

## WHERE POTATO IS KING

Roger Brown

The potato industry is worth over 350 million dollars in the economy of Washington. Currently third in the nation in the production of potatoes, Washington, the most recent host of the National Potato Convention boasts progressive methods and quality product. The Washington potato industry includes first the grower to produce, and then, the fresh packer and processor who prepare and market the product. Over 75% of the raw product in Washington goes into processing. The following has been prepared by the Washington Potato Association to explain how quality Washington potatoes are transformed into quality Washington processed potato products.

It all starts with the delivery of raw product for production. Raw product is brought to the processor by truck from either the field or the cellar. Quality evaluations are made and the raw potatoes are placed in the receiving bays ready to enter the production line. In virtually all operations the whole product is first washed and peeled. In most the whole potatoes are dipped in a hot lye solution to soften the skins which are then removed by high pressure water sprays. Some operations use steam to soften the skins and sometimes brushes are used to remove them. The end result in each case is a clean peeled potato. The freshly peeled potato then goes to the trim table. Here the tubers are trimmed free of defects and the ones with excessive rot or other critically objectionable problems are discarded.

The process from here on is more variable, depending on the product being produced. For french fries, the next step is for the whole potato to be cut into strips. The strips cross equipment which removes the slivers and the short pieces mechanically. Next, the raw potato strips are conveyed across belts where workers hand sort the strips to remove any defects missed on the trim table.

The cooking process comes next. The raw strips go into large hot water tanks or blanchers. Two or three blanchers are used in the standard french fry process. Here the fries are partially cooked. Here also the sugars in the strips are nearly entirely removed. Blanching is necessary to have a good even color and good texture in the finished product. Following the blanch the fries are dipped in a sugar solution to give a nice even golden color. The partially cooked strips are next fried. They are carried through a frier of hot oil at 325 - 400° F. This finishes the pre-cooking of french fries.

The fried french fries are last frozen through a quick freezing process in some cases as quickly as 10 - 15 minutes. This involves a temperature reduction of 300° to 0° F. The finished frozen french fries are then packaged and sold in all sizes of containers both to retail and institutional outlets. Frozen Washington French fries are sold throughout the United States.

For dehydrated products, the process flow is the same for peeling and trimming. The raw product is then generally sliced and cooked. The cooking is done either in hot water blanchers as with french fries or with a steam blancher which is merely a steam box through which the product is passed. The cooked potato material is then riced or mashed. For flakes this mash is applied to a large drying drum. From this hot drum is removed a thin paper like sheet which is then broken into flakes and packaged ready for market. Granules are dried differently than flakes. The cooked potato mash is put through a series of drying and screening operations which remove most of the moisture leaving the potato cells whole yet separate from each other forming small granules.

Many other products are also made from Washington potatoes including pre-formed potato cylinders, Southern style hash browns, shredded hashbrowns, slices and potato dices. These are generally produced as by-products of a french fry operation.

Production of all these quality Washington potato products is dependent upon quality raw potatoes. Large clean defect free Washington Russets are just what the doctor ordered for long golden french fries, clean white dehydrated potato flakes, or granules, or any of the other top quality Washington potato products.

- 1.) Good raw product is free from excessive bruise. Bruises on the raw potato must be trimmed away to eliminate black spots or other undesirable defects in finished product.
- 2.) Good raw product is free from sugar ends. Black tips caused by sugar end product gives finished french fries an undesirable appearance and flavor.
- 3.) Good raw product is free from Net Necrosis. The potatoes with this symptom often look like sugar ends in the finished product, while in the frozen state it shows as defects or black specks in potato granules.
- 4.) Good raw product is free of growth cracks and surface scab. From these also defects result which detract from the finished product quality.
- 5.) Good raw product does not have high natural sugars. The excessive color produced from high natural sugars, makes the finished product color dark and uneven.
- 6.) Good raw product does not have extremely low solids content. Low solids potatoes yield limp watery french fries. The extreme of either high or low solids for dehydration cause serious problems.
- 7.) Good raw product is large and even-shaped to yield long french fries since the automatic cutters make excessive short pieces from irregular tubers. The short french fries are of little value.

With good raw product, the potato processor can make good finished product. For each deficiency in the raw product, the processor must adjust his process or his use of the raw product. Each adjustment adds to processing wastes or reduces the finished quality. Raw product which has very low quality often causes such high waste or such poor finished product as to be unusable.

1.) Good french fries are not full of defects. Black spots detract both from the frozen appearance and the final appeal of the french fries. Defects arise from many sources: bruise, scab, or rot to name a few. The peel which does not come off deep in growth cracks is another serious source of defects. Hollow heart causes serious defect problems also. It is not visible at a trim table and must be removed by hand from the inspection belt after the potatoes have been cut into strips.

Defects are eliminated by trimming whole potatoes or inspecting them out of the cut strips. Trimming is a most efficient means of defect control since only the defective portion is cut away. When processing raw product with a few defects, not many trimmers are required to keep finished product free of defects. On the other hand, when many defects exist, many trimmers are needed to keep defects out of the finished product. There is also much waste cost when excessive trimming is required. This waste is not only a loss in french fries but it generally also creates a disposal problem.

A defect not trimmed from the whole potato will cause one or several strips to have defects. These must be removed by hand on the inspection belt. If too many exist, the inspectors cannot sort them all out and they go on to lower the quality of the finished product. When defects are removed by inspection, the entire unit is discarded while only a small portion on the end may be defective. This results in a greater wastage of good product.

2.) Color is another important french fry character. Desirable french fries have a bright even color. Color makes the first and most lasting impression on the consumer.

Dark ends detract from the finished color and are objectionable in very small numbers. They arise from raw potatoes with sugar ends or slight Net Necrosis. Either of these must be found and trimmed on the trim table. Green ends also cause dark ends in the finished product and must be removed.

Another aspect which detracts from the finished french fry color is variation - that is, where some french fries are darker than the rest. This is generally due to excessive sugars in the raw product. Green potatoes also cause variation in color. As mentioned earlier... blanchers even out the sugar content in the raw strips. When excessive sugar exists in some strips, it does not leach out enough to be even colored with the rest. The sugar in green potatoes does not leach out as in a normal potato.

3.) The texture of the finished product is another critical factor for consumer acceptance. Most users of finished french fries desire a nice rigid fry with a mealy internal texture. To provide this requires the best of processing.

Texture is produced in french fries by cooking the starch inside the potato cells. This causes the potato cells to swell which is the secret to good texture. In the case of low solids potatoes there is insufficient starch inside the potato cells to achieve this end. For some low solids more processing can be done to cause more swelling of the starch that is there, however, when to low of solids content exists mealy texture cannot be developed at all.

The same number of problems occur in dehydration and again quality raw product is necessary for quality finished product.

1.) In potato granules the defects on the raw product are granulated right along with the potato cells. Defects also carry into finished flakes when the defect level is to high. Net Necrosis in granules causes a defect. The netting visible in the raw potato survives through the process as a black speck in the finished product.

2.) Although high sugars do not visually affect finished granules they do cause an off flavor after the storage of the finished product. Greening does affect the finished color of potato granules, it makes a slightly yellow cast as well as causing a bitter flavor.

3.) The recipe for reconstituting potato flakes and granules must necessarily be the same from day to day since it is printed on the package. A consistent finished product is therefore necessary to use with this recipe to make a nice fluffy mashed potato. When the solids of the raw potatoes vary excessively the characteristics of the finished product also vary. For example, if very low-solids raw product is used more water is removed during the processing of the finished product. In this case when the user using the recipe adds water to the finished product they are adding less water than was originally taken out of the product and too dry mashed potatoes results.

In quick review, quality finish french fries, flakes, granules, or by-products, reflect quality raw product. Clean, defect-free, low-sugar potatoes without low solids or disease are just the ticket. Quality must be the by-word. It's quality that sells Washington potato products and this comes from quality potatoes. Potatoes fill the Washington horizon. The Washington potato industry is growing by leaps and bounds and the grower, shipper, and processor are all part of this industry. What we do to continue and promote quality in Washington potatoes is going to play a significant part in the future of our Washington potato industry.