Potato processing report

1. INTRODUCTION

a.Types of potatoes

For all practical purposes, potatoes fall into two easy categories — baking potatoes and boiling potatoes. There's also a middle ground.

Probably the chief difference between the two types is the amount and nature of starch each contains. Baking potatoes are relatively high in starch and it is called amylose starch. Boiling potatoes are low in starch and it is called amylopectin. This pectin (just as with fruit for jams) is what holds the potato together when boiling or in soup and stews.

b. Baking potatoes

These are also called starchy potatoes. They tend to be long and have a coarse, cork-like skin. They are high in starch, with a dry, mealy texture. But, they turn light and fluffy when cooked.

They are ideal for baking, mashing and French fries. They are light and fluffy baked, light and creamy mashed, and frankly, the only potato worth frying.

c. Boiling potatoes

These are also called waxy potatoes. They come in a variety of shapes and can be long or round. They have a thin, smooth skin and an almost waxy flesh. They are relatively high in moisture and sugar, but low in starch.

2. Nutritional value

Some foods have higher nutritional values than other. Potatoes are so nutritious that one serving will meet a person's daily nutrition requirements. They are very nourishing, appetising and a good source of energy, proteins, minerals and vitamins. Today's lifestyle related diseases are best prevented through nutrition therapy.

a. What's in it for you?

Carbohydrates are the body's source of energy. The carbohydrates in potatoes are complex, meaning they provide the body with a steady flow of energy for an extended period. In any balanced meal the carbohydrates should be 60% of the daily kilojoules, therefore potatoes should be an important part of the menu.

b. Proteins

Protein provides the body's main source of growth and tissue repair. Like most proteins of plant origin, potato protein is lacking in essential amino acids. If consumed in combination with animal protein foods like milk it becomes a complete protein food. The body only needs small amounts of protein per day (60 - 100 g)

c. Vitamins and minerals

Potatoes make a useful contribution to our daily mineral and vitamin intake. One portion of potatoes contains many of the B-complex vitamins and up to a third of our daily vitamin C requirement. Potatoes are also a rich source of potassium, phosphorous and fluoride and contain small amounts of iron and zinc which are readily absorbed.

d. Dietary fibre

Dietary fibre is such an important part of a healthy diet yet most of us still seem to lack sufficient amounts of it in our daily intake. There are two types of fibre : soluble and insoluble fibre. Soluble fibre dissolves in water to form a gel in the intestines which softens the stools, whereas insoluble fibre retains water, therefore increasing the stool volume. Fibre is important in preventing diseases like cancer, obesity, diabetes and in maintaining health. The recommended intake of fibre for adults is 20 - 30 g daily. Potatoes are a good source of fibre, particularly the skin.

e. Fat

Potatoes contain very small amounts of fat, only 0.1 % per
100 g, which makes them ideal for slimming. Remember the fat is added to potatoes via dressing or sauces.

3. ISSUES: ESCAPING THE COMMODITY TRAP - POTATO PROCESSORS AND CONSUMERS

The strong economic pressures driving the processing potato industry are the result of companies purchasing the same raw material, often from the same growers, processing them in similar factories and competing fiercely on the same market.

The steady growth of the potato processing industry has stretched for decades, but is showing signs of flattening out in regions like Australisia, Canada, Germany, USA, and The Netherlands etc. (all classified as developed world). Clear consumer, community and legislative trends are emerging that challenge the industry to embrace more change or face a serious decline in market share.

Consumers are becoming more demanding, with rising expectations on food safety, health, functional foods, convenience, novelty and excitement. Modern food processors must embrace the concept of the "triple bottom line", and a large effort is underway to develop new technology and varieties to meet environmental commitments.

Innovation, particularly biotechnology, is a potential path out of the commodity trap. However the progress of new biotechnology continues to race ahead of public understanding, opinion, and legislation and cutting edge processing companies have adopted a very conservative and cautious approach.

4. AN OPERATIONAL EXAMPLE OF A GERMAN COMPANY, EIMA: FOOD PROCESSING TECHNOLOGY CUSTOM MADE- STEP BY STEP.

Engineering consult

- In an intensive exchange with the customer is done to determine the requirements and specify the project in detail.

Proposed solution

- A concrete proposed solution is presented, which is capable of being actually implemented without any changes.

3D CAD Drawing

- Using state-of-the-art computer systems, a complete three-dimensional model of the finished machine is designed.

CAD-CAM Coupling

- Transfer from design to production functions without any frictional losses. Short paths result in fast throughput times.

CAP

- The production command center controls production down to the tiniest detail (by applying the ultramodern visualization technology and perfect planning).

Cutting

- Using automated laser cutting plant, the processing of sheet metal to thickness of up to 25 mm with a format of up to 3000 x 1500 mm and an output of 4 KW is done.

Forming

- In the CNC-controlled bending press an exact bending over the entire length of the sheet metal is a matter of course.
- Pressure: 200t, maximum sheet metal length: 3600 mm

Welding

- Certified welders use modern equipment to ensure perfect results in production. Uncompromising quality is achieved in this area as well

Surface Treatment

- The surface treatment must meet the strictest quality requirements.

Final Assembly

- In the assembly department everything is joined into a whole. A test run is conducted before delivery to the customer.

Delivery

- Your system or machine will arrive on time and well prepared. Concrete time planning creates reliability.

Startup

- Installation and startup are performed by employees with maximum care and concentration for ultimate satisfaction.

Quality

- The quality of work performed by EIMA is best identified by the benchmarks they use to measure their output. And so that these can grow along with the current standard and their employees receive regular training.

Service

- In planning as well as in after sales service, great value is placed on the dialogue with customers. Customer satisfaction is of the utmost importance as well as the feedback received for performance improvement. Personal contact is also indispensable.

5. GENERIC MANUFACTURING PROCESS

Fully grown and ripe potatoes are thoroughly washed before peeling them. Then these potatoes are trimmed and put in brine water for 30-35 minutes to prevent browning. They are afterwards cut in the required sizes on slicing machine. These slices are blanched in boiling water and are then placed on drying trays which are then put in the drying machine. Temperature of dryer is maintained in the range of 140 to 150 F. After drying, they are fried in edible oil to make them crisp and brown and then they are packed in polythene bags.

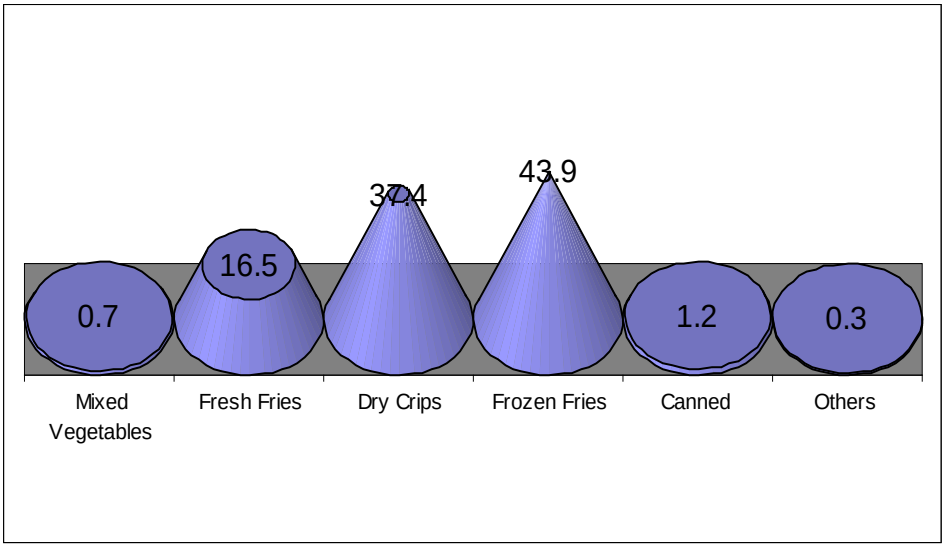
The process flow chart is as under:

Washing and Peeling
↓
Brining
↓
Slicing and Blanching
↓
Drying and Frying
↓
Packing

6. Processing trends in South Africa

South African processing industry sources products from fresh produce markets and directly from farmers. The industry growth comes mainly from frozen fries, dry crisp and fresh chips. The total crop taken for processing was estimated at 19.8% in 2004 production year. The manufacturing of dry, frozen and fresh chips jointly comprise 95% of processed potato products. The manufacturer of mixed vegetables, canned potatoes and baby food use the remaining 4.9%.

Figure 5: Potato processing during 2004



Source: Potato SA

Analysis of potato chain in South Africa over the last ten years on competitiveness has shown that, potatoes are more competitive when they are sold fresh than when processed. This could be true because statistically it is estimated that only 19% of the total production is taken up for processing.

Mixed Vegetables

This discipline represented 0.7% of the total processing industry in South Africa for 2004.

French Fries (Fresh)

The manufacturing of French fries (fresh) has shown a decrease over the last couple of years. The above production is mainly contributed by a number of small processors. The decrease in production is the result of a decrease in the number of companies involved in the industry and the strong increase in frozen french fry production that took a large part of the market.

French Fries (Frozen)

Frozen french fries represent 43.9% of the total processed potato products in South Africa. There has been an increase in the manufacturing of the above product over the last couple of years. Expansion is mainly due to today's fast paced life-style leading to an increase in fast food consumption. The growth in production is also the result of expansion in the existing facilities.

Canned

Only limited quantities of potatoes are canned in South Africa. The canned food is mainly in the form of mixed vegetables where potatoes can contribute up to 20% of the mixture. These days one can also find skinned, baby potatoes in a can. The above industry is not that big and represents 1, 2% of the total volume of potatoes for processing.

Crisps

Crisps represent 37,4% of the total processed potato products in South Africa.
The steady growth over the past five years in production is the result of an expansion in existing factories and an increase in the number of companies involved in the industry.

Mash

The mashing of potatoes happens at an insignificant level on an industrial level, which falls in the last category of the chart. A lot of mashing is done at domestic level including at retail level as part of various meals served or sold.

Limpopo together with areas like the Free State; Mpumalanga; Eastern, Western and Northern Cape and KwaZulu Natal account for about 40% of South Africa’s total potato crop. It is the second largest potato producer nationally and representing 19% of South Africa’s total production. This places Limpopo as an opportunity area to establish agro processing infrastructure to take advantage of the overall vast potato output it generates.

7. SUPPLY CHAIN ANALYSIS OF POTATO