargreaves - Technical Officer ❑ Tel 07850 547885 ❑ Fax 01482 870436 ❑ Email cucumber@beeb.net