

# *New Method of Preparing* **LIMA BEANS** *For Frozen Food Locker*

By Eunice Kelly<sup>1</sup>

The time involved with difficult shelling of green lima beans has often limited their general use. This is regrettable, because lima beans are one of the higher protein vegetables which could be used to supplement the generally more expensive protein sources in the menu.

For several seasons the author has used a method in home practice of preheating (blanching) lima beans in the pod for freezer locker storage. The pods are softened by this preheating in boiling water and the beans may be simply squeezed out of the pod, washed, sorted for maturity, and packaged for frozen locker storage. The table quality of lima beans prepared by this method for frozen locker storage appeared to be equal to that of lima beans prepared for freezer storage by the conventional method.

It seemed desirable, however, to check under controlled laboratory conditions the adequacy of this method of preheating (blanching) of lima beans for frozen locker storage. Four varieties of lima beans: Henderson Bush, Triumph, Thorogreen, and Baby Potato Bush, were used in the test. All four varieties were grown on the North Dakota Agricultural Experiment Station horticulture plots at Fargo, N. D., under supervision of the horticulture department. The lima beans were harvested by horticulture department personnel at optimum maturity for green lima beans and brought directly to the nutrition laboratory for processing.

In the laboratory, the supply of each variety of freshly harvested lima beans was divided into two equal parts. Half of the beans were prepared for freezer storage by a conventional recommended method (1). That is, the beans were shelled, sorted to remove imperfect or overmature beans, washed, scalded 1½ minutes (for small beans) in boiling water, cooled in ice water, and packaged for freezer storage. This group will be referred to as processed for freezer storage "shelled".

The other half of the same harvest of lima beans was scalded 2½ minutes (for small beans) in boiling water **in the pod**. This method of processing for freezer locker storage consists of the following steps:

- 1) Wash freshly harvested lima beans **in the pod** in cold running water.
- 2) Scald in boiling water—small beans 2½ minutes, large beans 3 minutes, extra large beans 4 minutes.

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(One minute added to the conventional blanching time for heating of pods.)

- 3) Cool in ice water and squeeze the beans out of the pod.
- 4) Remove imperfect or over-mature beans.
- 5) Wash in cool running water, drain and package for freezer storage.

After six months storage in the nutrition laboratory home freezing unit, samples of each variety processed by the two methods ("shelled" and "in pod") were cooked for serving and scored by three experienced judges for color, flavor, texture and general quality. The samples were also checked for differences in color by the Nickerson Whirling disk method (2) of color matching.

Peroxidase tests by the Masure and Campbell method (3) were made on the blanched samples at the time of removal from freezer storage for cooking.

## DISCUSSION OF RESULTS

Table 1 gives the results of the palatability ratings. The objective color readings are presented in Table II.

The peroxidase test was negative for all varieties by both methods of pre-heating, indicating that the time of scalding (blanching) was adequate by either method to preserve quality for a six month storage period.

Table I—Palatability Scores for Four Varieties of Frozen Lima Beans prepared by two methods of preheating (blanching)

Variety	Method of Pre-heating	Color*	Flavor*	Skin Texture*	Cotyledon Texture	General Quality*	Total Score**
Henderson	In pod	3.3	5.0	4.7	4.3	4.7	22.0
Bush	Shelled	3.2	4.7	4.3	4.0	4.3	21.0
Triumph	In pod	4.3	1.7	3.2	4.0	2.0	15.7
	Shelled	3.7	4.3	4.3	4.7	4.0	21.0
Thoro-green	In pod	4.7	4.0	3.3	3.7	4.0	19.7
	Shelled	4.7	5.0	4.3	4.3	4.7	23.0
Baby Potato	In pod	4.7	4.0	4.0	4.0	4.3	21.0
Bush	Shelled	4.3	4.7	4.0	3.7	4.3	21.0

\* Scores based on 5 most desirable and 1 least desirable

\*\* Scores based on 25 most desirable and 1 least desirable

## EFFECT ON COLOR

The color of frozen lima beans is equally well, if not better preserved by the new method of blanching as interpreted by the judges' ratings (Table I). This is borne out by the objective color readings for hue (true color) shown in Table II, exception in the case of the Baby Potato Bush variety.

Table II—Hue, Value and Chroma readings for four Varieties of Frozen Lima Beans Prepared by two methods of pre-heating (blanching).

Variety	Method of Pre-heating	Hue	Value	Chroma
Henderson Bush	In pod	7 Gy	6.7	5.8
	Shelled	7 Gy	6.7	5.1
Triumph	In pod	7.5 Gy	6.5	6.0
	Shelled	7.5 Gy	6.5	6.0
Thorogreen	In pod	4 G	6.6	5.4
	Shelled	4 G	6.6	5.4
Baby Potato Bush	In pod	5.5 Gy	6.6	6.2
	Shelled	8.0 Gy	6.5	5.9

There was a much greater variation in size of beans within the Baby Potato Bush variety than with the other varieties tested. Since blanching "sets the color" of a vegetable; and in the "in pod" method of scalding, the overmature beans are discarded **after** the color is "set" rather than **before** as in the conventional method, it is possible that a slightly larger bean was retained by the "in pod" method than by the conventional method of blanching. This would account for the objective color reading of the Baby Potato Bush "shelled" beans being nearer the green on the Hue circle than the "in pod," as the smaller beans contain more green. It did not influence the judges' scoring, however, as the "in pod" were rated 4.7 as compared to 4.3 for "shelled".

The method of blanching had no effect on the chroma (strength of color) or value (lightness or darkness) of the beans (Table II).

Varietal preference on the basis of color was shown by the judges. Thorogreen, which contained the most green, was given highest rating, 4.7, whereas, Henderson Bush with the least green and more yellow was given the lowest color score (3.2 to 3.3).

### EFFECT ON FLAVOR

From Table I it appears that lima beans blanched after shelling were preferred for flavor over those blanched in the pod. It should be noted, however, that one of the scorers was especially sensitive to bitterness. Two of the three judges could distinguish no difference in flavor between those blanched after shelling and those blanched in the pod. In fact, they gave a perfect score (5.0) for flavor to all samples except Triumph blanched in the pod. Triumph was particularly bitter when blanched in the pod. This would indicate that any bitterness or strong flavor in a lima bean would be exaggerated by "in pod" blanching, and that this method of blanching should be reserved for mild flavored lima bean varieties.

No consistent effect on skin or cotyledon texture, by method of blanching was noted in these tests.

### SUMMARY

- 1) A method of pre-heating (blanching) lima beans in the pod has been described.
- 2) The method has been shown by palatability, color matching, and peroxidase tests to satisfactorily preserve quality in frozen lima beans over a six month storage period.
- 3) The method is not suited to strong flavored or slightly bitter varieties of lima beans.

### BIBLIOGRAPHY

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### PLANT CRIMINALS

Most foreign restrictions on the entry of plants from the United States are biologically sound and clearly stated. Yet there are quite a few bizarre conditions that must be met if you want to ship plants abroad. Some of these unusual requirements are highlighted by Ralph W. Sherman of the Bureau of Entomology and Plant Quarantine. He describes the little-publicized activities of the Export Certification Section of the Bureau's Division of Foreign Plant Quarantines, which expedites the movement of our plants to foreign destinations by performing the inspections and treatments necessary to conform to plant sanitation requirements of the receiving country.

On the odd side, for example, Burma prohibits the entry of Mexican jumping beans. As Sherman comments: "Whether the cozy bean moth larvae jitterbugging in these seedpods are too active for the slow rhythmmed Burmese or whether the natives lose too heavily in the games of chance that feature these acrobatic oddities isn't clear. But you can't send them." In still another tenor, plant import regulations of the U. S. S. R. brusquely outline their right to "embargo, return or destroy; decide its status regardless of statement in a foreign certificate." Chinese regulations are the simplest, while Mozambique, on the southeastern coast of Africa has an elaborate set of requirements. Some fancy "gobbledegook" appearing in a South American plant order could be quoted to show that we have no monopoly on this accomplishment.

Peru still prohibits the importation of Florida fruits and vegetables to keep out the Mediterranean fruitfly, while the U. S. S. R. embargoes citrus plantings from Louisiana because of citrus canker. The catch is that the 1929-30 campaign in Florida wiped out the Mediterranean fruitfly infestation there, and an intensive campaign, from 1914 to 1927, licked the citrus canker in the Gulf Region. Judging from potato embargoes, America's insect most feared abroad is our Colorado potato beetle. Other existing foreign embargoes are such that it is now illegal to ship hosts of the Japanese beetle or European corn borer back to their ancestral homes! — USDA