

# Processing Potatoes

## in California

J. M. Tinley and D. B. DeLoach

Growers and shippers in the potato industry of California are faced with two important decisions: whether the early-crop area has enough economic advantage in the fresh market to justify continuous production; and whether the expanding use by consumers of processed potatoes will result in a major curtailment in acreage for the fresh market or a partial diversion of production into processed products.

More than 70% of California's total annual output of potatoes is of the Long White or White Rose variety. The potatoes grown in the Northern Mountain counties—Tulelake area—are Russet Burbank. Most of the acreage in Kennebec is in the southern San Joaquin Valley and the coastal area.

The California potato industry has been developed to a considerable extent to take advantage of a market when national supplies of fresh potatoes from other states are at the lowest.

Normally, about 53% of the total output of potatoes in California are harvested in the late spring with another 11% in the early summer. The supply is largely from the interior valleys and, because of the high temperatures, most potatoes are shipped to market within a few hours of harvest.

From the supply standpoint—volume, location, and seasonal distribution—it might appear that California could support a sizable potato processing industry. However, because production is concentrated into a three-month period in the San Joaquin Valley—the most likely area to support a processing industry—a potato supply for a year-around processing industry in California does not exist.

A partial solution to the problem of a steady flow of potatoes for 8–10 months of the year for an economically sound processing industry might be found by increased planting of other varieties with other harvesting periods, and by expanding acreage in areas other than the southern San Joaquin Valley. Such varietal

and seasonal shifts would give a lower yield per acre.

Current production costs per acre and per hundredweight probably are higher in California than in Idaho, where potatoes are processed into dehydrated and frozen forms. California production costs are higher largely because of higher land values, higher costs for water, and because the bulk of potatoes—especially Long Whites—are hand lifted. California growers have favored the Long White type to maximize the summer supply. Long Whites have higher per acre yields than other varieties and, in the last analysis, low production costs per hundredweight depend largely upon yields per acre.

### Location of Plants

Nearly half of the acreage planted to potatoes in California is in centrally located—in regard to supplies from the Riverside–San Bernardino and central coast areas—Kern County. It has been suggested that as a beginning, at least, any processing facilities should be located in or adjacent to that county.

A single processing plant in the Kern County area would need a capacity considerably larger than that of the largest plant in Idaho, where 11 plants handled 12 million hundredweights of potatoes in 1959 and operated 9–10 months of the year, to make any considerable dent in the supplies available in the short late-spring California season. Also, the plant would need extensive refrigerated storage facilities.

It is unlikely that there will be any considerable substitution by consumers of processed potato products for fresh potatoes until after 1964 or 1965. Furthermore, processing firms in Idaho will probably have to augment their local supplies of potatoes by considerable purchases of California potatoes in April and May, when the supplies of Idaho potatoes are low.

Several large, full-line wholesale food

manufacturers and distributors have integrated into potato processing firms in Idaho, Maine, and elsewhere. Most of the established firms can assure, within limits, their trade customers of a continuity of supply of the various products of quality maintenance, at competitive prices.

Any new processing firm in California must plan to expend considerable sums in developing a market for its products, unless it can become a supply source for an established manufacturer or distributor.

The development of potato processing facilities in California will involve considerable capital expenditures, and will be a high-risk undertaking.

Fortunately, because it is likely it will be 1964 or 1965 before there will be any extensive substitution by consumers of processed for fresh potatoes, the development of a processing industry in California could be approached on a staged basis. During the first year or two efforts could be concentrated on experiment and research work to test the suitability of California potatoes for processing into a variety of potato products, and controlled tests of consumer and trade acceptance of those products. Such experimentation should provide much basic information relative to development of a processing industry in the state. If the experimental stages indicate that processed potato products can be produced economically in California, the risk element would be reduced and investment capital should be easier to obtain.

### Financing and Staging

Capital to finance the early development stages could be raised on an industry basis under existing California marketing laws, provided the industry desired to initiate such a cooperative effort. Funds so raised could be administered by an industry board established under a marketing order.

Research and experimentation on developing new varieties of potatoes, new processing techniques, improved methods of quality control, and consumer taste preferences might lead to changes in techniques or in new products that could make a processing industry in California economically feasible.

If such research indicates that it is feasible to process a variety of products from California-grown potatoes, the industry might contract with one or more processing firms in Idaho for actual com-

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# Mechanical injury to Potato Tubers during harvesting

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Damage to potatoes during field harvesting and hauling operations often amounts to 40%–50% before the tubers reach the packing shed.

To determine the extent of the injuries and at what points they occurred, a recent study was concentrated on field harvesting operations in six Kern County fields.

Four samples of potatoes were taken at five different points of the harvest operation: from the ground after digging, out of the stub sacks, from the end of the loader, out of the truck bed, and after the load was dumped at the shed. Conditions of the drop from the loader to the truck bed were duplicated at the Shafter Field Station.

All samples were stored in a shed for seven days before the potatoes were ex-

amined for injuries. Tubers damaged by small cracks, less than 1/2" in length, and by very small bruises would not cause any appreciable market loss and were

Totals of Injured Tubers Found at the Different Stages of Harvesting (Cumulative percentages)

Operation	Injury	Field					
		I	II	III	IV	V	VI
Digging	Moderate	6	18	29	18	29	17
	Severe	12	10	15	2	1	3
	Total	18	28	44	20	30	20
Picking	Moderate	10	24	50			
	Severe	12	16	5			
	Total	22	40	55			
Loading	Moderate	17	28	52	17	29	56
	Severe	15	15	8	5	7	3
	Total	32	43	60	22	36	59
At shed	Moderate	18	26	61	18	54	50
	Severe	30	22	4	6	10	7
	Total	48	48	65	24	64	57

L.S.D. at 5% = 8.8  
L.S.D. at 1% = 11.6

classified as slightly injured. The classification of moderate injury included tubers with cracks between 1/2" and 1 1/2" long and tubers with medium sized bruises. Tubers with cracks or cuts longer than 1 1/2" and tubers with severe bruises were classified as severely injured.

Four of the six fields included in the study, especially Field III, were cloddy. Field IV was sandy and relatively damp. Field V was sandy and dry. In Field III, numerous clods and a digger with a high speed digging chain caused a large percentage of injured tubers.

Tubers Injured in Each Harvesting Operation (Percentages)

Operation	Field					
	I	II	III	IV	V	VI
Digging	18	28	44	20	30	20
Picking	4	12**	11**			
Loader	10*	3	5	2	6	39**
Picking plus loader	14**	15**	16**	2	6	39**
Drop, haul, unloading	16**	5	5	2	28**	..
Handling to shed, except digging	30	20	21	4	34	37

\* Significant 5%  
\*\* Significant 1%

The loading machine can do a good job without causing too much injury. However, in Field VI, the damage by the loader increased the injury from 20% to 59% and caused 60% of the total injury for the field. In Field VI, the potatoes were dumped directly onto the conveyor chain, but the short pad in the loader was not long enough to protect the tubers.

The above table presents the percentages of tubers injured in each harvest operation. The height of drop into the truck and the care taken in loading affect the amount of injury. The drop was 4' in Field I, 2' in Field II, and 3' in the other four fields. The increased percentages of injury in samples taken at the shed after unloading showed the injury caused by the drop from the loader to the truck, by hauling, and by unloading. Lowering the end of the boom of the loader down into the truck would prevent some of the injury.

Occasionally a man walks on the potatoes in a truck to facilitate unloading at the shed. Moderate injury was caused to 19% of the potatoes unloaded in this way and severe injury to 11%, a total of 30%.

Bumping the stub sacks with the loader in the picking-up operation caused a 4% increase in injury. A 3/4" thick rubber pad in the bottom of the hopper of the loader reduced dumping injury by 12%.

## PROCESSING

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mercial processing and marketing of products manufactured from California potatoes. Such a contract arrangement would disclose valuable information on processing and marketing costs as well as the need for modification of processing techniques and products under operational conditions.

An alternative to a contractual arrangement—or as a follow-up—a pilot type of plant, probably in the Bakersfield area, could be established to test the commercial feasibility of processing and marketing products made from potatoes grown in California.

If the results of the contract experimentation—or the pilot plant—indicate that California-grown potatoes can not be processed successfully in competition with potatoes grown and processed elsewhere, the California industry should accept this situation and direct its attention to alternative adjustments.

Even if the results indicate that from the standpoint of product quality and costs a potato processing industry is

feasible in California, it may not be wise immediately to establish such an industry if there are indications there is already an overexpansion of processing facilities—nationally and especially in Idaho—and an unbalanced supply-demand situation for processed potatoes. Such an overexpansion of facilities and product supply could result in severe price competition, thereby increasing investment risks and making it desirable to postpone the development of processing facilities in California.

If all relevant factors are satisfactory, however, California growers and shippers should support the establishment of a potato processing industry in or near the Kern County area. Financial participation by growers and shippers would indicate their intention to supply the raw material for processing.

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