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Building of the ISO 22000 System for Snack Food Company

Hasna Hussein Mohammad Daghamin

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Prepared by:

Hasna Hussein Mohammad Daghamin

B.Sc.: Food Science and Technology .Al- Quds University – Palestine.

Supervisor: Dr. Ibrahim Afaneh

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Prepared By: Hasna Hussein Mohammad Daghamin
Registration No.: 21112745

Supervisor: Dr. Ibrahim Afaneh

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The names and signatures of the committee members are as follows:

1. Head of committee: Dr. Ibrahim Afaneh. Signature.....
2. Internal examiner: Dr. Suleiman Al loussi. Signature.....
3. External examiner: Dr. Mohammed Al-Sayed. Signature.....

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الإهداء

بسم الله الرحمن الرحيم

(قل إعملوا فسيرى الله عملكم ورسوله والمؤمنون)

صدق الله العظيم

إلهي لايطيب الليل إلا بشكرك ولايطيب النهار إلى بطاعتك .. ولاتطيب اللحظات إلا بذكرك .. ولا تطيب الآخرة إلا بعفوك .. ولا تطيب الجنة إلا برؤيتك

الله جل جلاله

إلى من بلغ الرسالة وأدى الأمانة .. ونصح الأمة .. إلى نبي الرحمة ونور العالمين ..

سيدنا محمد صلى الله عليه وسلم

إلى أبي الذي لم يبخل علي يوماً بشيء

وإلى أمي التي زودتني بالحنان والمحبة

إلى رمز الحب وبلسم الشفاء
إلى القلب الناصع بالبياض (زوجي الغالي)

إلي كل من أضاء بعلمه عقل غيره
أو هدى بالجواب الصحيح حيرة سائليه
فأظهر بسماحته تواضع العلماء
وبرحابته سماحة العارفين

الى الدكتور الفاضل (ابراهيم عفانه).

الذي تفضل بإلاشراف على هذا البحث فجزاه الله عنا كل خير فله مني كل التقدير والاحترام ..

Declaration

I certify that this thesis submitted for the degree of master is the result of my own research, except where otherwise acknowledged, and this thesis has not been submitted for the higher degree to any other university or institute**.**

Signed: ……..

Name: Hasna Hussein Mohammad Daghamin

Date: 8/6/2016

Abstract

This project deals with building one of the most important quality system in food industry which is ISO 22000 and mainly for snack food company. ISO 22000 is an international standard intended to be used by organization within the food chain, the purpose of this system is to provide a practical approach to ensure the reduction and elimination of food safety risks enable to protect consumers.

Food safety is the assurance that food will not cause any harm to the consumer when it is prepared and /or consumed according to its intended use. The food industry has a number of quality assurance systems available like GMP (Good Manufacturing Practices), HACCP (Hazard Analysis Critical Control Point), ISO (International Organization for Standardization) standards. These systems and their combinations are recommended for food quality and safety assurance.

Therefore, ISO 22000, as companied with multi quality systems, namely; HACCP which is the preventative, proactive and systematic approach of food safety, which relies on the identification and control of all the known associated health hazards in the food chain. GMP used very effectively in checking the conformity of the infrastructure, employee, and equipment's for producing snack food free of hazard and risks. Were the ISO 9001 helped in applying all documentation, follow ups. Finally, the assuring of using the correct techniques in dealing with the equipment's were guaranteed through the applications of food quality management system techniques.

By this way the research showed that the ability of controlling the biological, chemical, and physical hazards from the raw material production, through manufacturing, distribution and

consumption of the finished product were granted without a requirements for further investigation for snacks food industry.

A randomly sample of factory production were used in periodic sampling time to perform microbiology test including: Total plate count ,Staph aureus ,Total coliform, and Mould and Yeast test for each pack. Results showed great protection of the products from any harmful and hazards.

For each product flowchart of production, heavy and deep discussion were took place enable to cover all gaps could be correlated for a hazard existence or associated with potential risk. Moreover, the microbes investigated for snacks products (as stated by PS) were deeply discussed and gathered information form medical reported for their health impact on human.

However, it is found that snack food industry who applies these techniques are ISO 22000 appliers by default. Those inspective and legislative bodies must understand this fact and develop their methods of inspection.

بناء نظام جودة (iso 22000) لشركة مسليات شبس

اعداد : حسنة حسين الدغامين

اشراف: د. ابراهيم عفانه

الملخص

نظراً لزيادة الطلب على الغذاء ذو الجودة المرتفعة والآمن صحياً فقد أصبح من الضرورى التعرف على مخاطر التلوث التى قد يتعرض لها الغذاء وتحليل تلك المخاطر وتقييم درجة التأثير السلبى لها على سلامة الغذاء ومن ثم تحديد إجراءات التحكم فى تلك المخاطر ومنعها عن الغذاء فى المراحل المختلفة للإعداد والتصنيع والتداول ولذلك يتناول هذا المشروع بناء واحد من انظمة الجودة الأكثر أهمية في صناعة الغذاءو هونظام ISO22000 وبشكل رئيسي لشركة للمواد الغذائيةلمسليات الشبس . ISO22000 هو معيار دولي يحدد متطلبات نظام إدارة السلامة الغذائية. و يحتاج إليه كل متدخل في سلسلة الإنتاج الغذائي يريد إثبات قدرته في السيطرة على المخاطر المتعلقة بسلامة الأغذية و ذلك لضمان إنتاج مواد غذائية آمنة، تستجيب لمتطلبات العملاء و تتوافق مع الأنظمة المعمول بها في هذا الشأن.

ISO 22000 الغرض من هذا النظام هو توفير نهج عملي لضمان الحد والقضاء على المخاطر التي تهدد سلامة الغذاء والمستهلك .

سلامة الأغذية هي التأكيد على أن الغذاء لن يسبب أي ضرر للمستهلك عند إعداده أو استهلاكه وفقا للاستخدام المقصود منها. صناعة المواد الغذائية لديها عدد من أنظمة ضمان الجودة المتاحة مثل برنامج الرصد العالمي (ممارسات التصنيع الجيدة)، نظام تحليل المخاطر (تحليل المخاطر ونقاط التحكم الحرجة)، ISO (المنظمة الدولية للتوحيد القياسي) المعايير. وأوصت هذه النظام ومجموعاتها لجودة الأغذية وضمان السلامة.

لذلك، ISO 22000، كما هومرتبط مع أنظمة الجودة المتعددة، وهي: HACCP نظام تحليل المخاطر والنقاط الحرجة وهو نهج وقائي استباقي ومنهجي لسلامة الأغذية، الذي يعتمد على تحديد ومراقبة جميع

المخاطر الصحية المرتبطة المعروفة في السلسلة الغذائية. GMP وهو (ممارسات لتصنيع الجيد)و استخدامها بشكل فعال جدا في التحقق من المطابقة للبنية التحتية، والموظفين، والمعدات اللازمة لإنتاج الغذاء وجبة خفيفة خالية من الأخطار والمخاطر. كانت ISO 9001 ساعدت في تطبيق جميع الوثائق ومتابعة الصعود. وأخيرا، ثم يضمن استخدام التقنيات الصحيحة في التعامل مع المعدات من خلال تطبيقات التقنيات إجراءات التشغيل القياسية.

بهذه الطريقة أظهرت الأبحاث التي منحت القدرة على السيطرة المخاطرالبيولوجية والكيميائية، والأخطار المادية من إنتاج المواد الخام، من خلال تصنيع وتوزيع واستهلاك المنتج النهائي بدون شروط لمزيد من التحقيق لصناعة مسليات الشبس .

تم استخدام عينة عشوائية من إنتاج المصنع في وقت أخذ العينات الدورية لأداء اختبار علم الأحياء الدقيقة بما في ذلك: التعداد الكلي للاحياء الدقيقة ، العنقوديات الذهبية، مجموع القولونية، والخمائر والعفن لكل عينة . وأظهرت النتائج حماية كبيرة من المنتجات من التلوث بهذه المخاطر.

لكل منتج مخطط انتاج و مكان الإنتاج، وقد استغرق مناقشة ثقيلة وعميقة تمكن من تغطية يمكن أن يرتبط كل الثغرات لوجود خطر أو ترتبط مع المخاطر المحتملة. وعلاوة على ذلك، فإن الميكروبات التحقيق للمنتجات وجبات خفيفة (كما ذكر من قبل PS) نوقشت بعمق وتجمع على شكل معلومات طبية ذكرت للتأثير الصحي على الإنسان.

ومع ذلك، وجدت أن صناعة الوجبات الخفيفة الذي ينطبق على هذه التقنيات هي ISO 22000 المطبقةافتراضيا. يجب أن تلك الهيئات القانونية والتشريعية فهم هذه الحقيقة وتطوير أساليبها في التفتيش.

Chapter One : Introduction

1. Introduction:

1.1 Definition of Food:

Food is any substance consumed to provide nutritional support for the body. It is usually of plant or animal origin, and contains essential nutrients, such as carbohydrates, fats, proteins, vitamins, or minerals. The substance is ingested by an organism and assimilated by the organism's cells in an effort to produce energy, maintain life, or stimulate growth.

Food is defined as anything solid or liquid which when swallowed, digested and assimilated, nourished the body.

Historically, people secured food through two methods: hunting and gathering, and agriculture. Today, most of the food energy consumed by the world population is supplied by the food industry.

Some countries list a legal definition of food, often referring them with the word foodstuff. These countries list food as any item that is to be processed, partially processed, or unprocessed for consumption. The listing of items as food include any substance intended to be, or reasonably expected to be, ingested by humans. In addition to these foodstuffs, drink, chewing gum, water, or other items processed into said food items are part of the legal definition of food. Items not included in the legal definition of food include animal feed, live animals (unless being prepared for sale in a market), plants prior to harvesting, medicinal products, cosmetics, tobacco and tobacco products, narcotic or psychotropic substances, and residues and contaminants.

1.2Food Source:

Most food has its origin in plants. Some food is obtained directly from plants; but even animals that are used as food sources are raised by feeding them food derived from plants. Cereal grain is a staple food that provides more food energy worldwide than any other type of crop. Maize, wheat, and rice – in all of their varieties – account for 87% of all grain production worldwide. Most of the grain that is produced worldwide is fed to livestock.

Some foods not from animal or plant sources include various edible fungi, especially mushrooms. Fungi and ambient bacteria are used in the preparation of fermented and pickled foods like leavened bread, alcoholic drinks, cheese, pickles, kombucha, and yogurt. Another example is blue-green algae such as Spirulina. Inorganic substances such as salt, baking soda and cream of tartar are used to preserve or chemically alter an ingredient.

1.2.1 Plants

Many plants or plant parts are eaten as food. There are around 2,000 plant species which are cultivated for food, and many have several distinct cultivars.

Seeds of plants are a good source of food for animals, including humans, because they contain the nutrients necessary for the plant's initial growth, including many healthful fats, such as Omega fats. In fact, the majority of food consumed by human beings are seed-based foods. Edible seeds include cereals (maize, wheat, rice, et cetera), legumes (beans, peas, lentils, et cetera), and nuts. Oilseeds are often pressed to produce rich oils - sunflower, flaxseed, rapeseed (including canola oil), sesame, et cetera.

Seeds are typically high in unsaturated fats and, in moderation, are considered a health food, although not all seeds are edible. Large seeds, such as those from a lemon, pose a choking hazard, while seeds from apples and cherries contain a poison (cyanide).

Fruits are the ripened ovaries of plants, including the seeds within. Many plants have evolved fruits that are attractive as a food source to animals, so that animals will eat the fruits and excrete the seeds some distance away. Fruits, therefore, make up a significant part of the diets of most cultures. Some botanical fruits, such as tomatoes, pumpkins, and eggplants, are eaten as vegetables.

Vegetables are a second type of plant matter that is commonly eaten as food. These include root vegetables (potatoes and carrots), bulbs (onion family), leaf vegetables (spinach and lettuce), stem vegetables (bamboo shoots and asparagus), and inflorescence vegetables (globe artichokes and broccoli and other vegetables such as cabbage or cauliflower).

1.2.2 Animals

Animals are used as food either directly or indirectly by the products they produce. Meat is an example of a direct product taken from an animal, which comes from muscle systems or from organs.

Food products produced by animals include milk produced by mammary glands, which in many cultures is drunk or processed into dairy products (cheese, butter, etc.). In addition, birds and other animals lay eggs, which are often eaten, and bees produce honey, a reduced nectar from flowers, which is a popular sweetener in many cultures. Some cultures consume blood, sometimes in the form of blood sausage, as a thickener for sauces, or in a cured, salted form for times of food scarcity.

Some cultures and people do not consume meat or animal food products for cultural, dietary, health, ethical, or ideological reasons. Vegetarians choose to forgo food from animal sources to varying degrees. Vegans do not consume any foods that are or contain ingredients from an animal source.

1.3 Production of Food:

Most food has always been obtained through agriculture. With increasing concern over both the methods and products of modern industrial agriculture, there has been a growing trend toward sustainable agricultural practices. This approach, partly fueled by consumer demand, encourages biodiversity, local self-reliance and organic farming methods. Major influences on food production include international organizations (e.g. the World Trade Organization and Common Agricultural Policy), national government policy (or law), and war.

In popular culture, the mass production of food, specifically meats such as chicken and beef, has come under fire from various documentaries, most recently documenting the mass slaughter and poor treatment of animals, often for easier revenues from large corporations. Along with a current trend towards environmentalism, people in Western culture have had an increasing trend towards the use of herbal supplements, foods for a specific group of person (such as dieters, women, or athletes), functional foods (fortified foods, such as omega-3 eggs), and a more ethnically diverse diet.

1.4Food manufacturing:

Packaged foods are manufactured outside the home for purchase. This can be as simple as a butcher preparing meat, or as complex as a modern international food industry. Early food processing techniques were limited by available food preservation, packaging, and transportation. This mainly involved salting, curing, curdling, drying, pickling, fermenting,

and smoking Food manufacturing arose during the industrial revolution in the 19th century. This development took advantage of new mass markets and emerging new technology, such as milling, preservation, packaging and labeling, and transportation. It brought the advantages of pre-prepared time-saving food to the bulk of ordinary people who did not employ domestic servants.

At the start of the 21st century, a two-tier structure has arisen, with a few international food processing giants controlling a wide range of well-known food brands. There also exists a wide array of small local or national food processing companies. Advanced technologies have also come to change food manufacture. Computer-based control systems, sophisticated processing and packaging methods, and logistics and distribution advances can enhance product quality, improve food safety, and reduce costs.

1.5 Food aid:

Food aid can benefit people suffering from a shortage of food. It can be used to improve peoples lives in the short term, so that a society can increase its standard of living to the point that food aid is no longer required. Conversely, badly managed food aid can create problems by disrupting local markets, depressing crop prices, and discouraging food production. Sometimes a cycle of food aid dependence can develop. Its provision, or threatened withdrawal, is sometimes used as a political tool to influence the policies of the destination country, a strategy known as food politics. Sometimes, food aid provisions will require certain types of food be purchased from certain sellers, and food aid can be misused to enhance the markets of donor countries. International efforts to distribute food to the neediest countries are often coordinated by the World Food Programme.

1.6 Function of Food

Foods are classified according to their functions in the body:

1.6.1 Energy yielding:

This group includes foods rich in carbohydrate, fat and protein. One gram of carbohydrate gives 4calories. One gram of protein gives 4 calories. One gram of fat gives 9 calories. This group may be broadly divided into two groups:

•Cereals, pulses, nuts and oilseeds, roots and tubers.

•Pure carbohydrates like sugars and fats and oils.

Cereals provide in addition to energy large amounts of proteins, minerals and vitamins in the diet.

Pulses also give protein and B vitamins besides giving energy to the body. Nuts and oilseeds are rich in energy yielding as they are good sources of fats and proteins. Roots and tubers though mainly provide energy, they also contribute to some extent to minerals and vitamins.

Pure carbohydrates like sugars provide only energy (empty calories) and fats provide concentrated source of energy and fat soluble vitamins.

1.6.2. Body building:

Foods rich in protein are called body-building foods. They are classified into two groups:

•Milk, egg, meat, fish: They are rich in proteins of high biological value. These proteins have all the essential amino acids in correct proportion for the synthesis of body tissues.

•Pulses, oilseeds and nuts: They are rich in protein but may not contain all the essential amino acids required by the human body.

1.6.3. Protection and regulation:

Foods rich in protein, vitamins and minerals have regulatory functions in the body e.g., maintaining the heart beat, water balance, temperature. Protective foods are broadly classified into two groups:

•Foods rich in vitamins and minerals and proteins of high biological value e.g., milk, egg, fish,liver.

•Foods rich in certain vitamins and minerals only e.g., green leafy vegetables and fruits.

1.6.4. Maintenance of health:

Food is often classified as:

1. Carbohydrate, including Fiber
2. Protein
3. Fat
4. Vitamins and Minerals

Carbohydrates are substances that contain carbon, hydrogen and oxygen. They are used in the body to produce energy. They include sugars and starches. Carbohydrates are usually obtained from plant sources. They are broken down in the body to form glucose, and any that is not immediately required in stored in the liver and muscles as glycogen. Plants use carbohydrates to build structures and store any excess as starch, whereas, animals use protein.to build structures and store any excess as fat.

Plants make carbohydrates from sunlight, water, chlorophyll, and carbon dioxide. We obtain them from plants, for example:

- cereals
- starchy roots
- legumes (pulses)
- vegetables and Fruits
- sugars, preserves and syrups

Carbohydrates are mainly used by the body to produce energy. Where there is a lack of energy, we might think of carbohydrates. The energy in the body is used for:

- External activities (behavior), such as work, sport, leisure - that is any movement of the body.
- Internal activities including breathing, pumping blood, digestion and the activities of the immune system.

None-digestible carbohydrate (Fiber)

Fiber, or roughage, refers to the non-digestible carbohydrates in vegetables and to a lesser extent in fruit. Fibre may actually be 'fibrous', as in celery, or may be a powder, or, when mixed with water in the intestines, a jelly. Fibre provides:

- Bulk
- Lubrication, and
- Nutrition for friendly bacteria in the colon.

When fiber is combined with water, it swells up and provides bulk to the digestive system. This makes it easier for food to pass through the intestines. Food also passes through the digestive system faster, so that waste products are retained for less time in the body.

Some fiber has the effect of lubricating the contents of the intestines and, therefore, makes the food pass through easily and in a timely manner. The benefits here are the same as for bulk.

In addition, friendly bacteria in the colon feed on fiber and they are therefore nourished by it. By helping these friendly bacteria, we enable them to help us to digest food. Also, by giving them support, they are more able to exclude other, less friendly bacteria, from our colons.

Fibre is, therefore, necessary for a healthy and efficient digestive system.

Proteins

Proteins are composed, like carbohydrates, of carbon, oxygen, and hydrogen, but with nitrogen. They may also contain sulphur and phosphorus. They are complex molecules composed of amino acids.

Proteins are used by the body to:

- enable growth, development and repair.
- build structures such as muscles, tissues and organs, including the heart, lungs, digestive organs.
- enzymes, such as those required for digestion.
- hormones, such as those for the endocrine glands.

Proteins, therefore, are needed not only for obvious body structures, such as muscles, but also for the immune and digestive systems, etc.

Complete proteins are obtained from meat, fish and dairy products including eggs. Proteins can also be obtained from certain combinations of foods, for example, cereals and beans.

Fats and oils

Fats are substances that are not soluble in water. They are composed of fatty acids and glycerol. Fats are also called lipids.

Sources of fat include animal meat, fish, and vegetable oils. Fats are used by the body:

- In every cell structure.
- Especially to build nerves and brain. The brain is 40% fat.
- To insulate the body.
- To produce sex hormones and adrenal cortex hormone
- To produce cholesterol (essential for cell membranes and bile salts, for example).
- To absorb certain vitamins (A, D, E, and K).
- To store energy.

Fats have got themselves a bad name in recent times, yet they are an essential food. That is, the body requires its intake of fat every day for health and, especially, well being. Like the other groups of food, when the body does not get the fat it needs, then illness results.

Vitamins and Minerals

Vitamins are substances that are required in the diet for health and wellbeing. They are often grouped as fat-soluble or water-soluble. Fat-soluble vitamins are vitamins A, D, E and K. Water-soluble vitamins include vitamins C and B.

Minerals are non-organic substances that are required in the diet. While only small amounts of minerals are required in our diet, they are critical in building bones and teeth, regulating heartbeat and transporting oxygen from the lungs to the tissues.

Vitamins and minerals occur in a variety of foods. That is, by eating a variety of foods, you can get the necessary vitamins and minerals you need for health.

2.Types of food:

2. Snacks Food:

2.1 Definition of Snack Food:

Defines the noun“ snack” (first recorded use, 1757) as “a light meal, food eaten between regular meals, food suitable for snacking;” and the verb “snack” (1807) as “to eat a snack.” Thus, a cold leftover from last evening’s home or restaurant meal, an afternoon bowl of breakfast cereal, a cup of soup reconstituted from a dry mix package, or cookies and milk for children returning from school in midafternoon ,are properly called “snacks. ”But, what if there are no, or only a few, “regular meals?” It has been estimated hat less than 20% of U.S. families eat breakfast. Moreover, scheduling of “regular” meals is erratic when both parents (or a single parent) and children leave home at different times for work and school, when lunches are primarily eaten away from home, and when structured athletic and social activities for the children occupy weekday evenings and sometimes weekends as well.

Snacks are the convenience and fun foods of people on the go, and older

opinions about their propriety don't apply anymore.

The terms "snacks," "snack foods," and "savory snacks" mean the same.

The latter term has been used frequently with various meanings, including "salty" and "seasoned."

2.1. Snacking :

Snacking is not a new phenomenon. Savory or salty snack foods, such as the potato chip and corn chip, are seen as relatively new because they were only commercialized in the last century and a half. Always evolving with new flavors and styles, savory snack foods are considered uniquely "American." They have become icons of the American lifestyle and symbols of the hard-charging, ever changing image most people of the world associate with the American style and spirit. Savory snack foods are multipurpose foods that can be eaten with a meal or on the go and are often associated with fun-filled events like picnics, barbecues, or sports, where an informal atmosphere reigns. Their association with fun reinforces the image of these foods as typically American to the rest of the world.

2.1.1. Nutritional value of snacks :

Snack foods are often subjectively classified as junk food because they typically have little or no nutritional value, and are not seen as contributing towards general health and nutrition. With growing concerns for diet, weight control and general health ,government bodies like Health Canada are recommending that people make a conscious effort to eat more healthy, natural snacks – such as fruit, vegetables, nuts and cereal grains – while avoiding high-calorie, low-nutrient junk food.

At 2010 study showed that children in the United States snacked on average six times per day, approximately twice as often as American children in the 1970s.

In the late 1970s and early 1980s, manufacturers of snack foods and ready-to eat breakfast cereals and, to a lesser degree, fast food chains serving hamburgers and french-fried potatoes came under criticism for selling "junk" and "empty calorie" foods. In some cases, it appeared that otherwise professional comments by nutritionists and dieticians were fanned by the news media into vicious attacks on these industries. This era was unfortunate for the nation, and mainly led to only lawyers talking to lawyers. Such scars take a long time to heal.

McDonalds TM and others sponsored full-page advertisements featuring data supporting the nutritional value of fast service foods. Interestingly, several years later, the U.S. Navy found, by weighing post-meal tray scrapings, that enlisted men aboard ships were not consuming enough "traditional" meals for adequate nutrition. As a result, fast food vendors were invited to help establish trial hamburger, salad and snack bars to serve familiar foods to young recruits on, a large warship during a long voyage. The gains in food intake and improved morale were so impressive that the practice spread to other ships and to on feeding in other services.

During the same period, ready-to-eat breakfast cereal manufacturers conducted considerable research on the relationships between presweetened cereals and the development of dental caries in children. Snack manufacturers offered products with different salt levels for individuals concerned about hypertension .Sodium chloride-potassium chloride mixtures were tried as seasonings ,but negative effects on flavor were experienced and concerns arose about excessive potassium intake. Now, approximately 20 years later, the complex carbohydrates of cereals(starch) are considered desirable.

The snack food industry continually searches for products and processes that increasingly please consumers and addresses nutritional concerns, some times,only to find limited demand or acceptance in the marketplace. Such was the case for snacks with reduced salt content, use of non-caloric frying oils and low-fat/no-fat snacks.

People are coming to realize that increased snacks consumption is the result, rather than the cause, of our fast-changing society, and therefore cannot be blamed for all its problems. The following applaud able comment, by a qualified nutritionist, also appeared in the 1980s:

Nutritionists are concerned that people eat the right amounts and combinations of foods to promote good health. Individuals should learn, however, not to feel guilty when they have a snack of a favorite food. The bottom line to the role of snacking in the American diet is that individuals need to learn how to eat in

a rational way. With the exception of special medical restrictions, all foods can contribute to a healthful diet, provided individuals eat a variety of foods, and eat them in the right proportions.

2.1.3 Importance of snacks:

snacks can play an important role in managing kids' hunger and boosting nutrition. A well-timed snack can even out spikes in hunger and provide a much-needed energy boost between meals.

Snacks can keep younger children from getting so hungry that they become cranky, and they can keep older kids from overeating at larger meals. And for picky eaters of all ages, snacks can be added insurance that they're getting the necessary nutrients.

This doesn't mean that giving your child a cupcake half an hour before dinner is suddenly a good idea. The best snacks are nutritious — low in sugar, fat, and salt. Fresh fruit and vegetables and foods that contain whole grains and protein are also good choices.

But it's not just about what you offer as a snack it's how much you serve and when. Pay attention to portion sizes and timing of snacks so they don't interfere with a child's appetite for the next scheduled meal.

Kids who are allowed to graze all day long often have a hard time figuring out when they're truly hungry one key to maintaining a healthy weight in childhood and later in life. A structured meal and snack schedule is one solution. You offer the meals and snacks at the same times each day, and your kids can decide what they want to eat and how much.

1.3 Food Quality System:

1.3. Introduction

Safety is defined as the condition of being safe from undergoing or causing hurt, injury or loss (Webster's Ninth New Collegiate Dictionary, 1990). Food safety is the assurance that food will not cause any harm to the consumer when it is prepared and/or consumed according to its intended use (FAO/WHO, 1997). Food safety is a growing global concern, not only for its continuing importance to public health, but also because of its impact on international trade (Burros, 1997). Motarjemi and Mortimore (2005) emphasized that ensuring food safety in today's complex world is a daunting task and is possible only with a concerted effort of all sectors including government, consumer organizations and industry.

Quality, on the other hand, is not an absolute and it has been very difficult to define, to understand and especially to measure. The assurance of quality is a guarantee that agreed-

upon specifications have been met. Some writers claim explicitly or implicitly that quality is simple, but many treatises on quality conclude that quality is complex, multidimensional, and relative (Meiselman, 2001). Quality is not a scientific or a technical word, it is not a physical entity, but it is a very useful concept in general life and management (Juran, 1989). The terms ‘‘food quality’’ and ‘‘food safety’’ mean different things to different people.

Food quality is an interesting concept because it transcends all steps and all factors within the food chain, but it is of an intangible nature because it is perceived individually (Olsen et al., 2008). Food quality has a vast number of meanings and can encompass parameters as diverse as organoleptic characteristics, physical and functional properties, nutrient content and consumer protection from fraud. Safety is more straight forward, relating to the content of various chemical and microbiological elements in food (Burlingame and Pinero, 2007).

Food safety and food quality assurance are forms of guarantees. The assurance of quality is a guarantee that agreed upon specifications have been met. If safety related specifications are included in the quality assurance system, then the assurance of quality encompasses safety (Holleran,1999). Thus, the consumer is the key to defining quality, and a company’s internal definition of quality is meaningless if it fails to reflect consumer requirements(Kontogeorgos and Semos, 2008).It is generally agreed that high quality products or services are the essence of a company’s survival and competitiveness in the highly competitive global market(Misterek *et al.,* 1990; Garvin, 1987). To achieve their goals, companies are implementing quality assurance systems. Safety assurance systems require, to ensure the safety of food and to show compliance with regulatory and customer requirements, at each step in the food production chain (Trienekens and Zuurbier, 2007).

The implementation of quality assurance systems in the global food market strengthens companies’ position and improves their competitiveness (Karipidis et al, 2009).‘Quality

system' is known as the complete set of written procedures, training, practical activities and records (Newman, 2005). Effective quality assurance systems will address safety and quality of both the food products and processes. By separating product and process (production method), quality can be defined in terms of intrinsic quality (quality of the product) and extrinsic quality (systems of production and processing) (Manning and Baines, 2004).

Food companies in order to adopt quality practices are implementing quality assurance systems, such as Hazard Analysis Critical Control Point (HACCP) and ISO9000 (Ziggers and Trienekens, 1999). HACCP system focuses mainly in assurance on technological requirements while ISO 9000:2000 focus more in management aspects(Luning *et al*., 2006; Loc, 2006).

In 2005 the new ISO 22,000 standard, has been introduced aiming at managing safety in the food chain (Trienekens and Zuurbier,2007).

ISO 9001:2008 use a process approach and aims to achieve customer satisfaction by meeting customer requirements, to improve the system continuously, and to prevent nonconformity in products and/or services (ISO, 2001). ISO 9001:2000provides guidelines for organizations to establish their quality systems by focusing on procedures, control, and documentation. The system is based on the concept that certain minimum characteristics of a quality management system could be usefully standardized, giving mutual benefit to suppliers and customers, and focusing on process rather than product/service quality (Van der Wiele *et al.,* 2005). ISO 9001:2000focuses on customers' needs and expectations. One of the most important customer expectations is to have safe food products. ISO 9001:2000 allows an organization to integrate its quality management system with the implementation of a food safety system (Aggelogiannopoulos *et al.,* 2007). When food companies are

implemented quality assurance systems according to ISO 9000 series, ensuring quality procedures and reinforcing legislative requirements (Bolton, 1997).

ISO 9000 standards are internationally recognized and designed to demonstrate that the supplying organization has achieved a basic level of quality by the formalization and documentation of its6quality management system. The effective deployment of ISO 9000 quality management system has been widely recognized in recent years as a means of building sustainable competitive advantage and thereby enhancing firm performance (Koc,2007).

Despite the huge efforts paid by the food safety authorities, specialists and industry, food safety still remains critical and often is coming into spot light attracting media's attention with outbreaks that can bring a stack of multiple negative consequences.

Such major events like BSE in 2000, dioxin or PCB crisis in 1999 and others questioned the effectiveness of the food quality assurance systems and food safety management applied and demonstrate that new tools are needed to complement the actual systems in place. When evaluating the negative consequences one have to take into account the medical costs incurred, the economical losses that can badly shake local small industries, and least but not last consumers trust.

The safety paradigm is that although food is safer, consumers attitude is dominated by high levels of uncertainty.

Among the available Quality Assurance (QA) systems there are at hand today systems such as: GMPs (Good Manufacturing Practices), GHPs (Good Hygiene Practices), GAPs (Good Agricultural Practices) or other prerequisite systems and HACCP (Hazard Analysis. Critical Control Points) (van der Spiegel teal., 2003).

2.1 Individual quality and/or safety management systems for food industry:

A quality management system (QMS) system can be defined as: a set of coordinated activities to direct and control an organization in order to continually improve the effectiveness and efficiency of it performance.

Food quality is a complex concept that can be assessed only in relation to food safety. To be considered safe for consumption, a food must meet: legislative requirements; technological criteria; hygiene requirements; transport and handling requirements; trading conditions and satisfy its intended use.

The relation between quality and safety is intricate and although safety cannot be viewed as a totally independent aspect from quality, recognizing the complexity of both concepts brought the need of managing them separately.

In fact the reasoning behind separating food safety from quality was the need to place the concept of safety first and above all the other quality aspects.

The result can be classified in **quality assurance systems** (QA) that includes the prerequisites (GMPs, GHPs, GAPs) and HACCP; **quality management systems** (QMS) that refers to ISO or TQM; and **integrated systems** (ISO) such as ISO 22000.

3.1.1 GHP/GMP PRINCIPLES

Good Hygiene Practice (GHP) refer to procedures that must be undertaken and hygiene conditions that have to be fulfilled and monitored at all stages of production or trade in order to guarantee food safety.

Good Manufacturing Practice (GMP) denotes all the actions that must be undertaken and conditions to be fulfilled in order to ensure that production of food, wrapping materials and other materials expected for contact with food, is executed in proper way to guarantee safe end products and safe food for human consumption.

The Prerequisite Program in other words GHP/GMP is the first step to implementation of food safety and quality systems along the entire food chain beginning with the initial production, feed production, animal rearing, processing, transport and ending with the retail trade. The area covered by the GHP and GMP requirements [Turlejska2003] comprises:

– the site, surroundings and infrastructure of the enterprise,

– enterprise facilities and their functional layout,

– machines and equipment,

– washing and disinfecting processes,

– water supplies,

– waste control,

– pest protection and appropriate control in this field,

– personnel training,

– personnel hygiene,

– keeping documentation and records in the area of GHP.

In practice, the process of implementation of the GHP and GMP principles from the moment of their introduction consisted in the modernization of the existing enterprises and

adjustment of their infrastructure, facilities, machines and equipment to legally clearly specified hygiene-sanitary conditions. Unfortunately, in many cases this process was very costly since it was connected with the restructure of the existing facilities or even the construction of completely new ones. Very often the modernization process involved the exchange of the majority of machines and equipment because the old ones failed to comply with the basic hygiene-sanitary requirements. Successive requirements were fulfilled one after another by writing down definite procedures according to the principle: "Write down how you do it, do as you have written down". The form of the applied procedures is completely free and depends exclusively on the given company,

its needs and size, but it must include all the hygiene-sanitary requirements and must comply with the existing law. Correctly written down and implemented principles of good hygiene and manufacturing practices are approved and supervised by the appropriate sanitary services.

3.1.2 HACCP SYSTEM:

The Hazard Analysis and Critical Control Point (HACCP) involves all the procedures whose aim is to guarantee food safety by way of the identification and assessment of the scale of threat from the point of view of the health quality of food as well as the risk of hazards which may occur in the course of all the stages of the production process and food circulation. In addition, the system also aims to determine methods of limiting hazards and establishment of remedial actions.

The HACCP system is based on seven principles which, simultaneously, make up

consecutive stages of its implementation [Turlejska 2003]:

– hazard analysis, in other words, identification and assessment of threats and possible hazards of their occurrence and determination of control measures and methods of counteracting these threats:

–Determination of critical control points (CCP) in order to eliminate or minimize

the occurrence of hazards,

–Establish critical limits for the critical control points identified,

–Determination and implementation of a system for the monitoring of critical control points,

–Establishment of corrective actions, if a critical control point does not fulfil the

necessary requirements,

–Establishment of verification procedures in order to confirm if the system is effective and acts in accordance with the plan,

–Elaboration and maintenance of the documentation of the HACCP system concerning stages of its implementation and determination of the method of data registration and storage as well as archiving of the system documentation.

The basis for the elaboration and implementation of the HACCP system is the Codex Alimentarius. Other standards are also known, among others, the Danish Standard or the new ISO 22000 Standard.

The analysis of hazards provides an excellent tool which helps to involve the company intermediate management in its implementation. They feel obliged to analyses all operations taking place in the enterprise from the point of view of possible hazards which may occur. The HACCP team must, to a smaller or greater extent, collect literature data concerning the

threats and risks connected with them as well as data associated with the prevention and elimination of inconsistencies which have already developed. It is a process which helps the manufacturer to become aware of threats that are connected with food production, consequences of such threats as well as the huge responsibility for the consumers' health.

3.1.3 Critical control points (CCPs):

Critical control points (CCPs) are the result of hazard analysis and, in practical conditions, they can be treated as an operation or action that the manufacturer must pay special attention to because these points pose real hazards to the safety of food products in the case of deviations from the established parameters. At the same time CCPs are the point of control for the identified hazard but is not always the point where the hazard occurs i.e. enters the food chain. The control can be applied before the hazard occurs or after i.e. cooking. Therefore, in spite of frequent complaints that it is simply superfluous red tape, unnecessary requirement of the European Union, the HACCP system is in fact a tool which may be less or more perfect but, eventually, it allows food industry to provide consumers with safe food articles. Therefore, it is treated by the legislators as an important requirement to be fulfilled at all stages of production and distribution of food offered for sale as well as production of feeds for animals. The HACCP system need not be implemented only in the case of basic production, but it can be applied at all stages of the food chain including farms and even fishing boats.

3.1.4 Definition of ISO 22000:

ISO 22000 is an international standard intended to be used by organizations within the food chain. The purpose of ISO 22000 is to provide a practical approach to ensure the reduction and elimination of food safety risks as a means to protect consumers.

ISO 22000 follows a long tradition of preventive actions, identified and regulated by quality and food safety professionals. Three brief ISO 22000 concepts imported from ISO 9001 are planning (i.e., things work better when there is a plan and the plan is followed and enforced), procedures (i.e., consistency for extended time periods, especially when multiple people are involved), and employee competence (i.e., the use of competent personnel is necessary to achieve required results).

3.1.5 Definition of SIX SIGMA

Six Sigma - A highly disciplined process that enables organizations deliver nearly perfect products and services .The figure of six arrived statistically from current average maturity of most business enterprises .A philosophy and a goal: as perfect as practically possible .A methodology and a symbol of quality.

Six Sigma

Six sigma has been widely used in the business field to deliver doubled competitiveness and profits. Whether it is used in operating processes, process improvement, or new product development, six sigma is an organized, systematic management method for structured processing of complex issues. The step commonly used in process improvement is DMAIC, which include: 1) Define: identifying customer needs and core processes and identifying problems requiring urgent improvement; 2) Measure: by collecting existing information to under- stand the current level of process performance as an analytical basis; 3) Analyze: explore the causes of problems, and validate by data to confirm the root of the problem; 4) Improve: according to the root of the problems, propose the best solutions; 5) Control: ensure the continuation and standardization of the improvement plan.

Six Sigma is not:

•A standard.

•A certification.

•Another metric like percentage.

Rather!

•It is a Quality Philosophy and the way of improving performance by knowing where you are and where you could be. Methodology to measure and improve company's performance, practices and systems.

Six Sigma emerged as a natural evolution in business to increase profit by eliminating defects.

The Current business environment now demands and rewards innovation more than ever before due to:

1- Customer Expectations.
2- Technological Change.
3- Global Competition.
4- Market Fragmentation.

SIGMA LEVELS

Sigma level (Process Capability)	Defects Per Million Opportunities
2	308.537
3	66.807
4	6.210
5	233
6	3.4

SIX SIGMA METHODOLOGY

(It takes money to save money)

- BPMS: Business Process Management System.

- DMAIC :Six Sigma Improvement Methodology.

- DMADV :Creating new process which will perform at Six Sigma.

WHAT IS DMAIC?

(Define, Measure, Analyses, Improve. Control)

A logical and structured approach to problem solving and process improvement .An iterative process (continuous improvement).

A quality tool which focus on change management style.

Phases of Six Sigma are:

- **Define** specific goals to achieve outcomes, consistent with customers demand and business strategy.

- **Measure** reduction of defects.

- **Analyze** problems , cause and effects must be considered.

- **Improve** process on bases of measurements and analysis.

- **Control** process to minimize defects.

WHAT IS DMADV?

-Define the project.

-Measure the opportunity.

-Analyze the process options.

-Design the process.

-Verify the performance.

USAGE OF SIX SIGMA:

As shown in Figure 1.1, the six sigma approach is based on the methodology applied on the tools of an organization, thus this theme is unique for one organization to another. No such comprehensive system would be suitable for all organization. Each organization has its own theme.

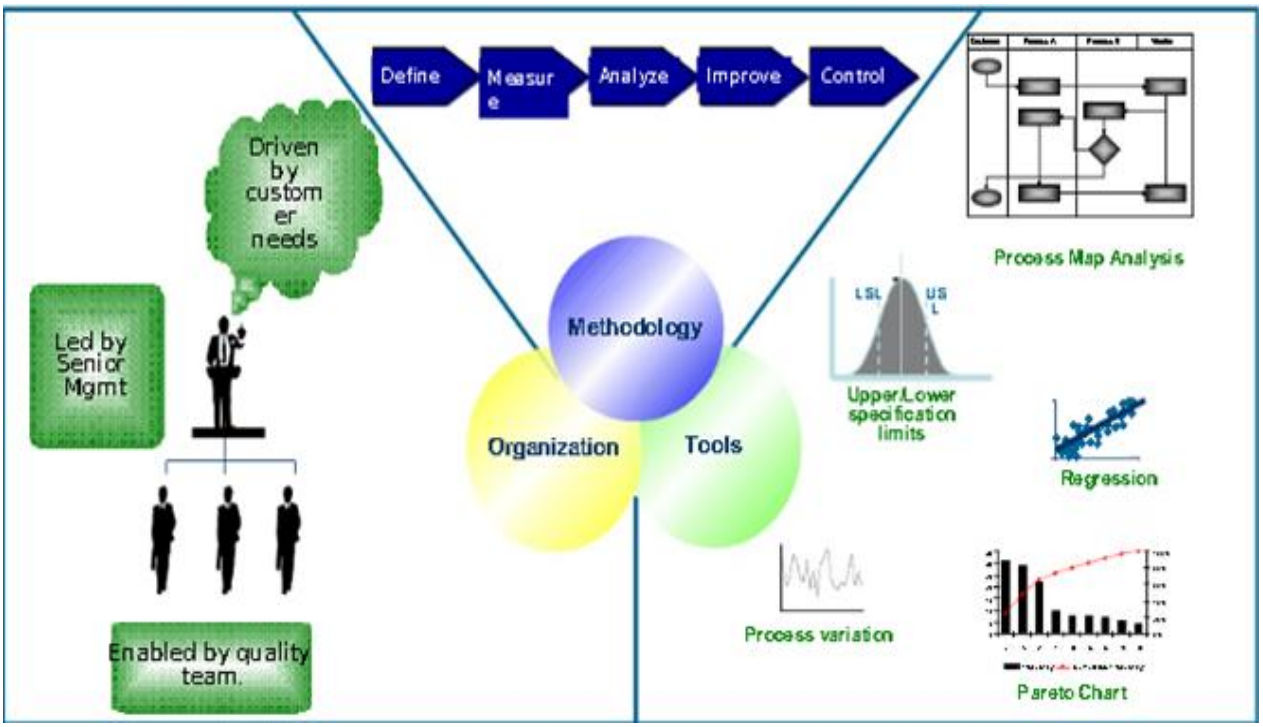


Figure. 1.1. the schematic approach of Six SIGMA in industry.

SIX SIGMA MANAGEMENT:

When practiced as a management system, Six Sigma is a high performance system for executing business strategy.

Six Sigma is a top down solution to help organizations:

Align their business strategy to critical improvement efforts.

Mobilize teams to attack high impact projects .

Accelerate improved business results .

Govern efforts to ensure improvements are sustained.

TOOLS & TECHNIQUES:

1. Check Sheets(collect data to make improvements).

2. Pareto Charts(define problem and frequency).

3. Cause and effect diagram (Identify possible causes to solve problem).

4. Histogram (Bar charts of accumulated data to evaluate distribution of data).

5. Scatter diagram (plots many data points and pattern between two variables).

6. Flow Chart (Identify unwanted steps).

7. Control charts (Control limits around mean value).

Problem

- Factories and food companies do not maintain keeps Systems do not investigate the quality and food safety requirements through the various stages of manufacture and thus trying to build a quality system of the company that I work out.

Objectives

- The purpose of ISO 22000 is to provide a practical approach to ensure the reduction and elimination of food safety risks as a means to protect consumers, Improved product quality and safety.

Chapter Two: Literature Review

2.1 Introduction:

The food industry has a number of Quality Assurance (QA) systems available like GMP (Good Manufacturing Practices), HACCP (Hazard Analysis. Critical Control Points),ISO (International Organization for Standardization) standards. These systems and their combinations are recommended for food quality and safety assurance. The agri- food production requires a specific approach to achieve the expected quality level. It is important to know to what extent the systems contribute to the total quality of the product and to balance the tools used for achieving the quality and safety objectives.

The food products safety was affected in the previous years by successive crises in the alimentary chain. As a way to re-establish the confidence of the consumers, it is necessary that food organizations prevent this kind of situations.

According to the World Health Organization (WHO), disease can either be food, air, or water borne. As such, food borne disease is any disease of an infectious or toxic nature caused by, or thought to be caused by the consumption of food or water.(Griffith, 2006a)studied that it can either be of a microbiological, chemical or physical nature.

(Griffith, 2006b)says that Food safety, synonymous with food hygiene, embraces anything in processing, preparation, or handling of food to ensure that it is safe to eat.(Pun and Bhairo-Beekhoo, 2008) says that the responsibility of food safety encompasses various food sectors of people, including producers and processors of food, governments and the consumers themselves.

Hazards in the process of manufacturing would constitute significant threats to the consumers because they could be passed on through the company's operations from receipt of raw material and ingredients to the distribution of packaged products (FAO, 1998).

The increasing concerns among the consumers related to food safety have been addressed by the competent authorities, through the publication of communitarian legislation and the ISO 22000:2005. In September 2005, the International Organization for Standardization (ISO) had published the ISO 22000:2005 standard - Food safety management systems – Requirements, that is applicable to any organization in the food chain". This standard integrates the requirements defined by ISO 9001 and the methodology used by HACCP (Hazard analysis and critical control point's management system).

2.2 Needed of ISO 22000:

Factories and food companies do not maintain keeps Systems do not investigate the quality and food safety requirements through the various stages of manufacture and thus trying to build a quality system of the snack food company.

ISO 22000 was chosen because ISO 9001, which specifies requirements concerning the quality management system; it is precisely this standard that is implemented in enterprises [ISO 9001: 2000],The Hazard Analysis and Critical Control Point (HACCP) involves all the procedures whose aim is to guarantee food safety by way of the identification and assessment of the scale of threat from the point of view of the health quality of food as well as the risk of hazards which may occur in the course of all the stages of the production process and food circulation. In addition, the system also aims to determine methods of limiting hazards and establishment of remedial actions.

ISO 22000:2005 is a food safety management standard that is developed based on the ISO 9001 approach. The standard was especially developed to manage food safety. It combines and supplements the core elements of ISO 9001 and HACCP to provide an effective framework for the development, implementation and continual improvement of a Food Safety Management System (FSMS).

ISO 22000:2005 specifies requirements to enable an organization:

- To **plan, implement, operate, maintain and update** a food safety management system aimed at providing products that, according to their intended use, are safe for the consumer.

- To **demonstrate compliance** with food safety requirements.

- To **evaluate and assess** customer requirements and **demonstrate conformity** with those mutually agreed customer requirements that relate to food safety, in order to enhance customer satisfaction.

- To **effectively communicate** food safety issues to their suppliers, customers and relevant interested parties in the food chain.

- To **ensure that the organization is consistent with** the declaration of food safety policy;

- To **demonstrate such conformity** to relevant interested parties.

- To seek **certification** or registration of its food safety management system by an external organization, or make a self-assessment or self-declaration of conformity to ISO 22000:2005.

2.3. Comparison of ISO 22000 with HACCP and ISO 9000:2008

(Frost, 2005) studied the developed with the participation of food sector experts, ISO 22000 incorporates the principles of HACCP, and covers the requirements of key standards developed by various global food retailer syndicates, in a single document.

The prerequisite programs (PRPs) are the main difference between ISO 22000 and HACCP. The incorporation of PRPs in the ISO22000 made the system more flexible as a smaller number of CCPs was introduced.

Surak (2006) states that ISO 22000strengthens the HACCP system in several ways. It is a management standard; there fore,it shares the following common elements with other management system standards:

• Policy.

• Planning.

• Implementation and operation.

• Performance assessment.

• Improvement.

• Management review.

Arvanitoyannis and Varzakas, (2009) refer that the main changes of ISO 22000

Compared with HACCP are the following:

1. Extension of the scope to include all the food businesses from feed and primary production as well as the organizations indirectly involved in the food chain.

2. The hazards that require control are those managed not only by CCPs but also through prerequisite programs (PRPs).

3. There is provision of crisis management procedures in the case that external dangers turn up.

4. Exist additional requirements for external communication between the foods

organizations and the relevant authorities involved in food safety beyond the internal communication requirements.

ISO 22000uses a systems approach (continual updating of the FSMS) to prevent new hazards from occurring in the food products and recognize the new technologies to control food safety hazards. On the other side, HACCP is inherently a system to prevent food safety hazards. (Surak, 2006) state that ISO 22000 strengthens HACCP by linking the plan to PRPs and defining management's responsibilities. (Arvanitoyannis and Tzouros, 2006) studied the another difference is the approach that ISO 22000 follows. ISO 22000 is implemented through the whole supply chain and not only in this final stage.

The ISO 22000 standard is fully compatible with other ISO management system standards such as ISO 9001. However, there are differences between the two standards.

(Surak,2006) studied the focus of ISO 9001 is quality, while the focus of ISO 22000 is food safety. (Frost, 2005)studied ISO 22000 extends the successful management system approach of the ISO9001:2000 quality management system standard which is widely implemented in

allsectors but does not itself specifically address food safety.

(Faergemand and Jespersen, 2004) states the standard ISO 22000 can be applied on its own, or in combination with other management system standards such as ISO 9001:2000, with or

without independent (third party) certification of conformity. (Frost, 2005) studied the Companies already certified to ISO9001 will find it easy to extend this to certification to ISO 22000.

(Talbot, 2007) studied Companies commit to an ISO 22000 approach in order to complete their ISO9001, ISO 14001, HACCP plans through the implementation of an integrated system.

2.4Component of ISO 22000 System:

ISO 22000is an international, auditable standard that the requirements for food safety management system by incorporating all the elements Good Manufacturing Practices (GMP) and Hazard Analysis Critical Control Points (HACCP)together with a comprehensive management system (Pillay and Muliyil, 2005).

Food Safety experts have found that well-functioning prerequisite programs (PRPs)simplify and strengthen the HACCP plan. ISO 22000:2005 is a HACCP-type standard based on and fits very well with ISO 9001:2000 especially developed to assure food safety. ISO 22000 will dynamically combine the HACCP principles and application steps with prerequisite programs, using the hazard analysis to determine the strategy to be used to ensure hazard control by combining the prerequisite programs and the HACCP plan (Faergemand and Jespersen, 2004).

The new standard offers an alternative to food enterprises that they do not implement ISO 9001 and they want to have an effective food safety management system (Aggelogiann opoulos*et al*., 2007) as it combines a series of advantages, involving quality management, external and in house communications, designating responsibility, implementing crisis

management, continual improvement, good health practices and differentiating between PRP and CCP Talbot (2007).

ISO 22000 may apply to all types of organizations within the food chain ranging from feed producers, primary producers through food manufacturers, transport and storage operators and subcontractors to retail and food service outlet together with interrelated organizations such as producers of equipment, packaging material, cleaning agents, additives and ingredients. The standard will combine generally recognized key elements to ensure food safety along the food chain, as follows (Faergemand and Jespersen, 2004):

- Interactive communication
- System management
- Hazard control

Varzakas and Arvanitoyannis (2008) refer that the advantages of ISO 22000 include :

1- Optimum distribution of resources inside the food chain organization.

2 -Effective communication of suppliers, clients, authorities and other involved

authorities.

3- Focus on the prerequisite programs.

4- Better documentation.

5- Creation of trust with the prerequisite the credibility of the management system based on the provision of the conditions for the accomplishment of solid.

ISO 22000 can be considered as a business management tool that links food Safety to business processes and encourages organizations to analyze customer requirements, define

processes and keep them in control. It enables integration of quality management and food safety management. It is intended for organization directly or indirectly associated with the food supply chain irrespective of size or complexity and is regarded as being able to bring transparency since it has been designed to cover every link in the food supply chain (Pillay and Muliyil, 2005).

The ISO 22000 provides the basis for demonstrating a company's compliance to a quality system by establishing the documentation and procedural standards that must be met. Under these standards, controls must be established for every aspect of the production process and all operational procedures and managerial actions must be documented. These standards are designed to demonstrate to customers that them supplying organization has achieved a basic level of quality assurance and food safety by the formalization and documentation of its quality management system'.

2.5 Role of ISO 22000 Components ;9001, HACCP:

ISO 9001:2000 use a process approach and aims to achieve customer satisfaction by meeting customer requirements, to improve the system continuously, and to prevent nonconformity in products and/or services (ISO, 2001). ISO 9001:2000provides guidelines for organizations to establish their quality systems by focusing on procedures, control, and documentation (Sun *et al.*, 2004). The system is based on the concept that certain minimum characteristics of a quality management system could be usefully standardized, giving mutual benefit to suppliers and customers, and focusing on process rather than product/service quality (Van der Wiele*et al.*, 2005).

ISO 9001:2000focuses on customers' needs and expectations. One of the most important customer expectations is to have safe food products. ISO 9001:2000 allows an organization to integrate its quality management system with the implementation of a food safety system

(Aggelogiannopoulos*et al.,* 2007). When food companies are implemented quality assurance systems according to ISO 9000 series, ensuring quality procedures and reinforcing legislative requirements (Bolton, 1997).

ISO 9000 standards are internationally recognized and designed to demonstrate that the supplying organization has achieved a basic level of quality by the formalization and documentation its quality management system. The effective development of ISO 9000 quality management system has been widely recognized in recent years as a means of building sustainable competitive advantage and thereby enhancing firm performance (Koc,2007).

HACCP is the system of choice in the management of food safety, and is compatible with that of quality management systems, such as ISO 9000 series (Manning et al, 2006; Nguyen et al., 2004). Adopting HACCP assists companies to comply with legislation, supports due diligence and fulfills customer requirements for a food and safety management system.

The objective of the HACCP system is to guarantee food safety by implementation of a quality system, which covers the complete food production chain, from the primary sector up to the final consuming of the product. Food manufacturers are not only responsible for the Good Manufacturing Practices within their respective organisations, but also address the possible hazards (Arnjadi and Hussain, 2005).For example, if there is a possibility that the raw materials are exposed to certain hazards, a manufacturer is responsible to check if and how the supplier of the raw materials controls these hazards. Besides, the manufacturer must supply the consumer with sufficient information about handling of the product to avoid hazards, which can occur during cooking and/or storage of the product. that the raw materials are exposed to certain hazards, a manufacturer is responsible to check if and how the supplier of the raw materials controls these hazards. Besides, the manufacturer must supply the consumer with sufficient information about handling of the product to avoid hazards, which can occur during cooking and/or storage of the product.

A 14-step Strategy Model of HACCP System Implementation

Many agencies, practitioners and researchers have suggested different strategies, models and frameworks to implement HACCP in food industry

sectors. Some of them are adopting a generic approach, while others are company or industry specific to a particular environmental or application. The standard required: pre-requisites procedures – cleaning operations, good manufacturing practice (GMP), training (hygiene awareness), recall procedure, pest control procedures, factory inspection prior to commencement of operations; and the development of a HACCP plan following a 12-step process (Khatri and Collins, 2007). Nathai-Balkissoon and Arumugadasan (2004) also advocated a 12-step HACCP Programme that was composed of five preliminary steps and seven basic HACCP principles for food plant operations.

3.1 Commitment to Food Safety Improvements

Top management is the main driver of safety efforts throughout the implementation process (Pun and Hui, 2002). Management leadership and commitment can bring about corporate-wide safety initiatives and management practices in compliance with the HACCP principles and related safety standards. Having a clear corporate vision and mission for HACCP system implementation is essential, so that people can understand management's commitment and expectation. The management should nurture a safety culture, develop the objectives, goals and policy, define the safety responsibilities, and delegate authorities and assign resources to where appropriate for the preparation and execution of changes and improvements across the entire organization.

3.2 Formation of a HACCP Team

In 2006, a multi-disciplinary HACCP team was formed at HSL. Members from a wide range of expertise were selected so as to ensure a company-wide participation and implementation. Their responsibilities include: 1) ensuring the Food Safety Management System requirements are established, implemented and maintained in accordance with the HACCP System and 2) reporting on the performance of the Food Safety Management System to management for review, and as a basis for continual improvement.

3.3 Conduct of Gap Analysis

A thorough Gap analysis examined objectively the current Quality Management System in place and related operations to the requirements of the HACCP system (such as material handling and storage, maintenance and equipment performance, personnel training, sanitation and personal hygiene, and health and safety recall procedures). The results helped the company to compile a list of areas for improvement and develop action plans and deadlines. Several tasks could be completed simultaneously by team members or assigned to other members of staff with respect to the assigned priorities and responsibilities

3.4 Description of the products

Begun with thorough understanding of the selected product, the HACCP Team should know the composition and processing of the food and the severity and risk of any hazards. The description of the product requires knowledge of 1) product characteristics and composition, 2) structure, 3) processing, 4) packaging, 5) storage and distribution conditions, 6) required shelf life, and 7) instructions for use. With the implementation of HACCP system, more details were required on microbiological characteristics, nutritional values, chemical and physical properties, and packaging labeling information.

3.5 Construction of Flow Diagram

Team members constructed the flow diagram to cover various steps in the operation for easy identification of routes of potential contamination and controls. Process flow diagrams include: 1) The sequence and interaction of various steps in the operation, 2) Any outsourced processes and subcontracted work, 3) Where raw material, ingredients and intermediate products enter the flow, 4) Where reworking and recycling take place, and 5) Where end products, intermediate products, by-products and waste would be removed. The objective was to visualize the flow of the production process and to make the process transparent. Once the flow diagram has been produced, it needed to be checked for accuracy. Variations

in work practices often occur when different line supervisors are in control. This check involved members of the HACCP Team at different times with different shifts. The completed checklists form a record of the assessment and provided a baseline for the assessment of change.

3.6 Identification of Hazards and Control Measures

The hazard analysis consists of 1) listing all the hazards that can be present, 2) assessing the probability and severity of risk, and 3) identifying ways in which the hazards can be controlled. The HACCP Team should ensure that the team complies with the terms of reference. There should be identification of the hazards, operational malpractices and contamination points (such as improper cleaning). Once the hazards have been identified, the control measures based on knowledge of the hazards, their normal sources and contamination points would then be constructed.

3.7 Determination of Microbiological Hazards

The decision tree approach was used for the team to look at the products, with the intention of identifying the microbiological hazards at HSL. Decision trees were structured in sets of questions. Typical questions include:

Are control measures in place?

Is control at this step necessary for safety?

Does the step eliminate or reduce hazard occurrence to an acceptable level?

Will contaminations occur at unacceptable levels or increase to unacceptable levels?

3.8 Determination of Physical and Chemical Hazards

Physical and chemical hazards are both important in food safety and amount to numerous complaints about product quality. Customer complaint records are the most useful source of information on physical and chemical hazards. Examples of chemical hazards include cleaning chemicals, pesticides, toxic metals organic compounds and packaging plastizers. Contamination with chemical hazards can take place from farm to consumption. The minimum dose needed for some chemicals to cause acute illness is known but others have a chronic long-term effect following consumption of low levels over extended periods. Physical hazards can be classified into 5 major categories, namely glass, metal, wood, plastic and miscellaneous. Miscellaneous items include such as sand, paint stones, rubber and objectionable foreign matter that may not constitute a hazard.

3.9 Conduct of Risk Assessment

Risk assessment is the process of evaluating food premises to decide if they need to be inspected frequently or not. Within HACCP, the risk concept is used to prioritize actions and determine level of control, and risk is defined as the likelihood or probability that a hazard will occur with consideration of severity. Risk can be quantified mathematically but this approach requires careful interpretation. Often the amount of raw data is inadequate or insufficient. An alternative is to consider food risk categories in high, medium or low degree.

3.10 Identification of Critical Control Points and Target Levels

Once the hazards and how they get into food (i.e. sources and contamination points) are identified, control measures can be decided. A control measure is the action or activity required to eliminate a hazard or reduce its impact or occurrence to an acceptable level.

More than one control measure may be required to control one hazard and more than one hazard may be controlled by one particular control measure. The work on risk assessment in combination with the damage potential (i.e. hazard severity) can assist to decide upon the level of control to be implemented. The control measures are also included in the Product Hazard Analysis.

3.11 Monitoring of Safety Measures

Monitoring is the series of observations or measurements to ensure that controlled measures are being implemented correctly and within critical limits. Monitoring enables management to detect loss of control at a CCP. Hence, it is important to specify who, how and when monitoring is to be performed and recorded. Results from monitoring should be used proactively and illustrate how SPC can be incorporated into HACCP.

Monitoring can be continuous where important data is constantly being recorded, for example temperature graphs can be discontinuous with observations made and recorded at specific time intervals.

Several types of monitoring activities are identified. These are:

1- Physical checks are manual and take the form of a simple test or following a standard operating procedure, and then a calculation followed by comparison to the set specifications for the process parameter. The measurement of percentage flavor of a product is a typical example. This requires weighing the flavored and unflavored chips and then a simple calculation.

2- Observation/Visual checks are best performed after training and testing for reliability and reproducibility against very specific criteria, which may include photographs, chart

and timings. Visual inspection of surface cleanliness is the first part of an integrated approach to monitoring.

3- Microbiological checks require an outsourced laboratory or the establishment of an internal laboratory for testing under controlled environment.

4- Chemical checks usually involve a laboratory test. This is a technical procedure usually requiring the Quality Department staff to conduct this test.

3.12 Planning for Corrective/Improvement Actions

A Quality Plan shows the areas in which tests are carried out, with reference to the test procedure, who does the testing, the frequency, and the disposition of the product when out of specification. A Corrective/Improvement Action Plan describes what should happen if a deviation is found, meaning if the value of a measurement lies outside the critical limit. If this were to happen, there must have been a loss of process control (e.g. failure to achieve a specified pasteurization temperature or failure to clan properly). These plans are also used to specify what should happen if the results obtained at a critical control point are within a critical limit or not. Besides, documentation of the incident and the defective product is recorded on a Non-Conformance Report. This document is only completed when an investigation has been done, the defective product has been tested and a decision has been made on the release and outcome of the product.

3.13 Verification of the HACCP Process and Documentation

Auditing is an important way of verifying HACCP plans. This is a systematic and independent examination to determine whether 1) HACCP activities and related results

comply with planned arrangements, and 2) those arrangements are implemented effectively and are suitable to achieve objectives. There are basically three types of HACCP Audits - namely Internal (e.g. In-house auditors), External (e.g. Supplier or Contracted body) and Regulatory (e.g. Chemistry, Food and Drug inspectorate).

The management should coordinate the safety audits, maintain the safety records consistently, and reinforce the safety practices for HACCP audits. Organisations should document systems and add in the requirements for activities affecting food safety, quality and customer satisfaction. In this context, HSL has integrated its HACCP documentation into existing quality policies, procedures work instructions and record or reference a separate HACCP manual of its ISO 9001 .

3.14 Reinforce Continuous Performance Improvements with HACCP

The management and the HACCP team should review the HACCP system at defined intervals sufficient to ensure its continuing suitability and effectiveness in satisfying the safety requirements and the company's stated safety policy and objectives. Moreover, maintaining the safety culture with committed management and efficient management reviews would ensure that organisations stay ahead with continuous performance improvements (Pun and Hui, 2002).

Barriers

The main problems of ISO 22000 implementation according to the participants, are focused on the employee training, certification requirements procedures and the supply chain The vast majority of the participants consider as the most important barrier of ISO implementation the lack of employee training. They agreed that employees are not interested in implementing the necessaries rules of hygiene.

Moreover, they have a negative attitude towards food safety programs. The adaptation of staff to quality standards is a difficult task as there is a lack of motivation while the supervision is not always efficient. Also, the time and effort to develop and implement ISO 22000 requirements, is a crucial parameter as most of the staff are part time employees and work seasonally. The next important parameter according to the participants is the lack of certified with ISO 22000 suppliers. Small producers are not certified with ISO 22000. So, they cannot supply the enterprises with certified products. As suppliers should be chosen only on the basis of ISO certification, the cost is raising up. Moreover, the administration cost is high.

Chapter Three: Materials & Methods

3.1 Introduction.

To indicate the quality of raw material &snacks food product under this Investigation , a number of analytical methods were used including chemical analysis & microbial analysis. To obtain high quality products ,raw material must be within high quality.

3.2 Methodology:

I work suggested the application of the ISO 22000 system on snack food company and doing Microbial and Chemical test on the sample from raw material to final product external and internal test like total plate count and yeast & mould .

According to the World Health Organization (WHO), disease can either be food, air or water borne. As such, food borne disease is any disease of an infectious or toxic nature caused by, or thought to be caused by the consumption of food or water. It can either be of a microbiological, chemical or physical nature (Griffith, 2006a).

Hazards in the process of manufacturing would constitute significant threats to the consumers because they could be passed on through the company operations from receipt of raw material and ingredients to the distribution of packaged products. (FAO, 1998).

Hazard analysis can be defined as the process of collecting and evaluating information on hazards and conditions leading to their presence in foods to decide which are significant for that food's safety (FAO, 1998).. *Hazard identification* involves analyzing each raw material, production process and consumer use, and identifying appropriate control measures to reduce or eliminate potential hazards. The identification requires systematic evaluation of raw materials used in the snack food and the steps identified in the production flow diagram.

Determination of Physical and Chemical Hazards :

Physical and chemical hazards are both important in food safety and amount to numerous complaints about product quality. Customer complaint records are the most useful source of information on physical and chemical hazards. Examples of chemical hazards include cleaning chemicals, pesticides, toxic metals organic compounds and packaging plastizers .Contamination with chemical hazards can take place from farm to consumption.

3.2.1 Chemical Analysis:

3.2.1 Peroxide Value.

Definition: it measures amount of peroxides formed in oxidized oil expressed as mill equivalents {meq} of oxygen found in 1Kg of oil or factor as meq of peroxide found in 1Kg of oil or fat.

This procedure as in AOCS (American oil chemist's society)

3.2.2 Chemicals:

1---glacial acetic acid.

2--- Chloroform.

2---potassium iodide.

4---sodium thiosulphate.

5---starch.

6---potassium dichromate.

7---hydrochloric acid.

8---different vegetable oils or fats that are used in frying.

2.2.3 Reagents

1--- 3:2(v/v) acetic acid chloroform mixture

2--- Saturated potassium iodide solution [keep in dark place]

3--- About 0.01 N standardized sodium thiosulphate solution [fresh]

4--- 1% starch solution.

2.2.**4 Principle:**

Ability of some substances [hydro peroxides] formed in oxidized oil convert iodide ion in to iodine then the liberated iodine is titrated with standardized sodium thiosulphate solution.

2.2.5 **Procedure:**

1- fill the burette with standardized sodium thiosulphate solution.

2- Take 250-ml Erlenmeyer flask with ground neck and stopper, wash it very well and dry.

3- Weigh accurately about 5 g oil in the flask [take the weight by different].

4- Add 30 ml of acetic acid chloroform mixture using graduated cylinder .stir until complete dissolving

5- Add 1ml of saturated potassium iodide solution then quickly insert the stopper and shake vigorously for 1min.

6- Unstopped then rinse the into the flask with about 30 ml DW.

7- Add 1ml of starch solution .

8- Titrate the liberated iodine with standardized sodium thiosulphate solution .

9- Carry out another determination on the sample .

10- Carry out simultaneously a blank test.

2.2.6 Standardization of sodium thiosulphate:

At first prepare solution of sodium thiosulphate by adding 25g sodium thiosulphate to 1L of distil water to obtain Normality 0.1N

Standardization

- In flask add 0.1g of potassium dichromate.
- Add 25 ml of distil water.
- Add 1g of KI .
- Add 1ml HCl concentrated .
- Then fill the burette with sodium thiosulphate .
- Titrate the content in the flask with sodium thiosulphate until the color change to yellow then add 1ml of starch [the color change to dark blue] then titrate till the color change to garnish.

2.2.7 Preparation of potassium Iodide:

Take 50ml of distil water and put it in flask

Put the flask on the hot plate till it boils.

Add slowly potassium iodide to the boiled water with continues stirring till white precipitate appears.

Then put it in dark glass and put the glass in dark place.

2.2.8 Preparation of starch 0.01:

Weight 1gr of starch and put it in flask 200ml

Add100ml D .water and shake it well.

2.2.9 Preparation of sodium thiosulphate:

Take 2.5gr of sodium thiosulphate and add 100ml of D. water then shake it very well to dissolve the sample. [N=1]

Take 10ml of the solution then add D .water till the volume become 100ml [N=0.01]

Put the solution in a burette.

2.2.10 Preparation of Acetic Acid with Chloroform mixture:

Take 60ml of Chloroform then add to it 90 ml of Acetic Acid and mix well.

The final results must be less than 10 meq/kg .

2.3.1 Acidity Test.

Definition: acidity is the mass of potassium hydroxide (KOH) in milligrams that is required to neutralize one gram of chemical substance. The acid number is a measure of the amount

of carboxylic acid groups in a chemical compound, such as a fatty acid, or in a mixture of compounds.

2.3.2 Reagents:

1) ethy1 alcohol 9%
2) 0.1 n aqueous sodium hydroxide
3) Phenolphthalein solution (1% in 96% ethanol)

2.3.3 Procedure:

1) Dry and clean 250 ml .flask is weighed.
2) About 7g of dried , filtered and well-mixed oil are weight into the flask .
3) 50 ml of 96% ethanol are taken and neutralized with 0.1aquouse NaOH solution in presence of 2 ml phenolphthalein solution to product faint permanent pink
4) The neutralized ethanol is added to the oil in the flask.
5) The whole mixture vigorously sharked and boiled and on a steam bath for two minutes.
6) There after, the flask contents are titrated with 0.1N aqueous NaOH solution until permanent faint pink appears persists one minute.

2.2.4 Calculation -:

1) Results could be reported as acid value (number of milling of KOH required to neutralize free fatty acids in 1 gram oil.

2) acid value = N X V X 56.1 / w ……..(1)

Where : N = normality of NaOH aqueous solution

V = milliliters of NaOH solution required to neutralize f present in the used sample

W = grams of the sample used in the experiment.

2) results could be reported as acidity %-free fatty acids content which means the percent of F.F.A expressed as a certain fatty of specified molecular weight according to the type of oil under investigation .normally oleic acid with a molecular weight of 2g is taken .in a number of cases an average molecular weight ,EO appropriate to the nature of the oil , is used . In each basis must be clearly stated

Acidity % = N X V X G X 100/1000XW ……. (2)

Where N = normality of NaOH aqueous solution

V = milliliters of NaOH solution required to neutralize f present in the used sample.

G = as oleic acid = 282.

W = grams of the sample used in the experiment.

The final results must be less than 0.8 as oleic acid.

2.4.1 Moisture Content

To determine the moisture content percentage in corn puffed, potato chips, snacked pasta by using the moisture analyzer machine:

- Press the on/off button.
- Set the correct instruction by :

  MODE BUTTON: to set 0 _ 100 %.

  F1 & F2: to set the temperature to 105 C°.
- Press to cf button to clear.
- Press enter to weight.
- Open the analyzer cover.
- Weight accurate 6 grams.
- Close the analyzer cover.
- Wait the moisture analyzer reading.

The final measure must be less than 3.5 % as moisture content in the final product.

3.2.2 Microbial test:

Enumeration of Staphylococcus aureus

1- Objective

This procedure describes the method of enumeration of *Staphylococcus aureus* in Corn puffed products, Potato Chips and Spicy snack products

2- Personnel

People with a food microbiology or a Microbiology degree and capable of handling microorganisms can carry on with this procedure.

3- Materials and Consumables

3.1 – Peptone Water.

3.2 – Baird Parker (BP) .

3.3 – Egg Yolk Tellurite Emulsion

3.4 – Stomacher sterile bags (31 cm x 18 cm)

3.5 – Alcohol at 70%

3.6 – Sterile Blades Scalpels

3.7 – Disposable sterile pipettes individually wrapped (1.2 ml, 10 ml)

3.8 – Pipettes Plus

3.9 – Test tubes with screw caps (16x100 ml)

3.10 – Petri dishes (90 mm)

4- Instrumentation

4.1 – Masticator (Stomacher)

4.2– Autoclave

4.3– Incubator

4.4– Water Bath

5- Media Preparation

5.1- According the information that available in media description (see the sticker label on media bottle)

6- Procedure

6.1 – Sample preparation

6.1.1 **–** Add 10 g of test sample aseptically to 90 ml peptone water.

6.1.2 **–** Blend in a stomacher for one minute at medium speed

6.1.3 **–** Keep the stomacher bag at room temperature for 20 minutes

6.2 – Identification

6.2.1 **–** Dilute the suspension to 10^{-1}, 10^{-2}

6.2.2 – Pour 15 ml of BP with egg yolk telluride emulsion, cooled previously at 47°C in each plate

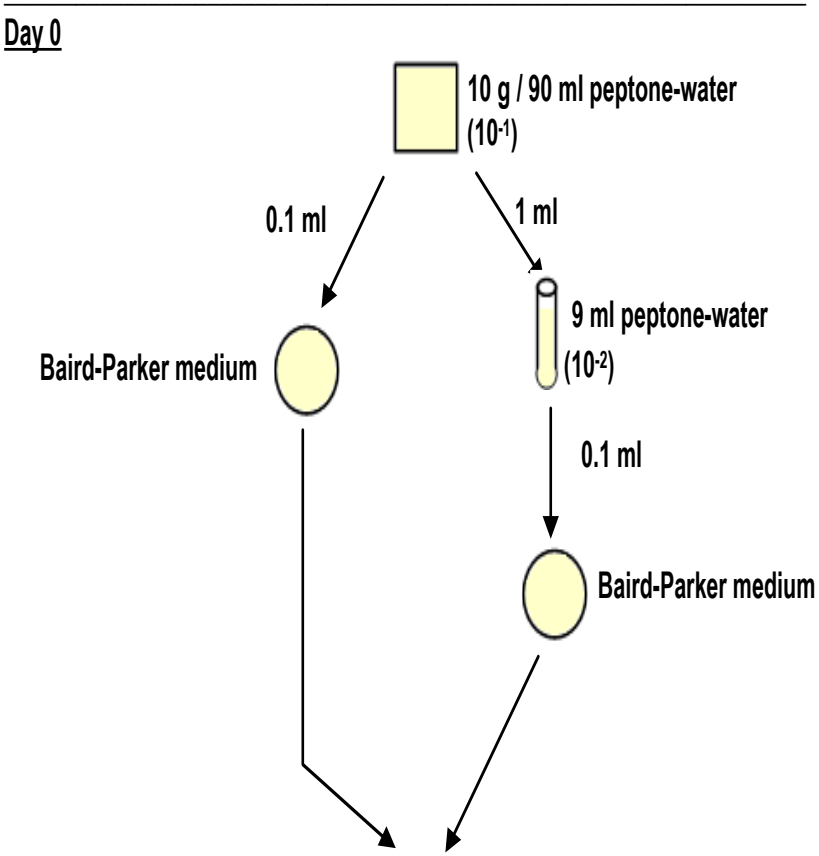
6.2.3 – Inoculate 0.1 ml of suspension in the Petri dish (one plate per dilution)

6.2.4 – Incubate the plates for 24hours, 48 hours at 37°C ±1°

6.2.5 – Count the colonies for each plate (*Colony characteristics:* gray- black shine convex 1-1.5mm diameter (18 hours) up to 3mm (48 hours) narrow white entire margin surrounded by zone of clearing 2-5 mm.)

6.2.6 _ The final result must be less than 10 colony / g .

Enumeration of Staphylococcus aureus



Pour in each plate 15 ml of BP with egg yolk Tellurite Emulsion, cooled previously at 47°C

Turn over the plates and incubate for 24 ±2 hours at 37°C ±1°C

Day 1

Count the typical colonies for each plate containing less than 150 colonies

Note: when sample taken from raw materials the laboratory technician shall be dilute the sample to 10^{-2}, but when taken from final product, dilute to 10^{-1} enough.

Enumeration of Yeast and Mould

1- Objective

This procedure describes the method of enumeration of *Yeast and Mould* in Corn puffed products, Potato Chips and Spicy snack products, according to the Palestinian standard method.

2- Personnel

People with a food microbiology or a Microbiology degree and capable of handling microorganisms can carry on with this procedure.

3- Materials and Consumables

3.1 – Peptone Water

3.2 – Oxytetracycline -Glucose Yeast Extract Agar – OGYE

3.3 – Oxytetracycline -Glucose Yeast Extract Agar (OGYE) supplement.

3.4 – Stomacher sterile bags (31 cm x 18 cm)

3.5 – Alcohol at 70%

3.6 – Sterile Blades Scalpels

3.7 – Disposable sterile pipettes individually wrapped (1.2 ml, 10 ml)

3.8 – Pipettes Plus

3.9 – Test tubes with screw caps (16x100 ml)

3.10 – Petri dishes (90 mm)

4- Instrumentation

4.1 – Masticator (Stomacher)

4.2– Autoclave

4.3– Incubator

4.4– Water Bath

5- Media Preparation

5.1- According the information that available in media description (see the sticker label on media bottle)

6- Procedure

6.1 – Sample preparation

6.1.1 **–** Add 10 g of test sample aseptically to 90 ml peptone-water

6.1.2 **–** Blend in a stomacher for one minute at medium speed

6.1.3 **–** Keep the stomacher bag at room temperature for 20 minutes

6.2 – Identification

6.2.1 **–** Dilute the suspension to 10^{-1}, 10^{-2}

6.2.2 – Pour 15 ml of Oxytetracycline -Glucose Yeast Extract Agar –OGYE- with OGYE supplement, cooled previously at 47°C in each plate

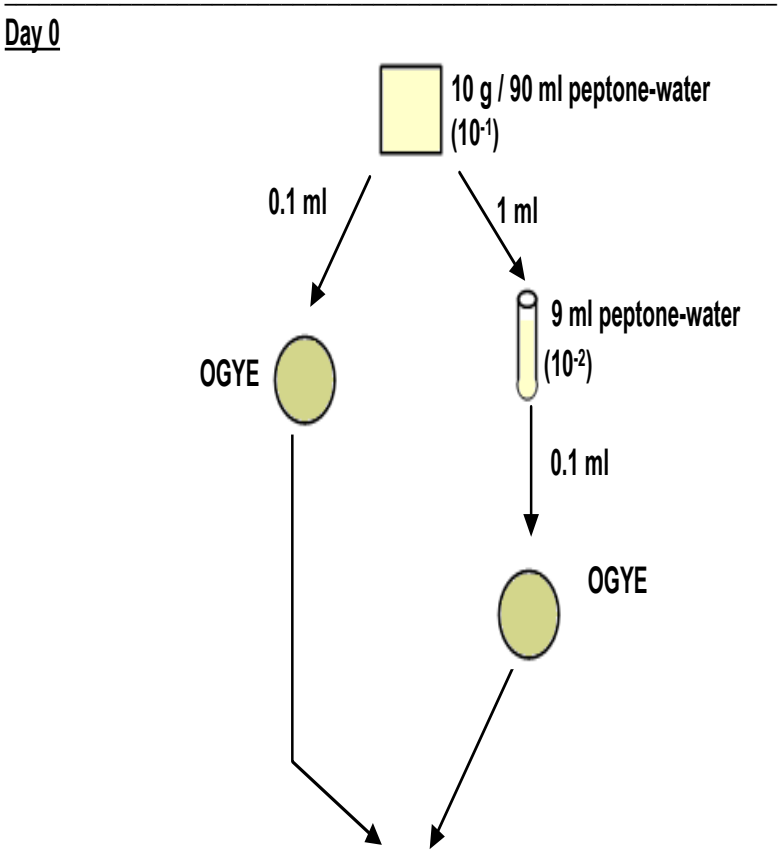
6.2.3 – Inoculate 0.1 ml of suspension in the Petri dish (one plate per dilution)

6.2.4 – Incubate the plates for 72 ± 2 hours, at 30°C ±1°C

6.2.5 – Count the colonies for each plate

6.2.6 _ The result must be less than 10 colony / g to potato chips & 100 colony /g for corn puffed product

Enumeration of Yeast and Mould



Pour in each plate 15 ml of Oxytetracycline -Glucose Yeast Extract Agar, cooled previously at 47°C

Turn over the plates and incubate for 72± 2 hours at 30°C± 1°C

Day 1

Count the colonies for each plate containing less than 250 colonies and more than 25 colonies.

Note: when sample taken from raw materials the laboratory technician shall be dilute the sample to 10^{-2}, but when taken from final product, dilute to 10^{-1} enough.

Enumeration of Total Coliforms

1- Objective

This procedure describes the method of enumeration of *Total Coliforms* in Corn puffed products, Potato Chips and Spicy snack products, according to the Codex Alimentarius method.

2- Personnel

People with a food microbiology or a Microbiology degree and capable of handling microorganisms can carry on with this procedure.

3- Materials and Consumables

3.1 – Peptone Water.

3.2 – Violet Red Bile Agar (VRBA).

3.3 – Stomacher sterile bags (31 cm x 18 cm)

3.4 – Alcohol at 70%

3.5 – Sterile Blades Scalpels

3.6 – Disposable sterile pipettes individually wrapped (1.2 ml, 10 ml)

3.7 – Pipettes Plus

3.8 – Test tubes with screw caps (16x100 ml)

3.9 – Petri dishes (90 mm)

4- Instrumentation

4.1 – Masticator (Stomacher)

4.2– Autoclave

4.3– Incubator

4.4– Water Bath

5- Media Preparation

5.1- According the information that available in media description (see the sticker label on media bottle)

6- Procedure

6.1 – Sample preparation

6.1.1 **–** Add 10 g of test sample aseptically to 90 ml peptone-water

6.1.2 **–** Blend in a stomacher for one minute at medium speed

6.1.3 **–** Keep the stomacher bag at room temperature for 20 minutes

6.2 – Identification

6.2.1 **–** Dilute the suspension to 10^{-1}, 10^{-2}

6.2.2 – Inoculate 1 ml of suspension in a Petri dish (one plate per dilution)

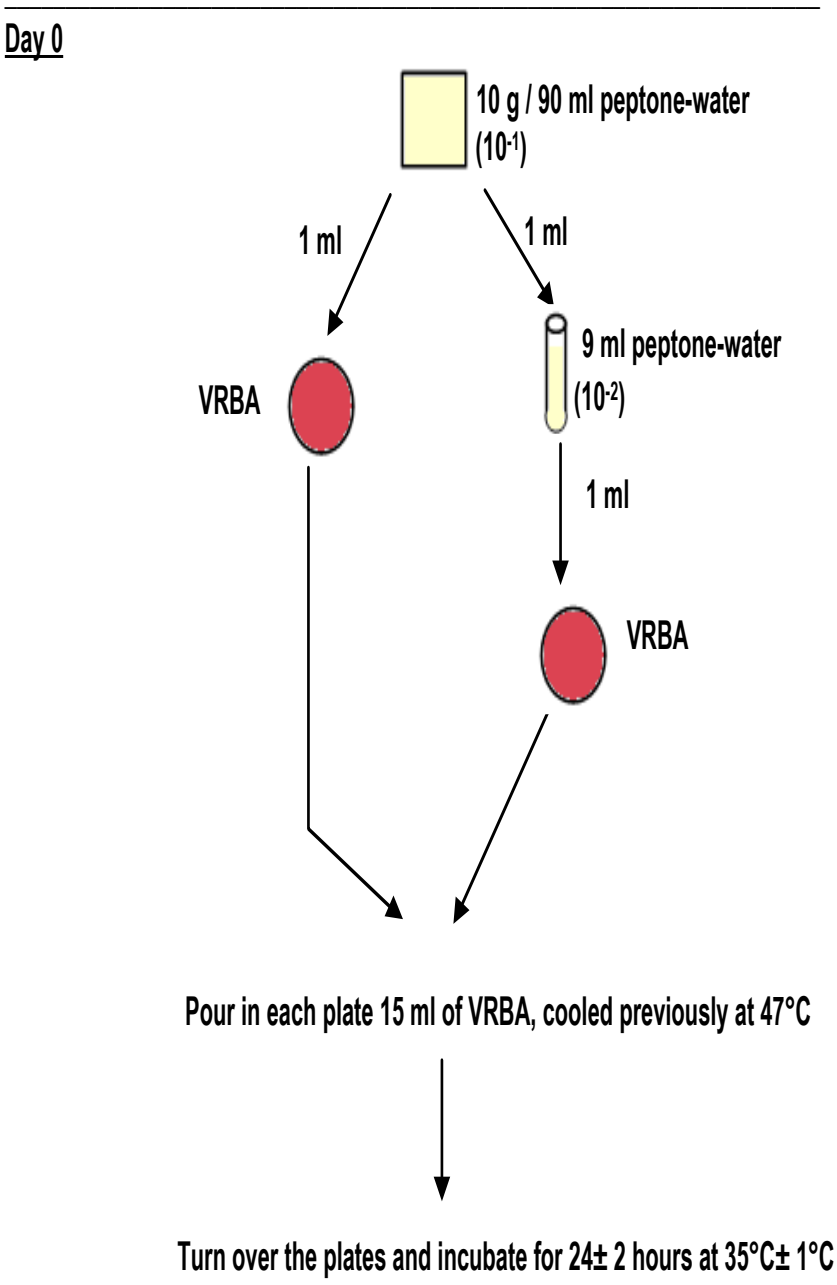
6.2.3 – Pour 15 ml of VRBA, cooled previously at 47°C in each plate

6.2.4 – Incubate the plates for 24 hours at 35°C ±1°C

6.2.5 – Count the colonies for each plate containing less than 150 colonies (*Colony characteristics:* Round, purple-red< 0.5 - 2 mm may be surrounded by purple-red haloes (lactose – positive organisms) pale, may have greenish haloes (lactose- negative organisms).

6.2.5 _ the final result must be less than 10 colony/ g

Enumeration of Total Coliforms



Note: when sample taken from raw materials the laboratory technician shall be dilute the sample to 10^{-2}, but when taken from final product, dilute to 10^{-1} enough.

Enumeration of aerobic microorganisms (Total Plate Count)

1- Objective

This procedure describes the method of enumeration of *Total Aerobic Microorganisms* in Corn puffed products, Potato Chips and Spicy snack products, according to the codex elimentarius method.

2- Personnel

People with a food microbiology or a Microbiology degree and capable of handling microorganisms can carry on with this procedure.

3- Materials and Consumables

3.1 – Peptone Water

3.2 – Nutrient Agar (Total Plate Agar)

3.3 – Stomacher sterile bags (31 cm x 18 cm)

3.4 – Alcohol at 70%

3.5 – Sterile Blades Scalpels

3.6 – Disposable sterile pipettes individually wrapped (1.2 ml, 10 ml)

3.7 – Pipettes Plus

3.8 – Test tubes with screw caps (16x100 ml)

3.9 – Petri dishes (90 mm)

4- Instrumentation

4.1 – Masticator (Stomacher)

4.2– Autoclave

4.3– Incubator

4.4– Water Bath

5- Media Preparation

5.1- add 1.5 gram from peptone water in one liter of water and mixed very well then, sterilization by autoclave at 121°C. or as bottle Directions.

6- Procedure

6.1 – Sample preparation

6.1.1 **–** Add 10 g of test sample aseptically to 90 ml peptone-water

6.1.2 **–** Blend in a stomacher for one minute at medium speed

6.1.3 **–** Keep the stomacher bag at room temperature for 20 minutes

6.2 – Identification

6.2.1 **–** Dilute the suspension to 10^{-2} , $10^{\circ 3}$.

6.2.2 – Inoculate 1 ml of suspension in a Petri dish (one plate per dilution)

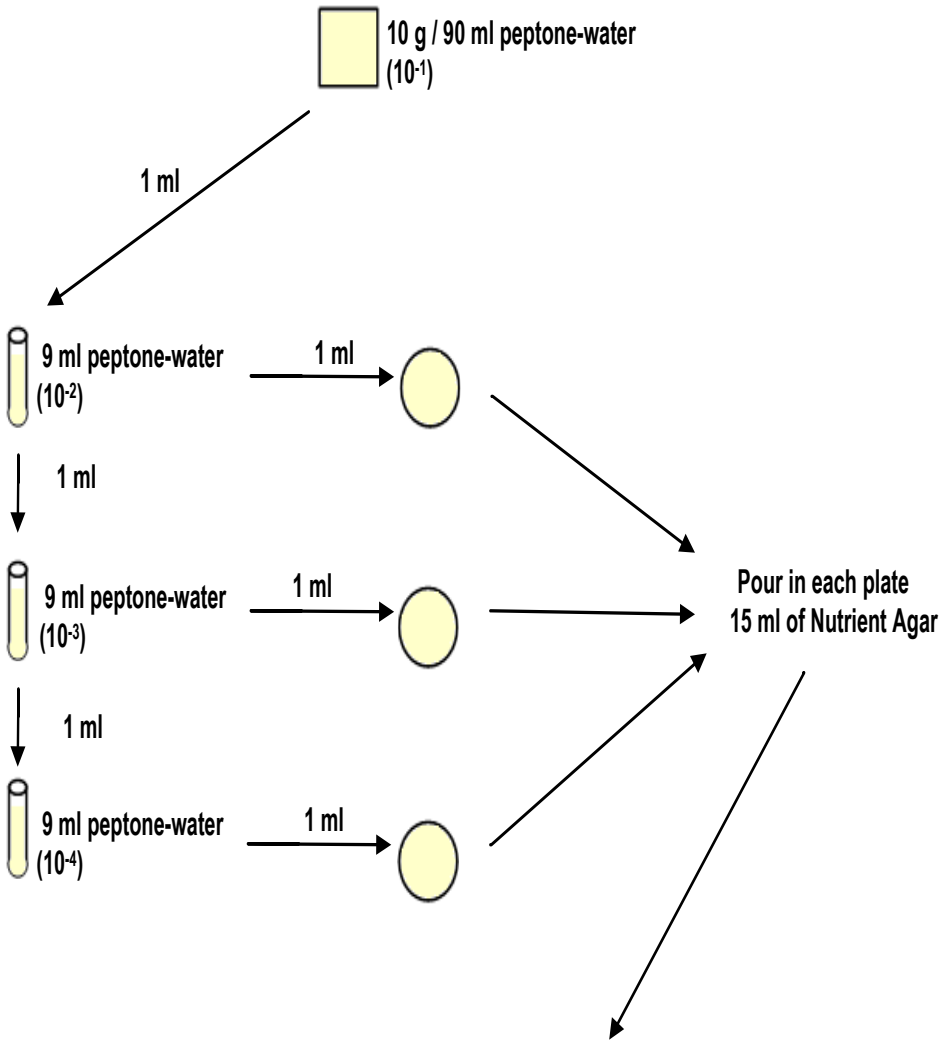
6.2.3 – Pour 15 ml of Nutrient Agar, cooled previously at 47°C in each plate

6.2.4 – Incubate the plates for 24 hours at 30°C ±1°C

6.2.5 – Count the colonies for each plate containing less than 300 colonies

6.2.6 _ the final result must be less than 50000 colony/ g

Enumeration of aerobic microorganisms (Total Plate Count)



Turn over the plates and incubate for 24 ±3 hours at 30°C± 1°C

Day 3

Count the colonies for each plate containing less than 300 colonies

Note: when sample taken from raw materials the laboratory technician shall be dilute the sample to 10^{-4}, but when taken from final product, dilute to 10^{-2} enough.

2. Intoxications caused by ingestion of a preformed bacterial toxin staphylococcal poisoning and botulism are intoxications. with intoxications, a by-product of the microorganism causes illness.

   The microorganisms of greatest concern are the following:

   1. Clostridium botulinum.
   2. Salmonella sp.
   3. Staphylococcus aureus.
   4. Clostridium perfringens.
   5. Listeria monocytogenes.
   6. Enterovirulent Escherichia coli.
   7. Shigella.
   8. Hepatitis A.
   9. Campylobacter.

1.1.2 Physical Safety:

The presence of microorganism in the food may and may not constitute a hazard to the end user depending upon how the food is handling or prepared. Proper handling or preparation may be sufficient to remove, prevent or reduce to an acceptable level a

microbiological hazard .physical hazard may be not easily inhabited .These hazards include a variety of materials often referred to an extraneous materials or foreign object.

There are five general source of physical hazards:

1. In advertent materials from the field (stone, metals, insect, thorns, wood, or small animals).
2. In advertent materials resulting from processing and handling (bone, glass, metal, wood, nuts, cloths, screening and wire, rust, etc).
3. Material entering the food during distribution (insects, metal, dirt, stone and other miscellaneous physical objects).
4. Material intentionally placed in food (employee sabotage or tampering).
5. Miscellaneous Struvite.

Physical hazard can cause varying degrees of injury, and in rare cause death. They can also cause psychological trauma or physical illness.

1.1.3 Chemical Hazards:

While chemical hazards are typically thought to come from the introduction of cleaning products into food,

The potential source of chemical hazards are wide spread.

1.2 Introduction of HACCP

1.2.1 What is HACCP?

HACCP is an of acronym for Hazard Analysis Critical Control Points. It is a science –based, systematic process for identifying food safety hazard and establishing methods of control with an emphasis on prevention.

HACCP as a concept for food safety is generally accepted as being developed in 1960s. In response to the national aeronautics and space Administration (NASA), Pillsbury developed and used HACCP as preventive system for increased confidence that food provided to astronauts would not cause illness. Imagine the problems if astronauts were to vomite or have diarrhea while in space.

The concept of HACCP continues to evolve. The development, use, and evolution were primarily an industry initiative. Only in recent year has HACCP gained global recognition and acceptance with industry and government official as the system of choice for food safety.

HACCP is effective for food safety because it is the disciplined application of science to each specific food process. This leads to effective control of the identified food safety hazards for that process. It works and because it works HACCP has gained acceptance globally as the food safety system of choice. HACCP is becoming part of food safety regulations in U.S, Europe and other parts of word. Haccp provides new hope of improved food safety because food safety controls are based on science, and HACCP fosters responsibility and ownership for food safety by food companies.

However, HACCP is dramatic departure from traditional food safety systems and regulations. The food industry and government regulatory bodies around the globe are struggling with the change. Under HACCP, the organizations HACCP team, and not a food safety regulator, has the responsibility to decide what to control and how to control it. This changes the role of a food safety regulator from a command and control function to that of a viewer and confirmer of organizations validated and implemented HACCP team .many regulatory official are not trained confident or competent for this new role .the food industry is also struggling with the change.

Many food organization lack the expertise and resource to develop and implement HACCP systems .thus they are unable to accept the responsibility for food safety.

In spite of the challenges, HACCP continue to gain recognition and acceptance by the industry and government for the following reasons:

1. It is this disciplined application of science to each specific food process that lead to effective control of identified food safety hazard.
2. It guides organizations and encourages them to accept responsibility for food safety instead of relying upon compliance with official regulations and inspections by food safety regulators.
3. The people responsible for a food process become involved in planning and implementing food protection controls the people become aware of their role and responsibility for food safety.
4. It improve the design of food products and processes for achieving safe food.
5. It prepares an organization for future HACCP based food safety regulations and trade specification.

The Five Preliminary Steps

1. **Assemble HACCP team.**
2. **Describe the product.**
3. **Identify the intended use.**
4. **Construct flow diagrams.**
5. **On-site confirmation of flow diagrams.**

Preliminary step1: Assemble HACCP team

There are two parts to this step:

-The assembling the HACCP team.

- Establishment of the scope of the HACCP plan to be developed.

The HACCP team is responsible for development of the HACCP plan beginning with the five preliminary step and continuing through all seven principle.it will be identifying the hazards significant for food safety to be controlled by the HACCP system, documenting the scientific basis for these decisions, and verifying the effective implementation of the HACCP plan .the team

will have the continuing responsibility to revise ,revalidate and re-verify the HACCP system to accommodate changes to the food products or processes, or in response to new Knowledge of food safety hazards.

As part of this first preliminary step, the HACCP team will establish the scope of the HACCP plan.

The team must decide if one HACCP plan can apply to all of the products within the facility, or whether more than

One plan is needed to accommodate the different foods or processes. The HACCP plan must clearly identify what products and processes it covers.

To develop a successful HACCP system, the HACCP team must have knowledge, authority, and effective communication skills. CODEX recommends a multi-disciplinary team knowledgeable of:

- The product to be covered by the HACCP plan.
- The processes associated with food production in the organization (receiving, cold storage, cooking etc.).
- The biological, chemical and physical hazards associated with the food products and process.
- The raw material and ingredients.
- Production, quality control, purchasing, shipping, maintenance, etc.

A team with this knowledge and experience .will also help foster ownership and responsibility for food safety by employees. A HACCP team may need to include outside experts such as chemists or biologists. An outside expert may also provide the HACCP team with training for effective implantation of HACCP.

Preliminary step 2: Describe product

A team must document each product covered by the HACCP plan. This is much more than a simple description of the finished product. It needs to include:

1- Raw material and ingredient.

2- The formulations or recipes.

3- Physical and chemical (pH, Aw, etc...) characteristics.

4- Process step.

5- Preservation system.

6- Packaging.

7- Storage.

8- Distribution.

Preliminary step 3: Identify intended use

Regardless of where the organization is in the food chain, it must identify the expected use of the product by the target end user or consumer. The team must consider the potential use of the product by those vulnerable to illness from lower exposure to hazards. The vulnerable groups include elderly, infant, the malnourished, or the ill, such as cancer or kidney patients.

It is also essential to describe how the targeted user is expected to receive the product (frozen, fresh, etc) and use it the intended user may be cooking or further processing the food before it goes to the actual consumer. The food may require cooking prior to consumption, and the cooking may be critical for direct consumption and must be made safe and packaged properly by the safe.

Preliminary step4: Construct flow diagram

The team must construct a diagram showing each step in the food production process .this flow diagram should outline each step in the organizations process from the receiving of ingredients to the delivery of the finished product .each step, process and physical location should be listed in the flow diagram .while the diagram must show the ingredients and product through the organizations process, there is not requirement for the documentation format. some organizations simply list the steps

while others draw flow charts describing the process .failure to identify each and every steps will prevent the HACCP team from accurately identifying all possible hazards

Preliminary step 5: On-site conformation of the flow diagram

When the flow diagrams are, the HACCP team needs to walk through the facility and observe the processes to confirm that all steps are identified and accurately described by the flow diagram. The team must consider variances in the operation that may occur on different shifts or during different business cycles.

The Seven Principles of HACCP

The seven principles of HACCP can be divided into two categories: the identification of significant hazards and the controls of those hazards. The seven principles are:

1. Conduct a hazard analysis.
2. Determine the critical control points (CCP).
3. Establish Critical Limits.
4. Establish a system to monitor control of the CCP.
5. Establish the corrective action to be taken when the monitoring indicates that a particular CCP is not under control.

6. Establish procedures for verification to conform that the HACCP system is working effectively.

7. Establish documentation concerning all procedures and records appropriate to those principles and their application.

The table of HACCP plan work sheet describe the flow chart of each product.

Assemble HACCP Team:

HACCP Team created from Dr.Ibrahim Afanha Quality control and researcher Hasna Dagamin for snack Food Company.

Leader	Dr.Ibrahim Afanha
Expert	PHD of food engineering
Researcher	Hasna Dagamin
Expert	Food industry

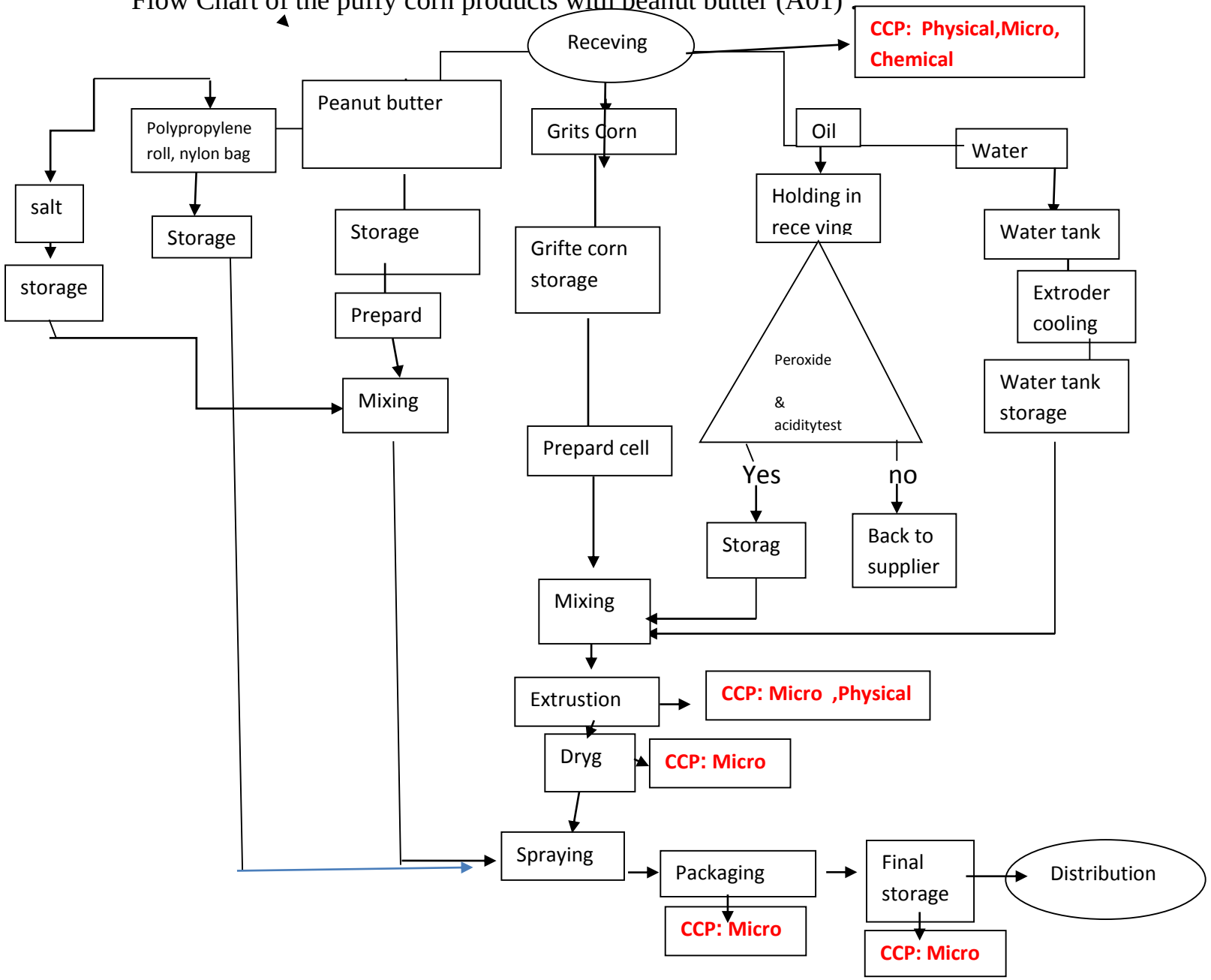
The table of HACCP plan work sheet describe the flow chart of each product.

Through the results of internal tests show there is no contamination where in the different sample take it every weak ,Products of puffed corn is:

1- **A01** with peanut butter flavor moister content ≤ 3.5% and fat content 22-32% , salt 3% maximum, Ash 2.5% maximum , Acidity 0.8 meq/g oil maximum , Peroxide value 10 meq/g oil maximum, yeast and Mould 100 cfu/g ,Total coliform 10 cfu/g , staphylococcus aureus 10 cfu/g , Total plate count 50000 cfu/g. Packaged Material poly propylene metal.

Samples of puffed corn:

Flow Chart of the puffy corn products with peanut butter (A01) :



Hazard Analysis Worksheet							
Company name : Product /Process:A01,(Extruder)							
CCP Step	**Hazard**	**Adverse Effect**	**Control Measure**	**Critical limit**	**Monitoring**	**Frequency**	**Corrective Action**
Receiving and handling of raw material	**Biological** **Physical**	Biological: cause different type of illness which may cause fever, dehydration and shock Onset is 8-44 hours (toxigenic strains)or 8-44hours (invasive strains) ,Nausea ,vomiting ,Diarrhea, abdominal cramps, and prostration symptoms may be sever. Onset ranges from 1-76 hours. Duration usually 24hours. Physical: cause many problem or injuries in intestinal track	Transport at GMPs condition Definition of suitable mesh size , mesh filter	**Bacteria≤50000 cfu/gm. Yeast&Mould≤100 cfu/gm. Coliform≤10cfu/gm . Staph≤10cfu /gm.** **Wr**ong mesh size damage Mesh size ≤300mm	Make Biological test Filter size Conformity check,	E very container receiving. At production start , at any filter replacement, At every one hour.	Reject vat Placing correct filter
Receiving of oil	**Chemical**	Causes different type of illness which may cause fever or death.	Transport in dark and clean tank.	**Peroxide value ≤ 10 meq/mg. Acidity≤0.8 meq/mg.**	Monitoring of Temperature of oil.	Every vat of oil receiving.	Reject of oil.

Hazard Analysis Worksheet

Company name :

Product / Process:A01, (Extruder)

CCP Step	Hazard	Adverse Effect	Control Measure	Critical limit	Monitoring	Frequency	Corrective Action
Extrusion process	Biological Physical	Biological: cause different type of illness which may cause fever, dehydration and shock Onset is 8-44 hours (toxigenic strains)or 8-44hours (invasive strains) ,Nausea ,vomiting ,Diarrhea, abdominal cramps, and prostration symptoms may be sever. Onset ranges from 1-76 hours. Duration usually 24hours. Physical: cause many problem or injuries in intestinal track	Temp of extrusion (50-100)C̊ Definition of suitable mesh size Size and shape of screw	**Bcteria≤50000/gm.** **Y&M≤100 /gm.** **Coliform≤10 /gm.** **Staph≤10 /gm.** **Size of screw (1-4)mm**	Temp for extruder not less than 50C	At every one hour. At Every Week	Adjust Temp of Extruder.
Drying Process	Biological	Micro: -Diarrhea, Vomiting ,Headache May be cause death cause different type of illness which may cause fever, dehydration and shock Onset is 8-44 hours (toxigenic strains)or 8-44hours (invasive strains) ,Nausea ,vomiting ,Diarrhea, abdominal cramps, and prostration symptoms may be sever. Onset ranges from 1-76 hours. Duration usually 24hours.	Definition of the reference processing parameter -machine regular check -Calibration of measuring instrument	Puffed corn Moisture content <3.5%	Regular control of the processing parameter -measuring moisture content	Every one Hour	Adjust Temp of Dryer ≤120 C̊

Hazard Analysis Worksheet

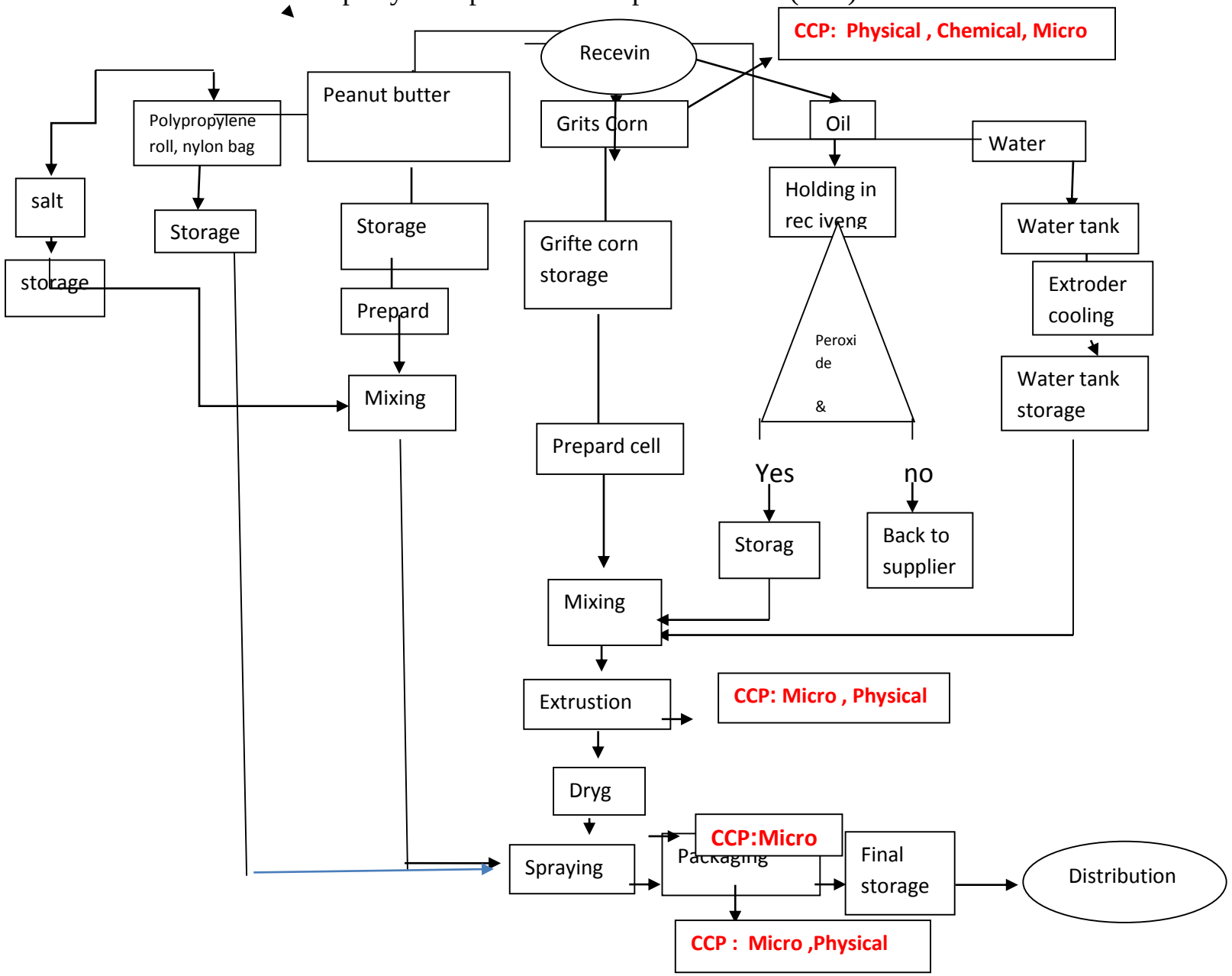
Company name :
Product / Process:A01, (Extruder)

CCP Step	Hazard	Adverse Effect	Control Measure	Critical limit	Monitoring	Frequency	Corrective Action
Packaging	Physical Present of undesirable packages residue(plastic film)	Physical: It does not high severe, but may cause many problems or injuries in intestinal track.	Physical test by QA, monitoring of damages package.	Finished product must be free from foreign bodies & visual foreign materials	Take sample and testing every hour , QA check the Packaging condition when damage of Package these Ingredient Scrapped	Every one Hour	Repackaging of sample and ravages damage package.
Final Storage	Biological	Biological**:** Multiplication of pathogenic microorganisms such as: - Mould and Yeast, these species may be produce aflatoxin or mycotoxin highly sever Cause illness ,Death -Bacteria Causes disease. cause different type of illness which may cause fever, dehydration and shock Onset is 8-44 hours (toxigenic strains)or 8-44hours (invasive strains) ,Nausea ,vomiting ,Diarrhea, abdominal cramps, and prostration symptoms may be sever. Onset ranges from 1-76 hours. Duration usually 24hours.	the **OPRPs** that control the hazard: Controlling the storage condition GMP temperature, light.	Temperature of storage at room temp 25C not above and Keep away from sunlight	Monitoring of Storage Condition .	Every days ,Every storage of final Product.	Check the Storage condition By QA and Applied FIFO system in storage process . Training employee on GMP system.

Products of puffed corn is:

2- **A02**with peanut butter flavor moister content ≤ 3.5% and fat content 22-32% , salt 3% maximum, Ash 2.5% maximum , Acidity 0.8 meq/g oil maximum , Peroxide value 10 meq/g oil maximum, yeast and Mould 100 cfu/g ,Total coliform 10 cfu/g , staphylococcus aureus 10 cfu/g , Total plate count 50000 cfu/g. Packaged Material poly propylene metal.

Flow Chart of the puffy corn products with peanut butter (A02):



Hazard Analysis Worksheet

Company name :
Product /Process: A02(Extruder)

CCP Step	Hazard	Adverse Effect	Control Measure	Critical limit	Monitoring	Frequency	Corrective Action
Receiving of raw grits corn ,flavor Handling	Biological	Micro: cause different type of illness which may cause fever, dehydration and shock Onset is 8-44 hours (toxigenic strains)or 8-44hours (invasive strains) ,Nausea ,vomiting ,Diarrhea, abdominal cramps, and prostration symptoms may be sever. Onset ranges from 1-76 hours. Duration usually 24hours.	Transport at GMPs condition	**Bcteria≤50000/ gm. Y&M≤100 /gm. Coliform≤10 /gm. Staph≤10 /gm.**	Make Biological test	Every container receiving.	Reject vat
	Physical	Physical: cause many problem or injuries in intestinal track.	Definitio n of suitable mesh size , mesh filter	**Wr**ong mesh size damage Mesh size ≤300mm	Filter size Conformit y check,	At production start , at any filter replacement, At every one hour.	Placing correct filter
Receiving of oil	Chemical	Causes different type of illness which may cause fever or death.	Transport in dark and clean tank.	**Peroxide value ≤ 10 meq/mg. Acidity≤0.8 meq/mg.**	Monitorin g of Temperatu re of oil.	Every vat of oil receiving.	Reject of oil.

Hazard Analysis Worksheet

Company name :
Product / Process: A02(Extruder)

CCP Step	Hazard	Adverse Effect	Control Measure	Critical limit	Monitoring	Frequency	Corrective Action
Extrusion process	Biological	Micro: cause different type of illness which may cause fever or death.	Temp of extrusion (50-100)C	**Bcteria≤50000 cfu/gm.** **Y&M≤100 cfu/gm.** **Coliform≤10 cfu/gm.** **Staph≤10 cfu /gm.**	Temp for extruder not less than 50C	At every one hour.	Adjust Temp of Extruder.
	Physical	Physical: cause many problem or injuries in intestinal track	Definition of suitable mesh size Size and shape of screw	**Size of screw (1-4)mm**		At Every Week	
Drying Process	Biological	Micro:-Diarrhea, Vomiting Headache May be cause death	Definition of the reference processing parameter -machine regular check -Calibration of measuring instrument	Puffed corn Moisture content <3.5%	Regular control of the processing parameter -measuring moisture content	Every one Hour	Adjust Temp of Dryer ≤120 C

Hazard Analysis Worksheet

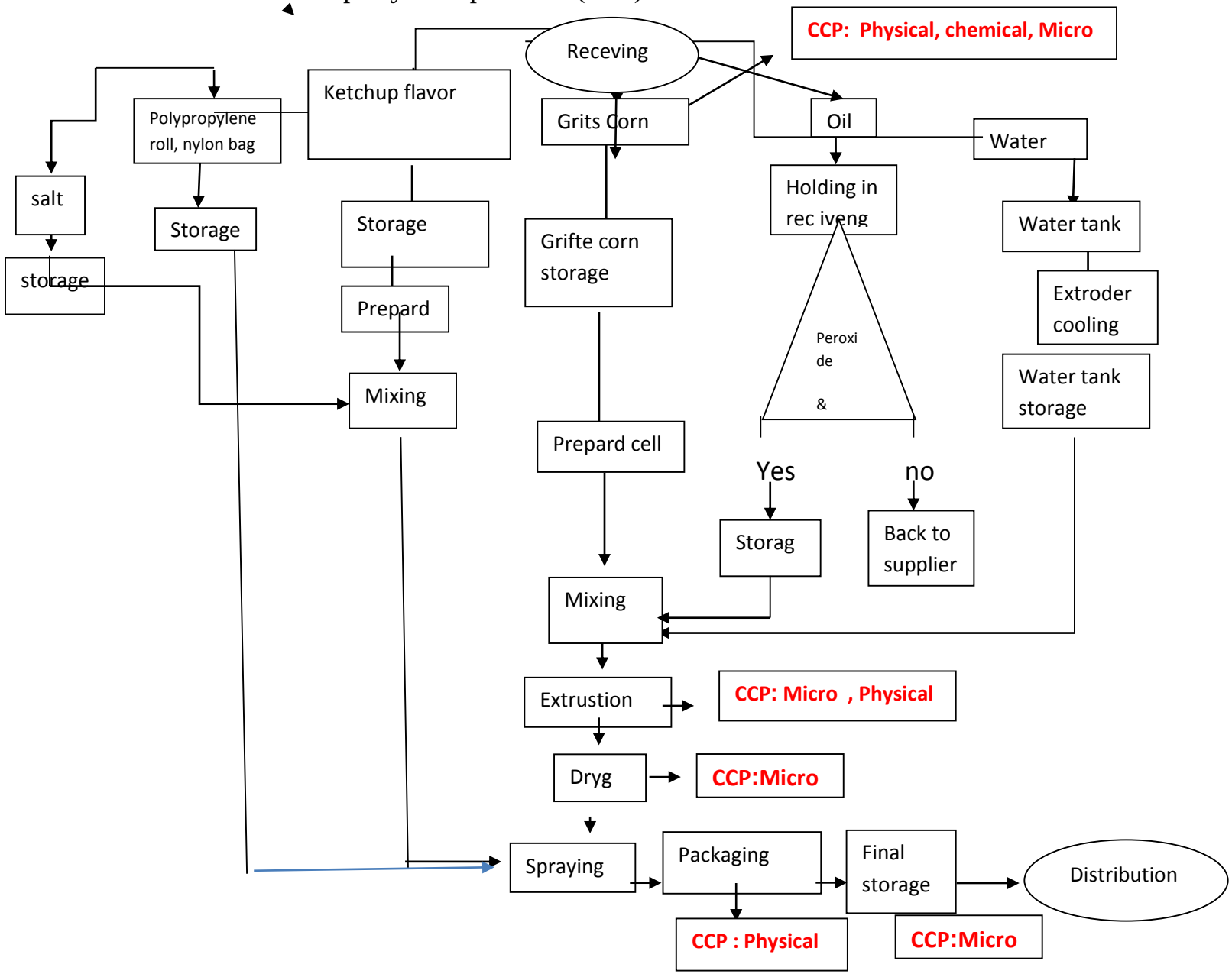
Company name :
Product / Process: A02(Extruder)

CCP Step	Hazard	Adverse Effect	Control Measure	Critical limit	Monitoring	Frequency	Corrective Action
Packaging	Physical Present of undesirable packages residue(plastic film)	Physical: It does not high severe, but may cause many problems or injuries in intestinal track.	Physical test by QA, monitoring of damages package.	Finished Product must be free from foreign bodies & any visual foreign materials	Take sample and testing every hour , QA check the Packaging condition when damage of Package these Ingredient Scrapped	Every one Hour	Repackaging of sample and ravages damage package.
Final Storage	Biological	Bio**:** Multiplication of pathogenic microorganisms such as: - Mold and yeast, these species may be produce aflatoxin or mycotoxin highly sever Cause illness ,Death -Bacteria Causes disease.	the **OPRPs** that control the hazard: Controlling the storage condition GMP temperature, light.	Temperature of storage at room temp 25C not above and Keep away from sunlight	Monitoring of Storage Condition.	Every day, Every storage of final Product.	Check the Storage condition By QA and Applied FIFO system in storage process. Training employee on GMP system.

Products of puffed corn is:

3- **A03**with moister content ≤ 3.5% and fat content 22-32% , salt 3% maximum, Ash 2.5% maximum , Acidity 0.8 meq/g oil maximum , Peroxide value 10 meq/g oil maximum, yeast and Mould 100 cfu/g ,Total coliform 10 cfu/g , staphylococcus aureus 10 cfu/g , Total plate count 50000 cfu/g. Packaged Material poly propylene metal.

Flow Chart of the puffy corn products (A03):



Hazard Analysis Worksheet

Company name :
Product /Process:A03 (Extruder)

CCP Step	Hazard	Adverse Effect	Control Measure	Critical limit	Monitoring	Frequency	Corrective Action
Receiving of raw grits corn ,flavor Handling	Biological	Micro : cause different type of illness which may cause fever, dehydration and shock Onset is 8-44 hours (toxigenic strains)or 8-44hours (invasive strains) ,Nausea ,vomiting ,Diarrhea, abdominal cramps, and prostration symptoms may be sever. Onset ranges from 1-76 hours. Duration usually 24hours.	Receiving and Handling at GMPs condition	**Bcteria≤50000 CFU /gm. Y&M≤100 CFU/gm. Coliform≤10 CFU/gm. Staph≤10 CFU/gm.**	Make Biological test	Every container receiving.	Reject vat
	Physical	Physical :cause many problem or injuries in intestinal track	Definition of suitable mesh size , mesh filter	**Wr**ong mesh size damage Mesh size ≤300mm	Filter size Conformity check,	At production start , at any filter replacement, At every one hour.	Placing correct filter
Receiving of oil	Chemical	Causes different type of illness which may cause fever or death.	Transport in dark and clean tank .	**Peroxide value ≤ 10 meq/mg. Acidity≤0.8 meq/mg.**	Monitoring of Temperature of oil.	Every vat of oil receiving.	Reject of oil.

Hazard Analysis Worksheet

Company name :
Product / Process: A03(Extruder)

CCP Step	Hazard	Adverse Effect	Control Measure	Critical limit	Monitoring	Frequency	Corrective Action
Extrusion process	Biological	Micro: cause different type of illness which may cause fever, dehydration and shock Onset is 8-44 hours (toxigenic strains)or 8-44hours (invasive strains) ,Nausea ,vomiting ,Diarrhea, abdominal cramps, and prostration symptoms may be sever. Onset ranges from 1-76 hours. Duration usually 24hours.	Temp of extrusion (50-100)C	**Bcteria≤50000 CFU/gm. Y&M≤100 CFU/gm. Coliform≤10 CFU/gm. Staph≤10CFU/gm.**	Temp for extruder not less than 50C	At every one hour.	Adjust Temp of Extruder.
	Physical	Physical :cause many problem or injuries in intestinal track	Definition of suitable mesh size and shape of screw	**Size of screw (1-4)mm**		At Every Week	
Drying Process	Biological	Micro: cause different type of illness which may cause fever, dehydration and shock Onset is 8-44 hours (toxigenic strains)or 8-44hours (invasive strains) ,Nausea ,vomiting ,Diarrhea, abdominal cramps, and prostration symptoms may be sever. Onset ranges from 1-76 hours. Duration usually 24hours.	Definition of the reference processing parameter -machine regular check -Calibration of measuring instrument	Puffed corn Moisture content <3.5%	Regular control of the processing parameter - measuring moisture content	Every one Hour	Adjust Temp of Dryer ≤120℃

Hazard Analysis Worksheet

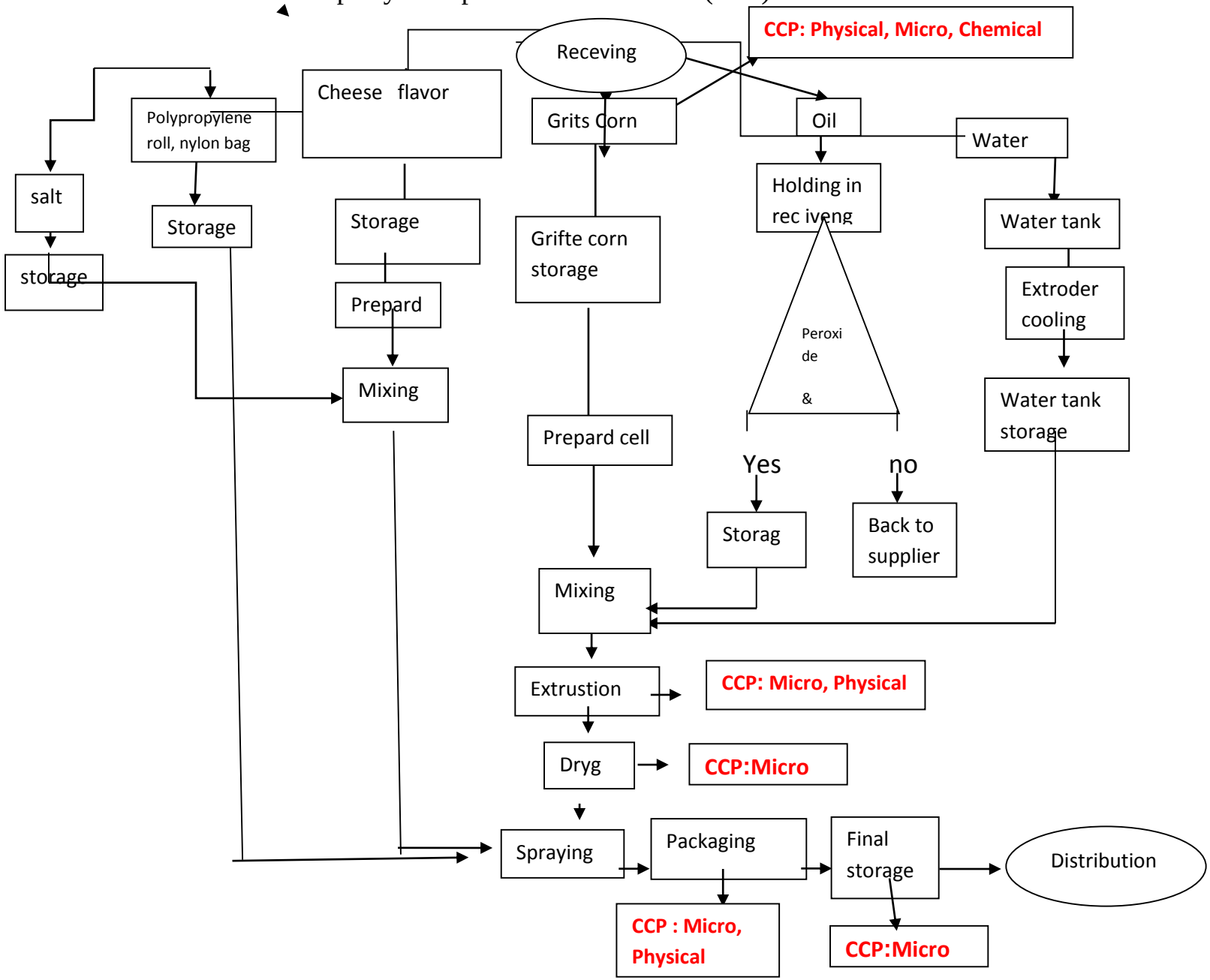
Company name :
Product / Process: A03(Extruder)

CCP Step	Hazard	Adverse Effect	Control Measure	Critical limit	Monitoring	Frequency	Corrective Action
Packaging	Physical Present of undesirable packages residue(plastic film)	Physical: It does not high severe, but may cause many problems or injuries in intestinal track.	Physical test by QA ,monitoring of damages package.		Take sample and testing every hour , QA check the Packaging condition when damage of Package these Ingredient Scrapped	Every one Hour	Repackaging of sample and ravages damage package.
Final Storage	Biological	Micro**:** Multiplication of pathogenic microorganisms such as: - Mold and yeast, these species may be produce aflatoxin or mycotoxin highly sever Cause illness ,Death -Bacteria Causes disease .	the **OPRPs** that control the hazard: Controlling the storage condition GMP temperature, light..	Temperature of storage at room temp 25C not above and Keep away from sunlight	Monitoring of Storage Condition .	Every days ,Every storage of final Product.	Check the Storage condition By QA and Applied FIFO system in storage process . Training employee on GMP system .

Products of puffed corn is:

4- **A04**with moister content ≤ 3.5% and fat content 22-32% , salt 3% maximum, Ash 2.5% maximum , Acidity 0.8 meq/g oil maximum , Peroxide value 10 meq/g oil maximum, yeast and Mould 100 cfu/g ,Total coliform 10 cfu/g , staphylococcus aureus 10 cfu/g , Total plate count 50000 cfu/g. Packaged Material poly propylene metal.

Flow Chart of the puffy corn products with cheese (A04) :



Hazard Analysis Worksheet

Company name :
Product /Process: A04(Extruder)

CCP Step	Hazard	Adverse Effect	Control Measure	Critical limit	Monitoring	Frequency	Corrective Action
Receiving and handling of raw grits corn ,flavor	Biological Physical	Biological: cause different type of illness which may cause fever, dehydration and shock Onset is 8-44 hours (toxigenic strains)or 8-44hours (invasive strains) ,Nausea ,vomiting ,Diarrhea, abdominal cramps, and prostration symptoms may be sever. Onset ranges from 1-76 hours. Duration usually 24hours. Physical: cause many problem or injuries in intestinal track	Receiving and handling under GMPs Regulation Definition of suitable mesh size , mesh filter	**Bcteria≤50000 CFU /gm. Y&M≤100 CFU/gm. Coliform≤10 CFU/gm. Staph≤10 cfu/gm.** **Wr**ong mesh size damage Mesh size ≤300mm	Make Biological test Filter size Conformity check,	Every container receiving. At production start , at any filter replacement, At every one hour.	Reject vat Placing correct filter
Receiving of oil	Chemical	Causes different type of illness which may cause fever or death.	Transport in dark and clean tank .	**Peroxide value ≤ 10 meq/mg. Acidity≤0.8 meq/mg.**	Monitoring of Temperature of oil.	Every vat of oil receiving.	Reject of oil.

Hazard Analysis Worksheet

Company name :
Product / Process: A04(Extruder)

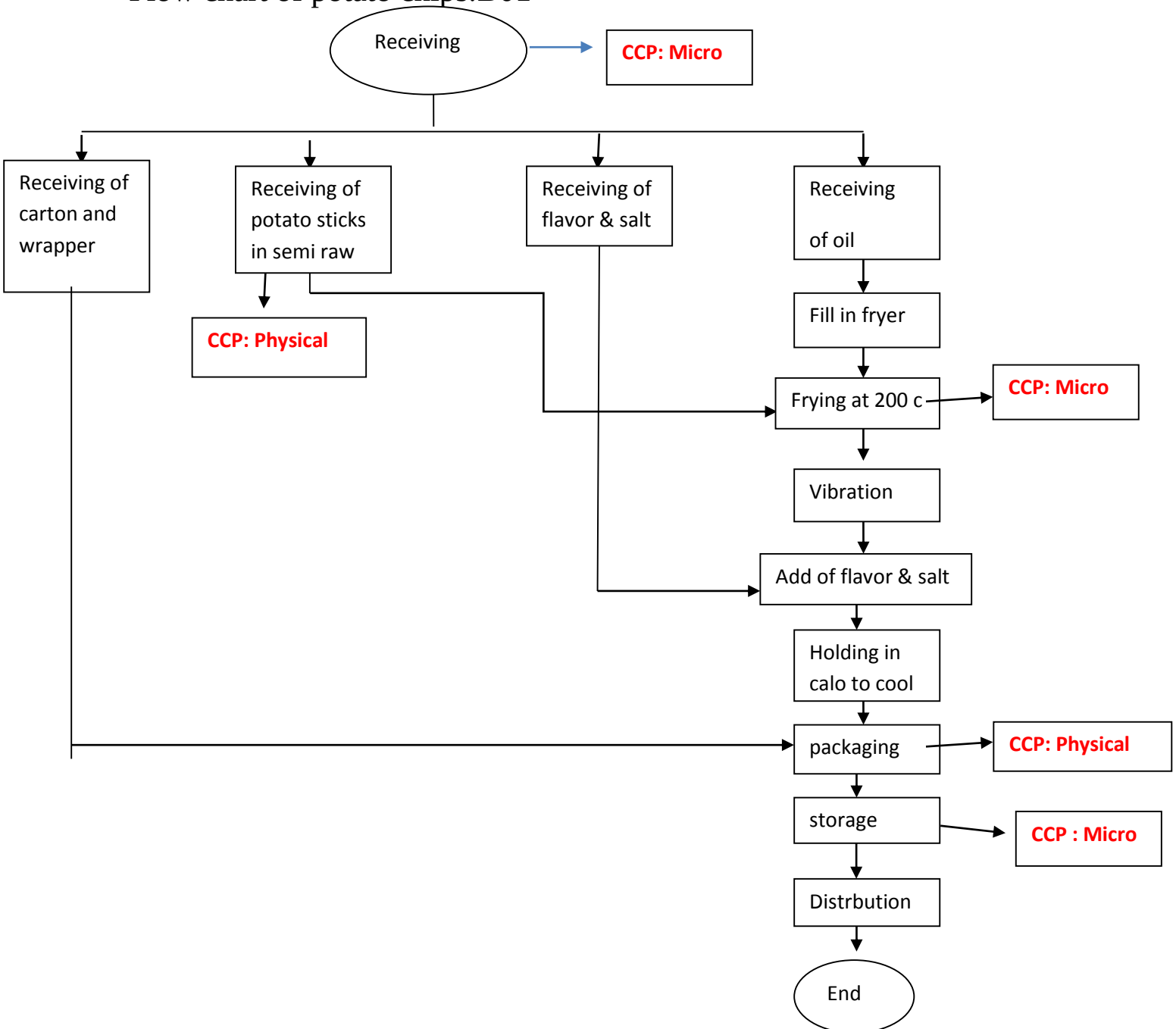
CCP Step	Hazard	Adverse Effect	Control Measure	Critical limit	Monitoring	Frequency	Corrective Action
Extrusion process	Biological	Micro: cause different type of illness which may cause fever, dehydration and shock Onset is 8-44 hours (toxigenic strains)or 8-44hours (invasive strains) ,Nausea ,vomiting ,Diarrhea, abdominal cramps, and prostration symptoms may be sever. Onset ranges from 1-76 hours. Duration usually 24hours.	Temp of extrusion (50-100)C	**Bcteria≤50000 CFU/gm. Y&M≤100 CFU /gm. Coliform≤10 CFU /gm. Staph≤10CFU /gm.**	Temp for extruder not less than 50C	At every one hour.	Adjust Temp of Extruder.
	Physical	Physical :cause many problem or injuries in intestinal track	Definition of suitable mesh size and shape of screw	**Size of screw (1-4)mm**		At Every Week	
Drying Process	Biological	Micro: cause different type of illness which may cause fever, dehydration and shock Onset is 8-44 hours (toxigenic strains)or 8-44hours (invasive strains) ,Nausea ,vomiting ,Diarrhea, abdominal cramps, and prostration symptoms may be sever. Onset ranges from 1-76 hours. Duration usually 24hours.	Definition of the reference processing parameter -machine regular check -Calibration of measuring instrument	Puffed corn Moisture content <3.5%	Regular control of the processing parameter -measuring moisture content	Every one Hour	Adjust Temp of Dryer ≤120 C

Hazard Analysis Worksheet

Company name :
Product / Process: A04(Extruder)

CCP Step	Hazard	Adverse Effect	Control Measure	Critical limit	Monitoring	Frequency	Corrective Action
Packaging	Physical Present of undesirable packages residue(plastic film)	Physical: It does not high severe, but may cause many problems or injuries in intestinal track.	Physical test by QA ,monitoring of damages package.	Finished product must be free from foreign bodies & visual foreign materials	Take sample and testing every hour , QA check the Packaging condition when damage of Package these Ingredient Scrapped	Every one Hour	Repackaging of sample and ravages damage package.
Final Storage	Biological	Micro**:** Multiplication of pathogenic microorganisms such as: - Mold and yeast, these species may be produce aflatoxin or mycotoxin highly sever Cause illness ,Death -Bacteria Causes disease .	the **OPRPs** that control the hazard: Controlling the storage condition GMP temperature, light..	Temperature of storage at room temp 25C not above and Keep away from sunlight	Monitoring of Storage Condition .	Every days ,Every storage of final Product.	Check the Storage condition By QA and Applied FIFO system in storage process . Training employee on GMP system .

Flow chart of potato chips:B01



HACCP Worksheet

Company name :

Product /Process:**B01**

CCP Step	Hazard	Adverse Effect	Control Measure	Critical limit	Monitoring	Frequency	Corrective Action
Receiving of raw Material	Biological	Micro: cause different type of illness which may cause fever, dehydration and shock Onset is 8-44 hours (toxigenic strains)or 8-44hours (invasive strains) ,Nausea ,vomiting ,Diarrhea ,abdominal cramps, and prostration symptoms may be sever. Onset ranges from 1-76 hours. Duration usually 24hours.	Receiving and handling under GMPs condition.	**Bcteria≤50000 cfu /gm.** **Y&M≤100 cfu /gm.** **Coliform≤10 cfu /gm.** **Staph≤10 cfu /gm.**	Make Biological Test	At Every Container Receiving	Reject Container
	Physical	Physical: cause many problem or injuries in intestinal track	Definition of suitable mesh size , mesh filter ,	**Wr**ong mesh size damage Mesh size	Filter size Conformity check, Metal detector	At production start , at any filter replacement, At every one hour.	Placing correct filter

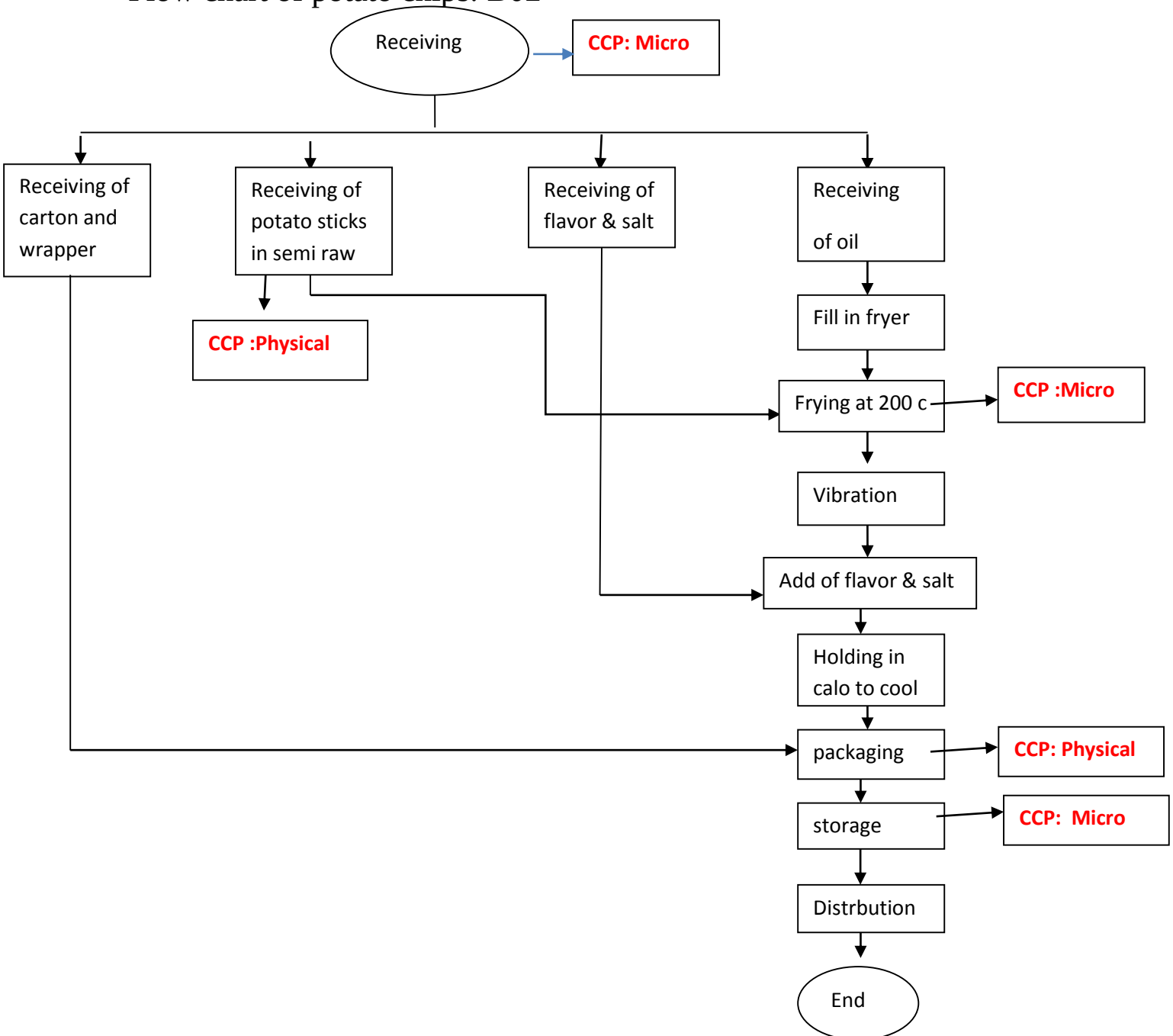
Hazard Analysis Worksheet							
Company name : **Product / Process: B01,frying**							
CCP Step	**Hazard**	**Adverse Effect**	**Control Measure**	**Critical Limit**	**Monitoring**	**Frequency**	**Corrective Active**
Frying process	Biological	Micro: : cause different type of illness which may cause fever, dehydration and shock Onset is 8-44 hours (toxigenic strains)or 8-44hours (invasive strains) ,Nausea ,vomiting ,Diarrhea ,abdominal cramps, and prostration symptoms may be sever. Onset ranges from 1-76 hours. Duration usually 24hours.	Temp of Fryer (200)C̊	**Bcteria≤50000 cfu/gm.** **Y&M≤100 cfu /gm.** **Coliform≤10 cfu /gm.** **Staph≤10 cfu /gm.**	Temp for Fryer not less than 200C̊	At every one hour.	Adjust Temp of frying not less 200C
Packaging	Physical Present of undesirable packages residue(plastic film)	Physical: :cause many problem in intestinal track	Metal detector	Finished product must be free from foreign bodies & visual foreign materials	Regular control of the processing parameter -measuring moisture content -QA check the Packaging condition when damage of Package these Ingredient Scrapped	Every one Hour	

Hazard Analysis Worksheet

Company name :
Product / Process **:B0 ,frying**

CCP Step	Hazard	Adverse Effect	Control Measure	Critical Limit	Monitoring	Frequency	Corrective Action
Final Storage	**Biological**	Micro: cause different type of illness which may cause fever, dehydration and shock Onset is 8-44 hours (toxigenic strains)or 8-44hours (invasive strains) ,Nausea ,vomiting ,Diarrhea ,abdominal cramps, and prostration symptoms may be sever. Onset ranges from 1-76 hours. Duration usually 24hours.	the **OPRPs** that control the hazard: Controlling the storage condition GMP temperature, light..	Temperature of storage at room temp 25C not above and Keep away from sunlight	Monitoring of Storage Condition.	Every days ,Every storage of final Product.	Check the Storage condition By QA and Applied FIFO system in storage process. Training employee on GMP system .

Flow chart of potato chips: B02



HACCP Worksheet

Company name :

Product /Process:**B02**

CCP Step	Hazard	Adverse Effect	Control Measure	Critical limit	Monitoring	Frequency	Corrective Action
Receiving of raw Material	Biological	Micro: cause different type of illness which may cause fever, dehydration and shock Onset is 8-44 hours (toxigenic strains)or 8-44hours (invasive strains) ,Nausea ,vomiting ,Diarrhea ,abdominal cramps, and prostration symptoms may be sever. Onset ranges from 1-76 hours. Duration usually 24hours.	Receiving and handling under GMPs condition.	**Bcteria≤50000 cfu /gm.** **Y&M≤100 cfu /gm.** **Coliform≤10 cfu /gm.** **Staph≤10 cfu /gm.**	Make Biological Test	At Every Container Receiving	Reject Container
	Physical	Physical: cause many problem or injuries in intestinal track	Definition of suitable mesh size , mesh filter ,	**Wr**ong mesh size damage Mesh size	Filter size Conformity check, Metal detector	At production start , at any filter replacement, At every one hour.	Placing correct filter

Hazard Analysis Worksheet							
Company name : **Product / Process: B02,frying**							
CCP Step	**Hazard**	**Adverse Effect**	**Control Measure**	**Critical Limit**	**Monitoring**	**Frequency**	**Corrective Active**
Frying process	Biological	Micro: : cause different type of illness which may cause fever, dehydration and shock Onset is 8-44 hours (toxigenic strains)or 8-44hours (invasive strains) ,Nausea ,vomiting ,Diarrhea ,abdominal cramps, and prostration symptoms may be sever. Onset ranges from 1-76 hours. Duration usually 24hours.	Temp of Fryer (200)C̊	**Bcteria≤50000 cfu/gm.** **Y&M≤100 cfu /gm.** **Coliform≤10 cfu /gm.** **Staph≤10 cfu /gm.**	Temp for Fryer not less than 200C̊	At every one hour.	Adjust Temp of frying not less 200C
Packaging	Physical Present of undesirable packages residue(plastic film)	Physical: :cause many problem in intestinal track	Metal detector	Finished product must be free from foreign bodies & visual foreign materials	Regular control of the processing parameter -measuring moisture content -QA check the Packaging condition when damage of Package these Ingredient Scrapped	Every one Hour	

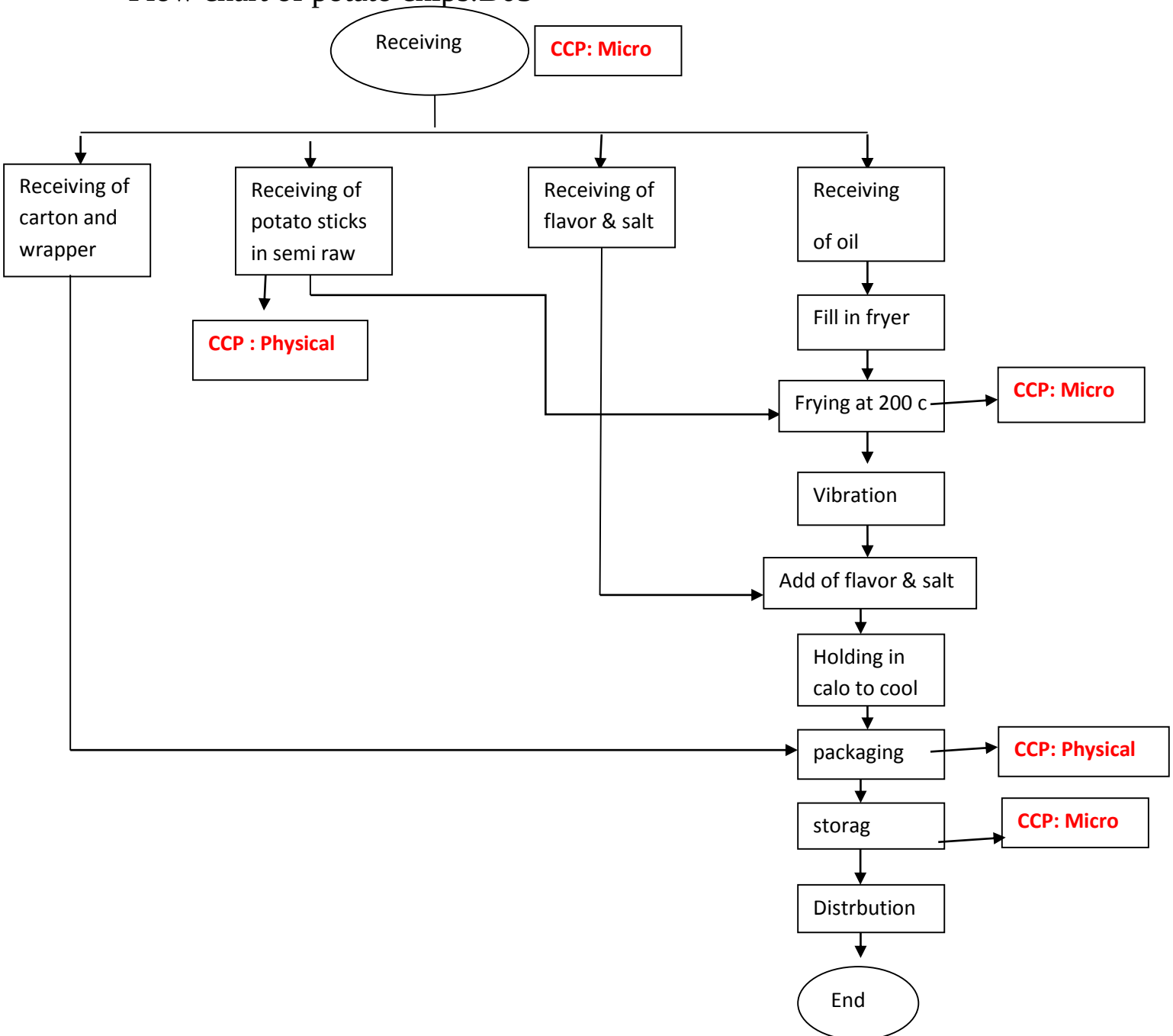
Hazard Analysis Worksheet

Company name :

Product / Process **:B02 ,frying**

CCP Step	Hazard	Adverse Effect	Control Measure	Critical Limit	Monitoring	Frequency	Corrective Action
Final Storage	**Biological**	Micro: cause different type of illness which may cause fever, dehydration and shock Onset is 8-44 hours (toxigenic strains)or 8-44hours (invasive strains) ,Nausea ,vomiting ,Diarrhea ,abdominal cramps, and prostration symptoms may be sever. Onset ranges from 1-76 hours. Duration usually 24hours.	the **OPRPs** that control the hazard: Controlling the storage condition GMP temperature, light..	Temperature of storage at room temp 25C not above and Keep away from sunlight	Monitoring of Storage Condition.	Every days ,Every storage of final Product.	Check the Storage condition By QA and Applied FIFO system in storage process. Training employee on GMP system .

Flow chart of potato chips:B03



HACCP Worksheet

Company name :

Product /Process:**B03**

CCP Step	Hazard	Adverse Effect	Control Measure	Critical limit	Monitoring	Frequency	Corrective Action
Receiving of raw Material (Sequer chips)	Biological	Micro: cause different type of illness which may cause fever, dehydration and shock Onset is 8-44 hours (toxigenic strains)or 8-44hours (invasive strains) ,Nausea ,vomiting ,Diarrhea ,abdominal cramps, and prostration symptoms may be sever. Onset ranges from 1-76 hours. Duration usually 24hours.	Receiving and handling under GMPs condition.	**Bcteria≤50000 cfu /gm.** **Y&M≤100 cfu /gm.** **Coliform≤10 cfu /gm.** **Staph≤10 cfu /gm.**	Make Biological Test	At Every Container Receiving	Reject Container
	Physical	Physical :cause many problem or injuries in intestinal track	Definition of suitable mesh size , mesh filter ,	**Wr**ong mesh size damage Mesh size	Filter size Conformity check, Metal detector	At production start , at any filter replacement , At every one hour.	Placing correct filter

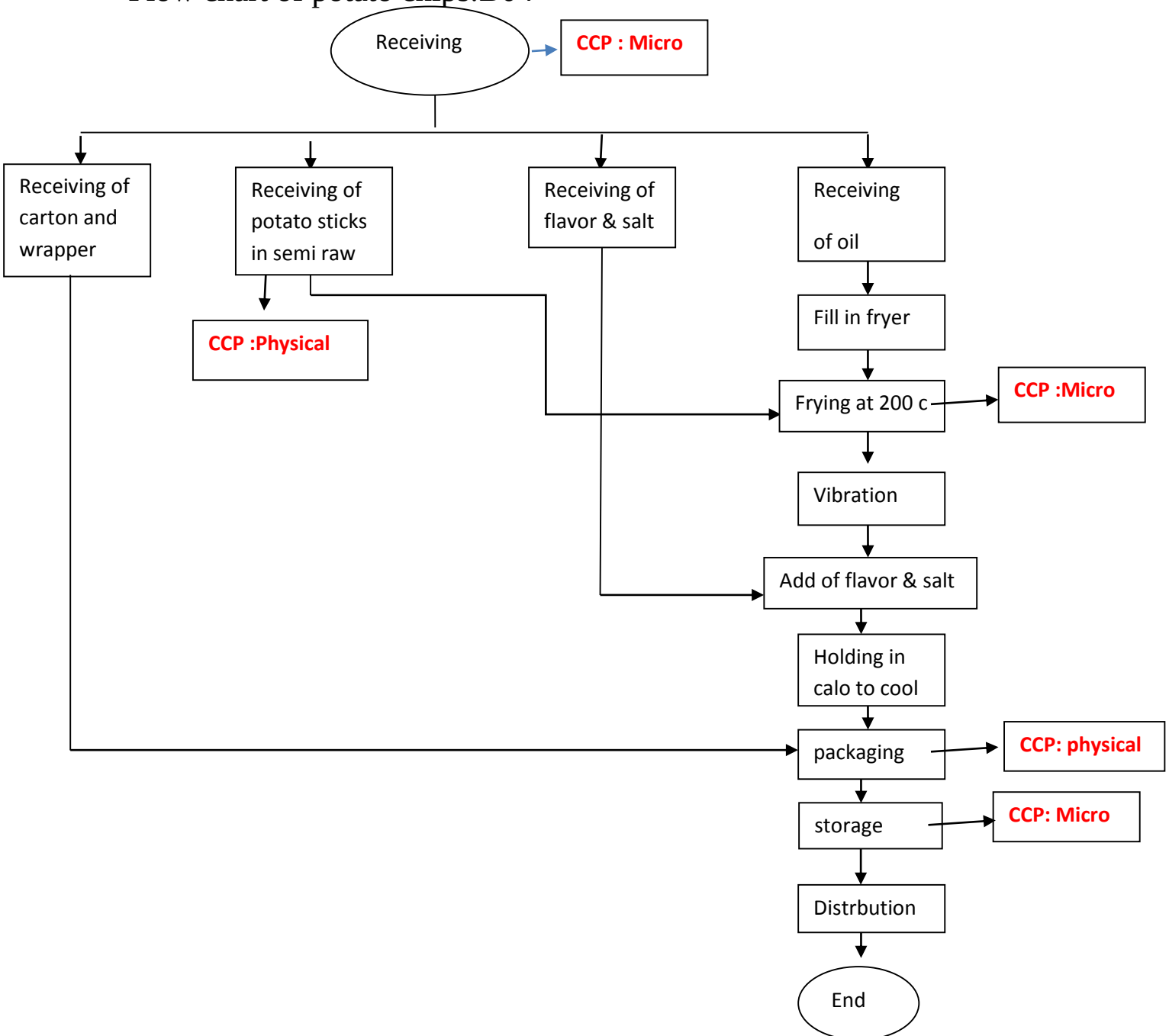
Hazard Analysis Worksheet							
Company name : **Product / Process: B03,frying**							
CCP Step	**Hazard**	**Adverse Effect**	**Control Measure**	**Critical Limit**	**Monitoring**	**Frequency**	**Corrective Active**
Frying process	Biological	Micro: : cause different type of illness which may cause fever, dehydration and shock Onset is 8-44 hours (toxigenic strains)or 8-44hours (invasive strains) ,Nausea ,vomiting ,Diarrhea ,abdominal cramps, and prostration symptoms may be sever. Onset ranges from 1-76 hours. Duration usually 24hours.	Temp of Fryer (200)C̊	**Bcteria≤50000 cfu/gm.** **Y&M≤100 cfu /gm.** **Coliform≤10 cfu /gm.** **Staph≤10 cfu /gm.**	Temp for Fryer not less than 200C̊	At every one hour.	Adjust Temp of frying not less 200C
Packaging	Physical Present of undesirable packages residue(plastic film)	Physical: :cause many problem in intestinal track	Metal detector	Finished product must be free from foreign bodies & visual foreign materials	Regular control of the processing parameter -measuring moisture content -QA check the Packaging condition when damage of Package these Ingredient Scrapped	Every one Hour	

Hazard Analysis Worksheet

Company name :
Product / Process **:B03 ,frying**

CCP Step	**Hazard**	**Adverse Effect**	**Control Measure**	**Critical Limit**	**Monitoring**	**Frequency**	**Corrective Action**
Final Storage	Biological	Micro: cause different type of illness which may cause fever, dehydration and shock Onset is 8-44 hours (toxigenic strains)or 8-44hours (invasive strains) ,Nausea ,vomiting ,Diarrhea ,abdominal cramps, and prostration symptoms may be sever. Onset ranges from 1-76 hours. Duration usually 24hours.	the **OPRPs** that control the hazard: Controlling the storage condition GMP temperature, light..	Temperature of storage at room temp 25C not above and Keep away from sunlight	Monitoring of Storage Condition.	Every days ,Every storage of final Product.	Check the Storage condition By QA and Applied FIFO system in storage process. Training employee on GMP system .

Flow chart of potato chips:B04



HACCP Worksheet

Company name :

Product /Process:**B04**

CCP Step	Hazard	Adverse Effect	Control Measure	Critical limit	Monitoring	Frequency	Corrective Action
Receiving of raw Material	Biological	Micro: cause different type of illness which may cause fever, dehydration and shock Onset is 8-44 hours (toxigenic strains)or 8-44hours (invasive strains) ,Nausea ,vomiting ,Diarrhea ,abdominal cramps, and prostration symptoms may be sever. Onset ranges from 1-76 hours. Duration usually 24hours.	Receiving and handling under GMPs condition.	**Bcteria≤50000 cfu /gm.** **Y&M≤100 cfu /gm.** **Coliform≤10 cfu /gm.** **Staph≤10 cfu /gm.**	Make Biological Test	At Every Container Receiving	Reject Container
	Physical	Physical: cause many problem or injuries in intestinal track	Definition of suitable mesh size , mesh filter ,	**Wr**ong mesh size damage Mesh size	Filter size Conformity check, Metal detector	At production start , at any filter replacement, At every one hour.	Placing correct filter

Hazard Analysis Worksheet							
Company name : **Product / Process: B04,frying**							
CCP Step	**Hazard**	**Adverse Effect**	**Control Measure**	**Critical Limit**	**Monitoring**	**Frequency**	**Corrective Active**
Frying process	Biological	Micro: : cause different type of illness which may cause fever, dehydration and shock Onset is 8-44 hours (toxigenic strains)or 8-44hours (invasive strains) ,Nausea ,vomiting ,Diarrhea ,abdominal cramps, and prostration symptoms may be sever. Onset ranges from 1-76 hours. Duration usually 24hours.	Temp of Fryer (200)C̊	**Bcteria≤50000 cfu/gm.** **Y&M≤100 cfu /gm.** **Coliform≤10 cfu /gm.** **Staph≤10 cfu /gm.**	Temp for Fryer not less than 200C̊	At every one hour.	Adjust Temp of frying not less 200C
Packaging	Physical Present of undesirable packages residue(plastic film)	Physical: :cause many problem in intestinal track	Metal detector	Finished product must be free from foreign bodies & visual foreign materials	Regular control of the processing parameter -measuring moisture content -QA check the Packaging condition when damage of Package these Ingredient Scrapped	Every one Hour	

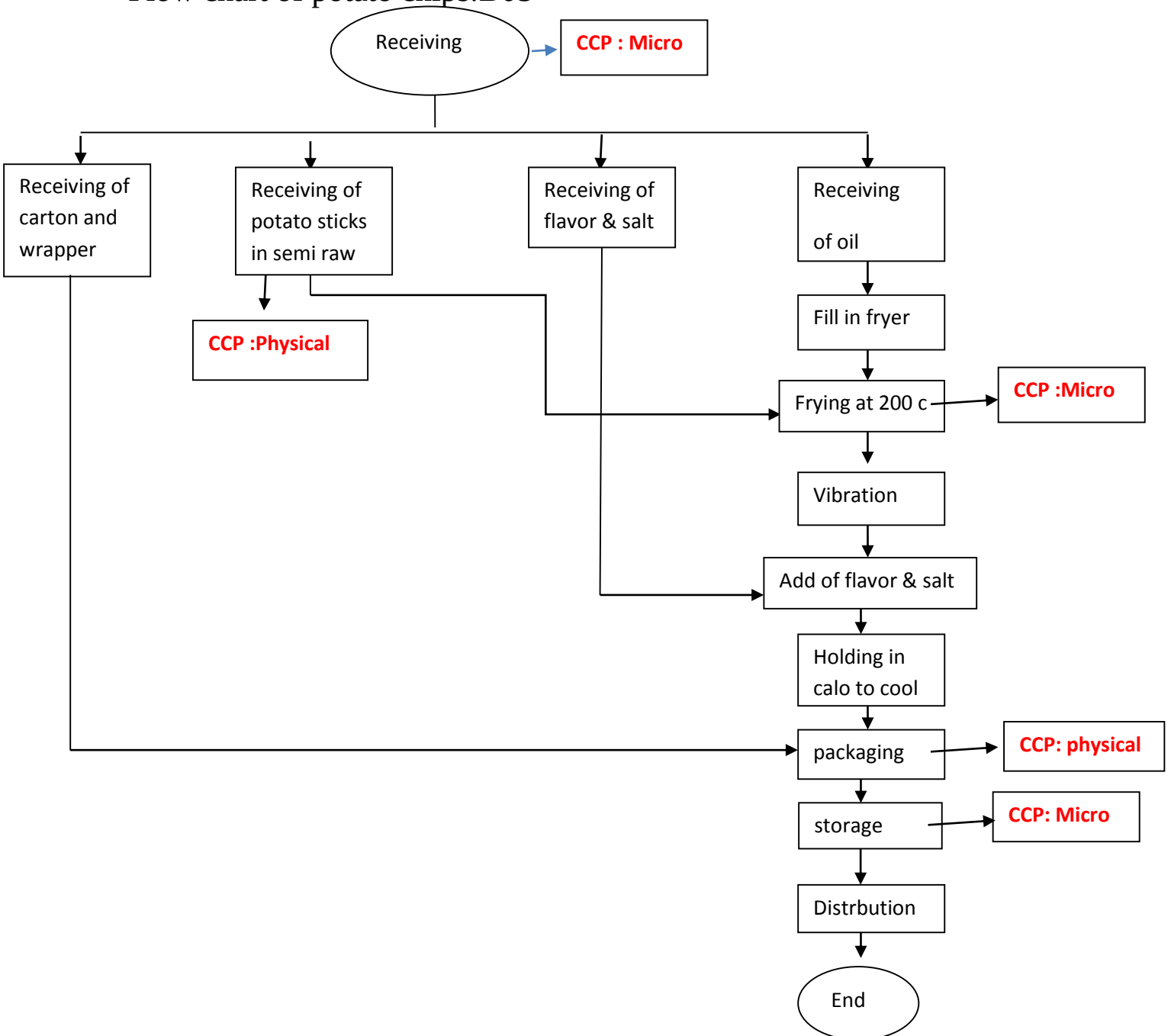
Hazard Analysis Worksheet

Company name :

Product / Process **:B04 ,frying**

CCP Step	Hazard	Adverse Effect	Control Measure	Critical Limit	Monitoring	Frequency	Corrective Action
Final Storage	**Biological**	Micro: cause different type of illness which may cause fever, dehydration and shock Onset is 8-44 hours (toxigenic strains)or 8-44hours (invasive strains) ,Nausea ,vomiting ,Diarrhea ,abdominal cramps, and prostration symptoms may be sever. Onset ranges from 1-76 hours. Duration usually 24hours.	the **OPRPs** that control the hazard: Controlling the storage condition GMP temperature, light..	Temperature of storage at room temp 25C not above and Keep away from sunlight	Monitoring of Storage Condition.	Every days ,Every storage of final Product.	Check the Storage condition By QA and Applied FIFO system in storage process. Training employee on GMP system .

Flow chart of potato chips:B05



HACCP Worksheet

Company name :

Product /Process:**B05**

CCP Step	Hazard	Adverse Effect	Control Measure	Critical limit	Monitoring	Frequency	Corrective Action
Receiving of raw Material	Biological	Micro: cause different type of illness which may cause fever, dehydration and shock Onset is 8-44 hours (toxigenic strains)or 8-44hours (invasive strains) ,Nausea ,vomiting ,Diarrhea ,abdominal cramps, and prostration symptoms may be sever. Onset ranges from 1-76 hours. Duration usually 24hours.	Receiving and handling under GMPs condition.	**Bcteria≤50000 cfu /gm.** **Y&M≤100 cfu /gm.** **Coliform≤10 cfu /gm.** **Staph≤10 cfu /gm.**	Make Biological Test	At Every Container Receiving	Reject Container
	Physical	Physical: cause many problem or injuries in intestinal track	Definition of suitable mesh size , mesh filter ,	**Wr**ong mesh size damage Mesh size	Filter size Conformity check, Metal detector	At production start , at any filter replacement, At every one hour.	Placing correct filter

Hazard Analysis Worksheet

Company name :
Product / Process: B05,frying

CCP Step	Hazard	Adverse Effect	Control Measure	Critical Limit	Monitoring	Frequency	Corrective Active
Frying process	Biological	Micro: : cause different type of illness which may cause fever, dehydration and shock Onset is 8-44 hours (toxigenic strains)or 8-44hours (invasive strains) ,Nausea ,vomiting ,Diarrhea ,abdominal cramps, and prostration symptoms may be sever. Onset ranges from 1-76 hours. Duration usually 24hours.	Temp of Fryer (200)C̊	**Bcteria≤50000 cfu/gm. Y&M≤100 cfu /gm. Coliform≤10 cfu /gm. Staph≤10 cfu /gm.**	Temp for Fryer not less than 200C̊	At every one hour.	Adjust Temp of frying not less 200C
Packaging	Physical Present of undesirable packages residue(plastic film)	Physical: :cause many problem in intestinal track	Metal detector	Finished product must be free from foreign bodies & visual foreign materials	Regular control of the processing parameter -measuring moisture content -QA check the Packaging condition when damage of Package these Ingredient Scrapped	Every one Hour	

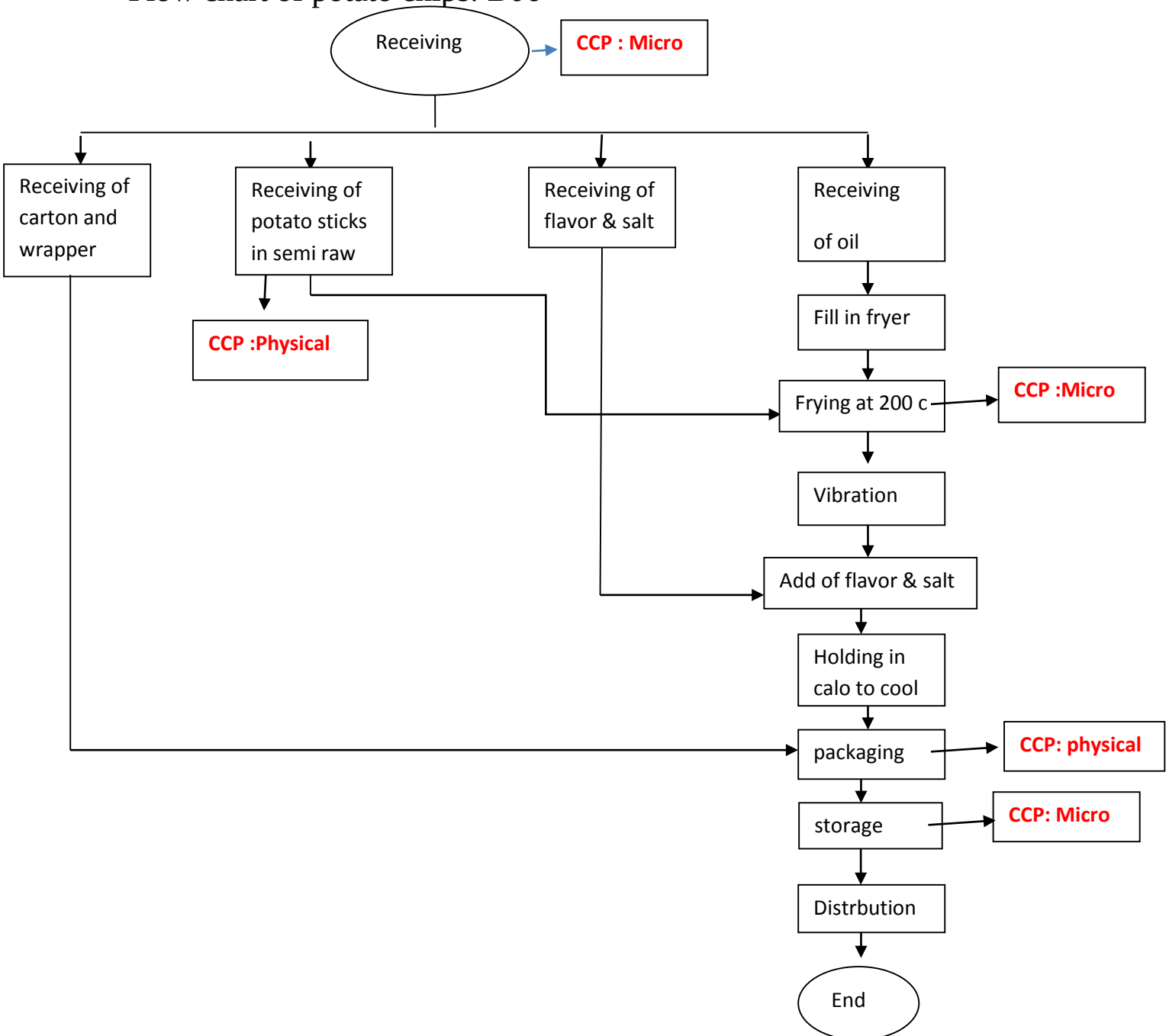
Hazard Analysis Worksheet

Company name :

Product / Process **:B05 ,frying**

CCP Step	Hazard	Adverse Effect	Control Measure	Critical Limit	Monitoring	Frequency	Corrective Action
Final Storage	**Biological**	Micro: cause different type of illness which may cause fever, dehydration and shock Onset is 8-44 hours (toxigenic strains)or 8-44hours (invasive strains) ,Nausea ,vomiting ,Diarrhea ,abdominal cramps, and prostration symptoms may be sever. Onset ranges from 1-76 hours. Duration usually 24hours.	the **OPRPs** that control the hazard: Controlling the storage condition GMP temperature, light..	Temperature of storage at room temp 25C not above and Keep away from sunlight	Monitoring of Storage Condition.	Every days ,Every storage of final Product.	Check the Storage condition By QA and Applied FIFO system in storage process. Training employee on GMP system .

Flow chart of potato chips: B06



HACCP Worksheet

Company name :

Product /Process:**B06**

CCP Step	Hazard	Adverse Effect	Control Measure	Critical limit	Monitoring	Frequency	Corrective Action
Receiving of raw Material	Biological	Micro: cause different type of illness which may cause fever, dehydration and shock Onset is 8-44 hours (toxigenic strains)or 8-44hours (invasive strains) ,Nausea ,vomiting ,Diarrhea ,abdominal cramps, and prostration symptoms may be sever. Onset ranges from 1-76 hours. Duration usually 24hours.	Receiving and handling under GMPs condition.	**Bcteria≤50000 cfu /gm.** **Y&M≤100 cfu /gm.** **Coliform≤10 cfu /gm.** **Staph≤10 cfu /gm.**	Make Biological Test	At Every Container Receiving	Reject Container
	Physical	Physical: cause many problem or injuries in intestinal track	Definition of suitable mesh size , mesh filter ,	**Wr**ong mesh size damage Mesh size	Filter size Conformity check, Metal detector	At production start , at any filter replacement, At every one hour.	Placing correct filter

Hazard Analysis Worksheet							
Company name : **Product / Process: B06,frying**							
CCP Step	**Hazard**	**Adverse Effect**	**Control Measure**	**Critical Limit**	**Monitoring**	**Frequency**	**Corrective Active**
Frying process	Biological	Micro: : cause different type of illness which may cause fever, dehydration and shock Onset is 8-44 hours (toxigenic strains)or 8-44hours (invasive strains) ,Nausea ,vomiting ,Diarrhea ,abdominal cramps, and prostration symptoms may be sever. Onset ranges from 1-76 hours. Duration usually 24hours.	Temp of Fryer (200)C̊	**Bcteria≤50000 cfu/gm.** **Y&M≤100 cfu /gm.** **Coliform≤10 cfu /gm.** **Staph≤10 cfu /gm.**	Temp for Fryer not less than 200C̊	At every one hour.	Adjust Temp of frying not less 200C
Packaging	Physical Present of undesirable packages residue(plastic film)	Physical: :cause many problem in intestinal track	Metal detector	Finished product must be free from foreign bodies & visual foreign materials	Regular control of the processing parameter -measuring moisture content -QA check the Packaging condition when damage of Package these Ingredient Scrapped	Every one Hour	

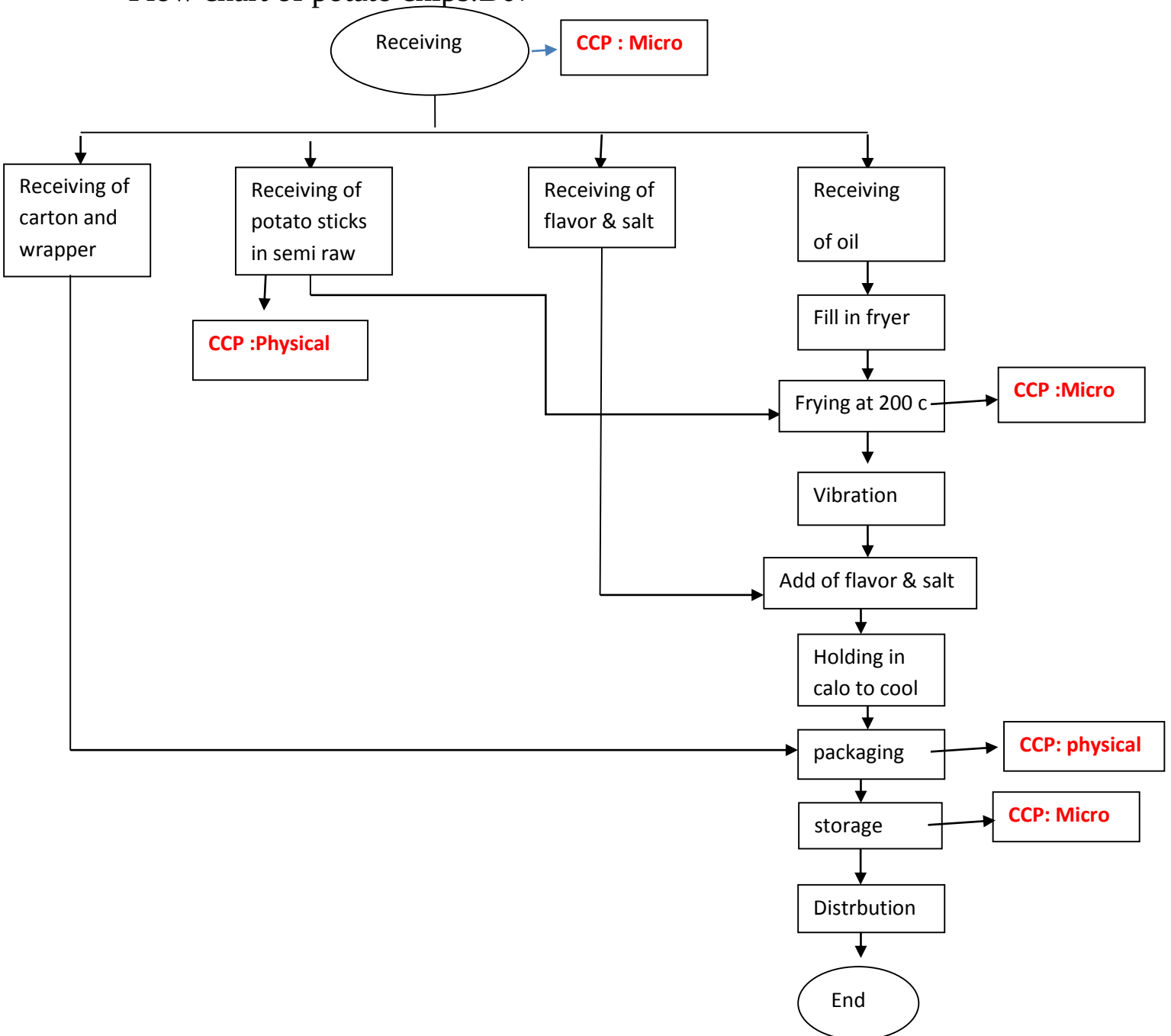
Hazard Analysis Worksheet

Company name :

Product / Process **:B06 ,frying**

CCP Step	Hazard	Adverse Effect	Control Measure	Critical Limit	Monitoring	Frequency	Corrective Action
Final Storage	**Biological**	Micro: cause different type of illness which may cause fever, dehydration and shock Onset is 8-44 hours (toxigenic strains)or 8-44hours (invasive strains) ,Nausea ,vomiting ,Diarrhea ,abdominal cramps, and prostration symptoms may be sever. Onset ranges from 1-76 hours. Duration usually 24hours.	the **OPRPs** that control the hazard: Controlling the storage condition GMP temperature, light..	Temperature of storage at room temp 25C not above and Keep away from sunlight	Monitoring of Storage Condition.	Every days ,Every storage of final Product.	Check the Storage condition By QA and Applied FIFO system in storage process. Training employee on GMP system .

Flow chart of potato chips:B07



HACCP Worksheet

Company name :

Product /Process:**B07**

CCP Step	Hazard	Adverse Effect	Control Measure	Critical limit	Monitoring	Frequency	Corrective Action
Receiving of raw Material	Biological	Micro: cause different type of illness which may cause fever, dehydration and shock Onset is 8-44 hours (toxigenic strains)or 8-44hours (invasive strains) ,Nausea ,vomiting ,Diarrhea ,abdominal cramps, and prostration symptoms may be sever. Onset ranges from 1-76 hours. Duration usually 24hours.	Receiving and handling under GMPs condition.	**Bcteria≤50000 cfu /gm.** **Y&M≤100 cfu /gm.** **Coliform≤10 cfu /gm.** **Staph≤10 cfu /gm.**	Make Biological Test	At Every Container Receiving	Reject Container
	Physical	Physical: cause many problem or injuries in intestinal track	Definition of suitable mesh size , mesh filter ,	**Wr**ong mesh size damage Mesh size	Filter size Conformity check, Metal detector	At production start , at any filter replacement, At every one hour.	Placing correct filter

Hazard Analysis Worksheet

Company name :
Product / Process: B07,frying

CCP Step	Hazard	Adverse Effect	Control Measure	Critical Limit	Monitoring	Frequency	Corrective Active
Frying process	Biological	Micro: : cause different type of illness which may cause fever, dehydration and shock Onset is 8-44 hours (toxigenic strains)or 8-44hours (invasive strains) ,Nausea ,vomiting ,Diarrhea ,abdominal cramps, and prostration symptoms may be sever. Onset ranges from 1-76 hours. Duration usually 24hours.	Temp of Fryer (200)C̊	**Bcteria≤50000 cfu/gm. Y&M≤100 cfu /gm. Coliform≤10 cfu /gm. Staph≤10 cfu /gm.**	Temp for Fryer not less than 200C̊	At every one hour.	Adjust Temp of frying not less 200C
Packaging	Physical Present of undesirable packages residue(plastic film)	Physical: :cause many problem in intestinal track	Metal detector	Finished product must be free from foreign bodies & visual foreign materials	Regular control of the processing parameter -measuring moisture content -QA check the Packaging condition when damage of Package these Ingredient Scrapped	Every one Hour	

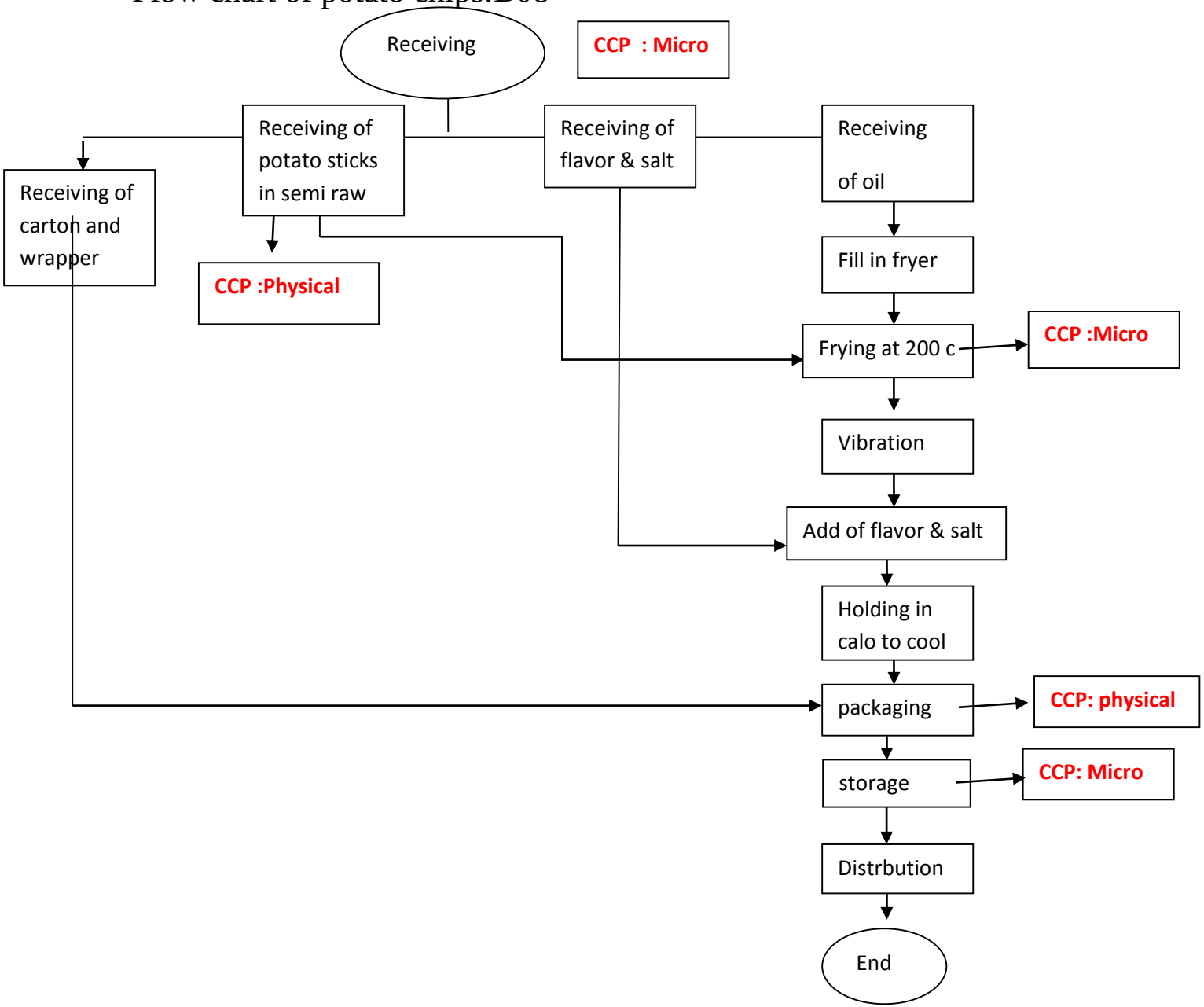
Hazard Analysis Worksheet

Company name :

Product / Process **:B07 ,frying**

CCP Step	Hazard	Adverse Effect	Control Measure	Critical Limit	Monitoring	Frequency	Corrective Action
Final Storage	**Biological**	Micro: cause different type of illness which may cause fever, dehydration and shock Onset is 8-44 hours (toxigenic strains)or 8-44hours (invasive strains) ,Nausea ,vomiting ,Diarrhea ,abdominal cramps, and prostration symptoms may be sever. Onset ranges from 1-76 hours. Duration usually 24hours.	the **OPRPs** that control the hazard: Controlling the storage condition GMP temperature, light..	Temperature of storage at room temp 25C not above and Keep away from sunlight	Monitoring of Storage Condition.	Every days ,Every storage of final Product.	Check the Storage condition By QA and Applied FIFO system in storage process. Training employee on GMP system .

Flow chart of potato chips:B08



HACCP Worksheet

Company name :

Product /Process:**B08**

CCP Step	Hazard	Adverse Effect	Control Measure	Critical limit	Monitoring	Frequency	Corrective Action
Receiving of raw Material	Biological	Micro: cause different type of illness which may cause fever, dehydration and shock Onset is 8-44 hours (toxigenic strains)or 8-44hours (invasive strains) ,Nausea ,vomiting ,Diarrhea ,abdominal cramps, and prostration symptoms may be sever. Onset ranges from 1-76 hours. Duration usually 24hours.	Receiving and handling under GMPs condition.	**Bcteria≤50000 cfu /gm.** **Y&M≤100 cfu /gm.** **Coliform≤10 cfu /gm.** **Staph≤10 cfu /gm.**	Make Biological Test	At Every Container Receiving	Reject Container
	Physical	Physical: cause many problem or injuries in intestinal track	Definition of suitable mesh size , mesh filter ,	**Wr**ong mesh size damage Mesh size	Filter size Conformity check, Metal detector	At production start , at any filter replacement, At every one hour.	Placing correct filter

Hazard Analysis Worksheet							
Company name : **Product / Process: B08,frying**							
CCP Step	**Hazard**	**Adverse Effect**	**Control Measure**	**Critical Limit**	**Monitoring**	**Frequency**	**Corrective Active**
Frying process	Biological	Micro: : cause different type of illness which may cause fever, dehydration and shock Onset is 8-44 hours (toxigenic strains)or 8-44hours (invasive strains) ,Nausea ,vomiting ,Diarrhea ,abdominal cramps, and prostration symptoms may be sever. Onset ranges from 1-76 hours. Duration usually 24hours.	Temp of Fryer (200)C̊	**Bcteria≤50000 cfu/gm.** **Y&M≤100 cfu /gm.** **Coliform≤10 cfu /gm.** **Staph≤10 cfu /gm.**	Temp for Fryer not less than 200C̊	At every one hour.	Adjust Temp of frying not less 200C
Packaging	Physical Present of undesirable packages residue(plastic film)	Physical: :cause many problem in intestinal track	Metal detector	Finished product must be free from foreign bodies & visual foreign materials	Regular control of the processing parameter -measuring moisture content -QA check the Packaging condition when damage of Package these Ingredient Scrapped	Every one Hour	

Hazard Analysis Worksheet

Company name :

Product / Process **:B08 ,frying**

CCP Step	Hazard	Adverse Effect	Control Measure	Critical Limit	Monitoring	Frequency	Corrective Action
Final Storage	**Biological**	Micro: cause different type of illness which may cause fever, dehydration and shock Onset is 8-44 hours (toxigenic strains)or 8-44hours (invasive strains) ,Nausea ,vomiting ,Diarrhea ,abdominal cramps, and prostration symptoms may be sever. Onset ranges from 1-76 hours. Duration usually 24hours.	the **OPRPs** that control the hazard: Controlling the storage condition GMP temperature, light..	Temperature of storage at room temp 25C not above and Keep away from sunlight	Monitoring of Storage Condition.	Every days ,Every storage of final Product.	Check the Storage condition By QA and Applied FIFO system in storage process. Training employee on GMP system .

Sample date: 2-10-2013

Sample	*Total plate Count*		*Staph aureus*		*Yeast & Moulds*		*Total Coliforms*	
	Internal	**External**	**Internal**	**External**	**Internal**	**External**	**Internal**	**External**
B01	19	50	0	0	0	0	0	0
B02	20	25	0	0	0	0	0	0
B03	0	28	0	0	0	0	0	0
B04	20	30	0	0	0	0	0	1

Sample Date: 7-10-2013

Sample	*Total plate Count*		*Staph aureus*		*Yeast & Moulds*		*Total Coliform*	
	Internal	**External**	**Internal**	**External**	**Internal**	**External**	**Internal**	**External**
B03	10	12	0	0	0	5	0	0
A01	30	44	0	0	0	5	0	2
B04	0	0	0	2	0	2	0	0
B02	40	30	0	0	0	0	0	0
A04	40	23	0	0	0	0	0	0

Sample date :22-10-2013

Sample	*Total plate Count*		*Staph aureus*		*Yeast & Moulds*		*Total Coliforms*	
	Internal	**External**	**Internal**	**External**	**Internal**	**External**	**Internal**	**External**
B04	20	10	0	2	0	0	0	0
B02	40	70	0	0	1	0	0	0
B05	10	52	0	4	0	0	0	
B06	30	50	0	4	0	0	0	1
A01	10	8	0	2	0	0	0	1
B07	20	0	0	4	0	0	0	0

Date of Sample: 28-10-2016

Sample	*Total plate Count*		*Staph aureus*		*Yeast & Moulds*		*Total Coliforms*	
	Internal	**External**	**Internal**	**External**	**Internal**	**External**	**Internal**	**External**
A03	30	25	0	0	0	2	0	0
B02	0	10	0	0	0	4	0	0
B03	0	15	0	0	0	1	0	2
B04	0	8	0	0	0	0	0	2
B01	0	0	0	2	1	0	0	4
A03	30	30	0	0	0	0	0	1
B04	10	11	0	2	0	0	0	1

Sample Date:05-11-2013

Sample	*Total plate Count*		*Staph aureus*		*Yeast & Moulds*		*Total Coliform*	
	Internal	**External**	**Internal**	**External**	**Internal**	**External**	**Internal**	**External**
B03	10	5	0	2	0	5	0	0
A01	50	30	0	2	0	1	0	2
B04	0	0	0	0	0	2	0	2
B06	30	20	0	4	0	4	0	0

Sample date :10-11-2013

Sample	*Total plate Count*		*Staph aureus*		*Yeast & Moulds*		*Total Coliform*	
	Internal	**External**	**Internal**	**External**	**Internal**	**External**	**Internal**	**External**
B03	0	0	0	0	0	4	0	2
A02	0	0	0	0	0	0	0	0
B04	0	0	0	1	0	2	0	3
B02	10	0	0	1	0	2	0	1
A04	0	0	0	0	0	0	0	1

Sample Date:17-11-2013

Sample	*Total plate Count*		*Staph aureus*		*Yeast & Moulds*		*Total Coliform*	
	Internal	**External**	Internal	External	Internal	External	Internal	External
B03	60	0	0	0	0	0	0	0
A01	0	0	0	0	0	0	0	0
B04	40	0	0	0	0	2	0	0
B02	20	10	0	0	0	0	0	0
B07	60	80	0	0	0	0	0	0

Sample Date:27-11-2013

Sample	*Total plate Count*		*Staph aureus*		*Yeast & Moulds*		*Total Coliform*	
	Internal	**External**	**Internal**	**External**	**Internal**	**External**	**Internal**	**External**
B03	10	0	0	0	0	2	0	0
A02	50	100	0	0	0	1	0	0
B04	50	70	0	0	0	1	0	0
B06	30	80	0	2	0	0	0	0
B07	0	0	0	0	0	0	0	0
B01	140	100	0	0	0	0	0	0

Sample Date: 30-11-2013

Sample	***Total plate Count***		***Staph aureus***		***Yeast & Moulds***		***Total Coliform***	
	Internal	**External**	Internal	External	Internal	External	Internal	External
B03	0	0	0	2	0	0	0	0
A02	0	1	0	1	0	0	0	1
B04	0	1	0	1	0	0	0	0
B02	0	1	0	1	0	1	0	0

Sample Date: 8-12-2013

Sample	***Total plate Count***		***Staph aureus***		***Yeast & Moulds***		***Total Coliform***	
	Internal	**External**	**Internal**	**External**	**Internal**	**External**	**Internal**	**External**
B03	30	2	0	0	0	0	0	2
A01	10	1	0	0	0	0	0	0
B04	0	1	0	0	0	0	0	0
B06	0	1	0	0	0	0	0	1
B02	10	1	0	0	0	2	0	0

Sample Date :25-12-2013

Sample	*Total plate Count*		*Staph aureus*		*Yeast & Moulds*		*Total Coliform*	
	Internal	**External**	**Internal**	**External**	**Internal**	**External**	**Internal**	**External**
A03	50	50	0	1	0	2	0	0
A02	10	15	0	0	0	2	0	0
B04	50	42	0	0	0	0	0	0
B02	0	10	0	0	0	1	0	0

Finally, through studying the result and discussion as total, it is obvious that the risk and hazards were almost in existent what so ever, this is due to the fact that the element of hazards and the potential of risk in snack food products in extruded form is very limited towards Zero level. This fact is granted through results obtained by internal examination microbial tests and double checked by external tests.

At the same time the form of discussion took place in form of hazard analysis sheet showed a far incidence possibilities of hazardous risk upon consuming such products. At the same time the microbial test showed no evidence of likelihood of any level of contamination. This fact need further investigation in the future to investigate other types of hazards.

Conclusions:

From this research several conclusions were drown and some highlight showed be taking into consideration while dealing with snack food companies inspection and follow ups:

- **F**ood safety is related to the presence of and levels of food-borne hazards in food at the moment of consumption.
- As food safety hazards may be introduced at any stage of the food chain, adequate control throughout the food chain is essential. Thus, food safety is a joint responsibility of all parties participating in the food chain.
- ISO 22000 ensure integrity of food supply chain by minimizing food-borne hazards throughout the food chain by insuring that there are no weak links.
- It therefore makes good scientific sense for those who are involved in food processing, manufacturing, storage, distribution of food and food products to adopt and implement ISO 22000.
- ISO 22000 for food safety management system is intended to provide food safety and security.
- The snack food industry are applying ISO 22000 by default. Those inspective and legislative bodies must understand this fact and develop their methods of inspection.

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