

## SECTION 1

### 1.0 IMPORTANCE OF FOOD FORTIFICATION IN CONTROLLING MICRONUTRIENT MALNUTRITION

#### 1.1 MICRONUTRIENTS IN HEALTH

##### 1.1.1 INTRODUCTION

Micronutrients are nutrients that are required for normal physiological function of the body in small quantities. They are important in cellular metabolism as components of enzymes that play catalytic roles in specific metabolic reactions while others function in a more general fashion. When low or absent in the diet, poor growth and physiological conditions known as deficiency symptoms occur.

The following micronutrients are of public concern in Zambia.

- Vitamin A
- Iodine
- Iron

Public health problem means that a wide range of the population is affected and requires a blanket coverage intervention to overcome the problem.

##### 1.1.2 Vitamin A in Health

###### Importance of Vitamin A

Vitamin A is essential for normal sight especially in reduced light. It also helps normal growth and development and protects the body from infection, thereby reducing mortality.

Vitamin A supplementation during pregnancy has been shown to reduce maternal mortality, reduced risks of urinary or reproductive tract infection. Vitamin A affects the course and outcome of infectious diseases. Without adequate levels of vitamin A episodes of diarrhoea last longer and childhood illness tends to be more severe. In communities where Vitamin A deficiency is common, about 30% of child deaths have been directly attributed to a lack of Vitamin A. Furthermore, recent studies suggest a strong association between the Vitamin A status of HIV-infected women and reduced transmission of the virus from mother to child.

###### Sources of Vitamin A

Vitamin A is found only in animal products, but plants such as vegetables and fruits contain a substance known as carotene which the human body can use to make Vitamin A.

These include:

***Animal Products***

eggs, kidneys, liver and milk, breastmilk and colostrum (for infants), butter and fish liver oil.

***Plant Products.***

<i>Dark green vegetables</i>	cassava leaves, cowpea leaves, pumpkin leaves, spinach, rape, bondwe etc
<i>Yellow vegetables</i>	carrots
<i>Yellow fruits</i>	mangoes, papaw, pumpkins
<i>Tubers</i>	yellow to orange sweet potatoes
<i>Oils</i>	red palm oil,

**Effects of Vitamin A Deficiency (VAD)**

Vitamin A deficiency (VAD) is very detrimental because it affects growth and development in children. It can affect the immune system and vision in extreme cases. If not treated in time VAD complication can lead to death. The effect ranges from sub-clinical to clinical. The following are the effects of VAD in detail;

- a) **Visual impairment** For many years vitamin A deficiency has been associated with xerophthalmia and blindness. The progressive effects of VAD begins when a child can no longer see in dim light and thus suffers from what is known as night blindness or xerophthalmia. As the affliction continues, the eye's conjunctiva and cornea becomes dry; lesions then appear on the cornea and in most severe (clinical) form, the cornea simply melts away causing permanent blindness.
- b) **Immunity:** Vitamin A deficiency is associated with a greater rate of infection and once infected the vitamin A deficient individual does not handle infection effectively. The possible mechanism for this includes increased penetration of pathogens through altered mucosal barriers and changes in lymphoid response.
- c) **Infection:** One of the major effects of vitamin A deficiency even before it is severe enough to cause xerophthalmia includes increased susceptibility to infection. There is a well-known correlation's between pneumonia, diarrhoea, measles and vitamin A deficiency in children.
- d) **Mortality:** Vitamin A deficiency increases mortality in children under 5 years old.

**Prevalence of Vitamin A Deficiency in Zambia.**

In Zambia vitamin a deficiency was first recognised as a public health problem in the early 1960's when it was described as the major cause of blindness in Luapula Province. In 1985 a study was carried out in Luapula Valley involving 4,275 children between 6 – 72 months which revealed that 1.89% of these children had xerophthalmia (clinical

vitamin A deficiency) and 16.5% had biochemical levels of severe deficiency, less than 10ug/dl.

In 1997 a national wide survey carried out and the results revealed that about 66% of children (about 6 in 10 children) below the age of 6 years and 21.5% of women are vitamin A deficient. Their serum retinal is equals or less than 20ug/dl. The night-blindness rates were 11.6% for women and 6.2% for children, placing Zambia in the severe clinical and sub-clinical vitamin A deficiency category according to WHO population affected cut-offs.

### **Causes of Vitamin A Deficiency**

The major causes of VAD are inadequate dietary intake of the preformed retinol (Vitamin A) or precursors of vitamin A. Increased Vitamin A requirement in certain physiological and pathological conditions, inadequate absorption or loss of intestinal content in diarrhea are often contributing factors.

#### **a) *Type of Diet***

There is lack or inadequate intake of Vitamin A from the diet because:

- Infants are not exclusively breastfed up to 6 months of age
- Vitamin A rich foods (especially animal products) might be too expensive for people to afford or are not available throughout the year (e.g. mangoes)
- Sufficient vitamin A rich foods are not given to young children
- People do not use (sufficient) oil or fat to prepare their meals; oils or fat are needed for the absorption of vitamin A by the body
- People consume diets low in animal protein
- Lack or no regular intake of fruits and vegetables

#### **b) *Childhood Illness:***

- Prolonged diarrhoea leads to mal-absorption of vitamin A and other foods
- Severe protein-energy malnutrition causes mal-absorption of vitamin A, especially with accompanying diarrhoea
- Measles increases the need for vitamin A in the body
- Roundworm infection causes mal-absorption of vitamin A and fat.

#### **c) *Physiological conditions,***

Pregnancy and lactation increases vitamin A requirements.

### **Relationship between Vitamin A deficiency and childhood illness**

Vitamin A deficiency increases the severity of measles, diarrhoea, protein-energy malnutrition and lower respiratory infections in children. The disease therefore, depletes a child's stores of vitamin A that may already have been depleted. This circular relationship between vitamin A deficiency and childhood illness puts a child at high risk of death and blindness.

## Groups Most at Risk of Vitamin A Deficiency

### a) *High Risk Group*

- Infants between 0-6 months who are not breastfed
- Infants and children 6 months to 6 years
- Lactating women
- People in perpetually dry areas e.g. Gwembe and Sinazongwe

### b) **Risk groups (that are likely to develop clinical vitamin A deficiency)**

- Children with measles
- Children with severe protein-energy malnutrition
- Children with acute or prolonged diarrhoea for more than 3 days
- Children with acute respiratory infection such as pneumonia

## Types of Intervention

Despite advances in knowledge about many striking benefits of vitamin A, progress in eliminating its deficiency among affected communities has been slow. To date, approaches to addressing the problem public health planners have focused on for the following;

### a) **Dietary diversification**

This is a long-term strategy to eliminate vitamin A deficiency. Its focus is on modifications in patterns of food production, consumption, and distribution. This could be done through change in agriculture or horticulture, education, and poverty alleviation strategies (policies). To have a positive results from such a strategy usually takes long and the areas with high levels of vitamin A deficiency (drier areas) do not benefit.

### b) **Supplementing the diet with high-dose capsules;**

High dose of vitamin A capsule is administered to the following;

- Infants and pre-school children every 4 6 months
- women within 8 weeks after delivery.
- Children suffering from diarrhoea, measles, lower respiratory infection and malnutrition and
- Adults with long diarrhoea and HIV/AIDS positive patients

This strategy has been justified in high-risk areas as a short-term measure. However, there are some limitations to achieving the desired goal. Some of which including gradual loss of "interest" by the target population, very small part of the population "most at risk" get vitamin A.

### c) **Fortifying commonly consumed foods.**

Fortification is a medium to long term approach to improving the micronutrient status of a large population. This implies adding vitamin A to one or more widely

consumed foods. It is more applicable when wide range of the population is affected and a blanket coverage is desired. Fortification is the major subject of the manual.

### 1.1.3 Iodine in Health

#### Importance of Iodine

Role of iodine in the body is related to its function as a constituent of the thyroid gland. The adult body contains 10-20 ug/dl of iodine of which 70-80% is concentrated in the thyroid gland. The thyroid gland is the only gland capable of synthesising the thyroid hormone which is important in the synthesis of proteins and enzymes hence in growth and its metabolic processes that involve efficient use of nutrients. The thyroid hormones also modulate the stimulation of oxygen consumption and influence the permeability of the cell membranes.

#### Source of Iodine

Iodine comes from the soil. Soils rich in iodine are those near the sea. It therefore, follows that food sources of iodine are;

- Salt prepared from sea water,
- Sea foods or plants grown near the sea

#### Effects of Iodine Disorders Deficiency (IDD)

Lack of iodine leads to the failure of the thyroid gland to make enough thyroid hormones which in turn leads to several important health consequences that are together called “Iodine Deficiency Disorder” (IDD).

It manifests itself as goitre and a range of physical and mental handicaps as described below;

- a) Goitre: Perhaps the most well known and visible sign of iodine deficiency. This is the enlargement of the thyroid gland due to lack of iodine. It appears as a swelling in the neck. Goitre vary in size. Some are small that cannot be seen but can only be felt when the neck is palpated, while others are large that can be seen from a distance. Goitre is present both in males and females but large ones are more common in females.
- b) Hypothyroidism: This is the result of low levels of thyroid hormones in the body. It produces the following effects; sluggishness, sleepiness, dry skin, cold intolerance and constipation.

In young children it may lead to mental and growth retardation while women who are hypothyroid during pregnancy may have miscarriages or stillbirths, low birth weight babies/or babies with congenital deformities. They may lead to having babies born with cretinism.

- c) Cretinism: This is a very severe form of hypothyroidism occurring during foetal or neonatal life. It is better to split cretinism into two;
  - i) Neurological cretinism In this case, the baby has damage to the brain and nervous system. The effects vary from mild to severe mental and physical

handicap and may include, deafness and mutism (no speech), squint eyes, weakness and stiffness especially of the legs.

Neurological cretinism is mostly from mothers who are iodine deficient in the first trimester of pregnancy when the baby's brain and nervous system are being developed. This form of cretinism is irreversible.

- ii) Hypothyroid cretinism In this case, the baby has signs which are similar to those listed under hypothyroidism.

Hypothyroid cretinism is mostly from mother who are iodine deficient in later part of pregnancy. If you give iodine the symptoms improves or disappear but treatment may not be effective if started after a child is one and one (01) to two (02) years old.

- d) Reproductive failure: There is evidence that women in severely iodine deficient areas have more miscarriages, still birth and other problems of pregnancy and reproduction than those in iodine sufficient areas.
- e) Child mortality: Child mortality in iodine deficient areas is much higher than in iodine sufficient areas. Birth weights are also better in iodine sufficient areas than iodine deficient areas.

### **Prevalence of IDD in Zambia**

Zambia has been known as country highly affected by IDD since the 1960's. In 1971 a national survey was carried out on school going children. A Total Goitre Rate (TGR) of 50.5%, ranging from 44% to 76% was found. In 1993, another survey was carried out and the results showed a TGR of 31.6%, ranging from 9% to 82%. However, WHO (1997) data indicates a drop of below 20% in the TGR.

In areas where local salt is produced, Kasempa and Kaputa district a survey carried out in 1998 on school going children. A TGR was 43% was found in Kasempa district and 16% in Kaputa district. In comparison the TGR for 1998 (43%) Kasempa district was higher than the provincial figures for 1993 (36.4%) but lower than the 1971 (76.2%). While for Kaputa district the TGR for 1998 (16%) was lower than the provincial figures for 1971 (50.6%) and 1993 (30.3%).

### **Cause of Iodine Deficiency Disorders**

Iodine deficiency result mainly from geological rather than social and economic conditions. That is iodine is found in soils near the sea, therefore, since Zambia is away from the sea the soil does not contain iodine and subsequently the crop grown on such soil are deficient in iodine. Iodine therefore has to be added to the diet from an external source through a process such as fortification and supplementation.. While both strategies are effective, fortification of salt is a common, long term and sustainable solution.

**Groups at Risk**

Iodine deficiency affects both sexes and all age groups but women and girls are more susceptible with adolescence period being of greater susceptibility.

**Intervention**

- a) **Supplementation:** The Zambian IDD programme has never focused on supplementation as a strategy for combating IDD. However, for areas where IDD has been observed to be very severe capsules of iodized oil have been distributed. In 1995 capsules were distributed in Gwembe valley, Kaputa and Kasempa districts, and these benefited women of child bearing age and school children.
  
- b) **Fortification:** IDD can easily be prevented by consumption of salt fortified with iodine. Fortification of salt commonly known as iodation or iodisation has therefore, become the most commonly accepted method of preventing IDD in the world.

### 1.1.4 Iron in Health

#### Importance of Iron

Iron is an important substance in the blood. It is involved with the use of oxygen, haemoglobin transports oxygen from the lungs to the tissues and other iron containing substances utilises the oxygen with the cells.

#### Source of iron

Iron is found in both animal and plants products. The iron from animal products known as haeme iron and is readily absorbed whereas that from plant sources is known as non-haeme iron and is not readily absorbed.

These include

<i>Animal Products</i>	Liver, kidney, eggs, fish, milk, breast milk
<i>Plant Products</i>	
<i>Cereals</i>	Maize, sorghum, millet, rice
<i>Legumes</i>	Beans, cowpeas, soyabeans, groundnuts, pigeon peas
<i>Leaf green vegetables</i>	Leaves of cassava, cowpeas, pumpkin, rape, beans

It is important to note that vitamin C rich foods if consumed at the same time, enhances the absorption of iron from plant sources.

#### Effects of IDA

Lack of iron causes a condition known as anaemia. Anaemia causes the following

- a) Interferes with oxygen carrying capacity of blood.
- b) Growth retardation: Iron deficiency children are underweight.
- c) Child behaviour and development: Children who are born iron deficient do not perform well on psychomotor tests, though most of the effects are reversible with iron therapy.
- d) Work performance and productivity: iron deficiency reduces work performance. This is due to the decreased oxygen carrying capacity caused by anaemia, and the effect of the iron deficiency on muscle function.
- e) Effect on pregnant women and their babies;
  - Low birth weight
  - Perinatal and neonatal mortality
  - Maternal mortality.
- f) Susceptibility to infection

#### Risk group

Infants, children especially those below the age of five and women especially child bearing age are most susceptible.

**Prevalence of IDA**

Anaemia has been recognised as major cause of morbidity in women and children. In developing countries, it is estimated that nearly 50% of women and children and 24% of men are anaemic. A nation wide survey carried out in 1998 revealed that 65% of children and 39% of women are anaemic(Luo and Mwela, 1998).

**Causes of IDA**

The causes of anaemia are multiple. Globally as well as in Zambia, nutritional iron deficiencies are the commonest causes of anaemia, with iron deficiency being the commonest followed by folate deficiency. Other causes include vitamin B<sub>12</sub> and protein deficiencies. Non nutritional deficiency iron anaemia include malaria and blood loss due to infection by parasites, such as hookworms and schistosomiasis.

## 1.2 FOOD FORTIFICATION

### 1.2.1 Background

In 1990 at the World Summit for children in New York, World leaders committed themselves to the elimination and control of micronutrient malnutrition by the year 2000. Three decade goals were set during that summit.

- a) *Virtual elimination of Vitamin A Deficiency (VAD)*
- b) *Virtual elimination of Iodine Deficiency Disorders (IDD)*
- c) *A one third reduction in Iron Deficiency Anaemia (IDA) among women by the year 2000*

These goals were endorsed during the “*Ending Hidden Hunger*” conference in Montreal in 1991 and the International Conference on Nutrition (ICN) in Rome in 1992.

Zambia adopted the same goals in its programme of action for women and children. In order to meet the challenges of the World Summit for children and the subsequent conferences, the National Food and Nutrition Commission (NFNC) formed a National Task Force for the control of IDD. This was followed later by the formation of the National Task Forces for the control of VAD and IDA respectively. In 1993 the three task forces were merged to become the National Task Force for the control of micronutrient malnutrition. The aim was to harmonise efforts and resources to control the three micronutrient deficiencies.

Among the duties of the task force was to recommend the type of intervention(s) that would be used to meet the targets on the above goals. Three major interventions are used for controlling micronutrient malnutrition, these are;

- Supplementation
- Fortification
- Dietary Diversification

Fortification of foods with micronutrients has recently received special attention in Zambia, especially following the success of the sugar fortification with vitamin A in 1998. Another food has been earmarked for fortification, maize meal the Zambian staple food.

#### **Advantages of food fortification**

Food fortification does not require the Zambian population to change their eating habits; thus the “target” population continues to eat the food chosen as a “vehicle”, which once fortified becomes a good source of the vitamin or mineral.

The added nutrient is provided in the diet in low but constant amounts, so there is little possibility of intakes becoming undesirably high.

### **Developing a food fortification programme**

The main objective of a food fortification programme is to increase the level of consumption of the added nutrient(s) to improve nutritional status of a given population. It should be noted that the primary role of food fortification is prevention of deficiency, thereby avoiding the occurrence of disorders that lead to human suffering and socio-economic disadvantages. However, food fortification can also be practised to eliminate and control dietary deficiency and their disorder.

Fortification can either be single or multiple. Single fortification is defined as addition of one micronutrient to a food or food mixture. Multiple fortification is defined as the addition of two or more micronutrient to a food or food mixture.

The important step in developing a generic food fortification programme may involve the following;

- a) **Determination of micronutrient status of a population**  
This involves the determination of the prevalence of micronutrient deficiency in the population. If the data indicates the need, the population must be segmented. The micronutrient intake must also be determined from a dietary survey. The consumption data for potential vehicles must also be determined from a dietary survey. The consumption data for potential vehicles must also be obtained at this stage. The micronutrient availability from the typical diet should also be determined.
- b) **Selection of a food vehicle**  
By selecting the right food vehicle, the need for encouraging individual compliance or changes in the customary diet will be minimised. Selection criteria for food vehicles is related to the consumption, processing, storage and marketing.
- c) **Selection of the fortificant**  
Selection criteria of the fortificant is related to good bio-availability during normal shelf life of the fortified product, interaction with flavour or colour systems, the cost or affordability, free commercial availability, feasibility of addition and dispersion. The fortification technology must be developed or identified at this stage.
- d) **Institutional support**  
The food fortification programme needs the support of government (policy makers and legislators). A successful approach to the micronutrient fortification program in a country is only possible if the participation of the food industry is incorporated. The co-operation of the food industry should be sought at a very early stage of the program development. The mechanism for collaboration between national governments, food industry and its marketing system, non-governmental organisations and the donor agencies must be identified.

- e) **Field trials**  
Well planned field trials must be conducted to determine the efficacy and effectiveness of the proposed fortification programme. These trials may reveal the reaction of the population towards the fortification program proposed.
- f) **Develop standards for the fortified food**  
The standards defining the product characteristics (quality and safety), packaging and labelling is an integral part of the fortification programme. This assists in quality assurance/control and inspection purposes.
- g) **Developing legislation and regulation**  
Effective fortification programme in any country needs to be supported by suitable legislation and regulations for mandatory compliance. To advocate and plan a food fortification programme, it is essential to ensure the existence of mechanisms through which the entire process can be legally controlled.
- h) **Campaigns**  
Education and promotional campaigns help to improve consumer awareness and acceptance. Legislation and regulations when combined with awareness-rising among policy makers and principal players (food industry and consumers) can play an important role in accelerating the fortification programme.

### **Fortified Foods in Zambia**

A number of foods have been fortified in Zambia with the aim of controlling the various micronutrients of public health problems and these are summarised in the Table below.

### 1.3 Sugar Fortification Programme in Zambia

#### Introduction

The high levels (66%) of VAD in Zambia calls for multiple interventions in controlling the deficiency. In the past foods such as margarine and butter have been fortified with vitamin A and mandatory regulations have been put in place to this effect. However, the impact of past intervention for overcoming VAD has been limited due to the following main reasons;

- Lack of a suitable food vehicle for fortification with vitamin A
- Ineffective promotion on the growing, processing, preservation and consumption of vitamin A rich foods
- Lack of policy on breast-feeding and breast milk substitutes
- Inadequate distribution and lack of understanding amongst the health care providers on the problem of VAD and the importance of supplementation

#### Rationale and Justification for fortifying Sugar with Vitamin A

Recognising the urgent need to control VAD in Zambia, the National Food and Nutrition Commission (NFNC) organised a workshop in May, 1996 to deal specifically with vitamin A. The workshop was multidisciplinary in nature and as a result of the workshop a Vitamin A Task Force was formed to immediately look at possible food vehicles for vitamin A fortification.

In trying to control vitamin A deficiency among the population, the Zambian Government decided to negotiate with Zambia Sugar Plc to have the sugar fortified with Vitamin A. This was followed by the enactment of the Statutory Instrument which requires that all the sugar sold on the Zambian market for domestic consumption be fortified.

According to Zambia Sugar Plc (ZS Plc) the company produced 150.5 kilo tonnes of sugar for the financial year ending 31<sup>st</sup> March, 1996. The domestic sale of sugar for the same period was 85.3 kilo tonnes . The unit production and sales are expected to increase yearly by 7-8% for 1997 to 2000.

Zambia Sugar Plc distributes its sugar for domestic consumption in 1 kg, 2 kg , 10 kg and 50 kg packs but all export sales are exclusive in 50 kg packs . Sugar distribution are done through private traders, manufacturers and institutions.

On the basis of Zambia Sugar Plc domestic sugar sales figures of 1996 and for a Zambian population of 9.6 million, the national sugar consumption per person per annum was 8.0 kg

It was justifiable that sugar be used as a vehicle for fortification with vitamin A because of the following

- It is consumed by virtually all Zambian households
- It is centrally processed making fortification and quality control easy
- It is distributed to all parts of Zambia

- Technical know how on fortification is available in South America which can easily be adopted in Zambia
- All domestic sugar consumption needs are produced locally and there is hardly importation
- Vitamin A remains stable in sugar for about a year longer than the period during which sugar is produced and consumed and does not cause any negative changes in the final product.

### **Development of Sugar Fortification**

Fortification programmes require careful planning to ensure that appropriate food vehicles and fortificants are selected to enhance micronutrient status of the target population. It also requires that appropriate quality assurances/control and monitoring systems are put in place. Keeping this mind the following activities were planned to ensure the success of sugar fortification programme.

- a) Establishment of a National Task Force to co-ordinate the sugar fortification programme
- b) Carrying out a baseline survey on sugar consumption and vitamin A intake from foods to compliment existing data.
- c) Updating data on VAD through serum and human milk evaluations
- d) Identifying and quantifying technical needs to initiate sugar fortification programme and for sustainability
- e) Preparing regulation on sugar fortification with vitamin A
- f) Identifying areas for Pilot studies on the effects of fortified sugar
- g) Establishing monitoring systems for regulatory compliance as well as overall product quality
- h) Developing and implementing evaluation systems

### **Responsibilities of the National Task Force**

The National Task Force had the responsibility of ensuring that the above activities were carried out. The members of the Task Force were therefore drawn from various institutions and each had specific roles to play as follows;

- a) **National Food and Nutrition Commission (NFNC)**
  - Provide secretarial services and co-ordinate all activities
  - Source for technical and financial assistance
- b) **Zambia Sugar Plc (ZS Plc);**
  - carry out fortification trials in conjunction with National Institute for Scientific and Industrial Research (NISIR)
  - manufacture and fortify sugar for domestic consumption with vitamin A
  - pack and distribute fortified sugar throughout the country.

- c) **National Institute for Scientific and Industrial Research (NISIR), Food Technology Research Unit (FTRU)**
- Provide technical staff
  - Assist ZS Plc carry out quality control uniformity
  - Evaluate the shelf life of vitamin A fortified sugar
  - Assist ZS Plc in identifying all technical requirements such as glassware, chemicals
- d) **Tropical Diseases Research Centre (TDRC)**
- Conduct surveys on sugar consumption in rural areas in conjunction with NFNC, FHANIS (Food, Health and Nutrition Information System) and FTRU
  - Evaluation of the level of VAD in Zambia before and during the vitamin A sugar implementation programme through serum and human milk analysis in conjunction with FDCL
  - Conduct additional dietary surveys in rural, urban and peri-urban areas in conjunction NFNC, FHANIS and FTRU
- d) **Food and Drugs Control Laboratory (FDCL)**
- Provide technical staff
  - Carry out routine checks on fortified sugar for compliance
  - Carry out supervisory Quality Assurance and Quality Control programme
- f) **Food and Drugs Board (FDB) and Zambia Bureau of Standards (ZABS)**
- Setting up Regulations and standards on fortified sugar with vitamin A
- g) **Health Inspectors, Authorised Officers**
- Carry out routine checks on fortified sugar for compliance
  - Carry out supervisory quality assurance/control programme
- h) **Co-operating Partners**
- USAID, UNICEF, OMNI / BASICS, and now MOST provide financial and technical support for the smooth running of the project

### **Process of Sugar Fortification**

#### a) Nature of Fortificant

The fortificant used in sugar is a special preparation of retinyl palmitate, which contains stabilisers that protect the retinol from both oxygen in the air and ultraviolet light. The fortifying compound presently used is the water-miscible, retinyl palmitate beadlet called “250-CWS”. The retinyl palmitate is produced by Hoffman-La Roche and BASF. The prototype 250-CWS contains 250,000 IU of retinol per gram (75mg/g).

Vegetable oil is used as the adhesive to attach the retinyl palmitate beadlets to sugar crystals. To reduce oxidation of the oil, which would turn the product rancid, an antioxidant suitable for human consumption is added. This addition is done in an

inert atmosphere, generally by bubbling nitrogen into a mixture of oil and an antioxidant.

b) Premix Preparation

To ensure that the correct amount of retinol is the final product, a concentrated vitamin A – sugar premix must be prepared. This step has two additional purposes;

- i) to obtain a product in which the fortificant does not separate from the sugar and
- ii) to dilute the fortificant to facilitate adding the correct concentration of retinol to bulk sugar.

Premix is manufactured using sugar similar to that, which will dilute it at the refinery to produce a homogeneous product.

A rotating 150 kg capacity, V-shaped blender made of stainless steel and mounted on a solid metal base is used to make the premix. It comprises two filling and one emptying gate, which are closed with rubber gaskets locked in place by central screws. The system is operated by an electric control panel. The rotating engine is located at one end of the base.

c) Fortified Sugar Production

The premix received from the production plant should be stored at the sugar refinery in a storage area that meets the same conditions as those at the premix plant. The date of arrival should be registered and the bags stored so that they will be used on a first-in/first out basis.

The premix can be added to the sugar at any point between the centrifuges and the packaging chutes. The usual point for adding premix is before sugar enters the drying turbines, where the mixing action is most intense. This is because retinyl palmitate beadlets segregate from the sugar crystal during the drying stage and are lost in the “dust” that escapes from the dryer.

Premix can be added to sugar in two ways; manually or using an automatic dosifying machine. In manual operation, a worker adds the premix to sugar inside each centrifuge using a container that holds a known weight of premix. This is done immediately before the sugar is emptied from the centrifuge or when sugar begins to pass along the conveyor belt. The automatic procedure requires a dosifier, which dispenses the premix on the conveyor belt leading to the drying turbines at a rate corresponding to the amount of sugar passing along.

*Manual Addition of Premix:* The workers operating the centrifuge should be responsible for adding the premix. Premix is placed in a 10 kg plastic container, located near the worker operating the centrifuge at a distance and height that are easy to reach. Using a calibrated container made of plastic or another stainless material, the worker extracts the correct amount of premix, which is calculated according to the sugar crystallisation yield and the centrifuge’s load weight (dry sugar equivalent). The calibrated premix container should hold the required amount of premix when full

and levelled off. If the sugar refinery has centrifuges of different sizes, each one must have its own calibrated container for adding the premix.

*Automatic Addition of Premix:* The types of dosifier and synchronization system to be used depends, to a large extent, on each refinery's mechanical structure. An inefficient premix addition system will result in variable fortification levels that produce fortified sugar that does not meet established norms.

Recent technological advances in sugar manufacturing have led to development of closed automatic centrifuges, making manual addition of premix impossible, thus, automatic dosifiers have been placed above the conveyor belt going to the drying turbines. Since the drying turbines is an efficient blender, there are advantages to placing the dosifiers before it.

The worker assigned to adding the premix should be trained to check that

- The premix flow from the dosifier is regular
- The unloading canal is not obstructed as sugar passes onto the conveyor belt, and
- The delivery of premix stops when no sugar is passing on the conveyor belt.

#### **1.4 Salt Iodation Programme in Zambia**

After the 1971 national survey which revealed that IDD was a public health problem, there was a need to fortify salt with iodine. Over the past 60 years, several ways of supplementing the diet with iodine have been proposed. A variety of food vehicles such as salt, bread, sweets, milk and water have been tried. Among these, salt has become the most commonly accepted because of its uniformity of consumption, universal coverage, acceptability and simple, low cost technology.

##### Salt Importation

Zambia produces small quantities of salt, most of the salt consumed is imported from neighbouring countries such as Namibia, Botswana and South Africa. In the 1970's there was only one major importer of salt, the National Milling Company (NMC). To respond to need of fortifying salt in, 1975 NMC installed a salt iodisation plant in Lusaka. However, this worked only for a short period before it was abandoned.

With the universal declaration on salt iodation, governments and salt industry representatives from eight Southern African countries, Zambia included, met in Botswana in April, 1992 to promote iodization at the production site of all salt consumed in the region. This meant that all the salt coming in to the country should be iodated at the source of mining.

##### Locally Produced Salt

Salt has been produced in Kaputa and Kasempa districts of Zambia using traditional methods from time in memorial. For example salt production in Kaimbwe salt pan of Kasempa district started in around 1826. The salt is mined in the swampy area where a hot water spring flows. The salt deposit either on the top soil or precipitates on the stems,

weeds and shrubs found in the swamp. The salt solution is absorbed by the pond weed/plant and is later collected, dried and burnt producing some ashes which are rich in salt. Unfortunately, the salt does not contain iodine.

Upon realising that some areas such were producing substantial quantities of local salt, NFNC with the help of UNICEF initiated a local salt iodation programme in Kaputa and Kasempa districts. This was as a follow up to the recommendations made in the 1993 IDD survey report.

In Kasempa, salt iodation started in September, 1998 and by July 1999 there was a record of 137 producers who has taken their salt for iodation. The average amount of salt taken for iodation per person at a given time ranged from 20 to 120 kg. The salt produced in the two districts looks dirty due to impurities. Improving the quality of the salt was recommended as an important aspect of the salt iodation programme.

In 1999, consultant was hired from Ministry of Mines, Mines Development Department by NFNC and UNICEF to recommend ways of improving the quality and quantity of salt which is locally produced in Kasempa district. Among other things the consultant recommended reduction of impurities by improving filtration process, and establishment of a mini-laboratory to check the iodation levels of the salt.

### **Salt Fortification Process**

Most of the salt consumed in Zambia is imported, therefore, is fortified with iodine compounds from the countries of origin. However, there are two districts Kasempa and Kaputa, which produce salt for local consumption. This is not done on a large commercial scale, but rather on a small commercial scale by local families. Therefore salt fortification at the two levels will be discussed separately.

#### Type of Fortificant

Iodine is normally added to salt as the iodate or iodide of potassium, calcium or sodium. The addition of these compounds does not change the colour, appearance or taste of salt. The fortificants commonly used are potassium iodide (KI) and potassium iodate (KIO<sub>3</sub>).

Iodate is more stable in impure salt subjected to poor packaging and humid environmental conditions. Potassium iodate is less soluble than potassium iodide and less likely to migrate out of the bag (Lotfi, et al, 1996).

Potassium iodide is the least expensive but most unstable compound. It can easily be lost if the iodized salt is subjected humid conditions. Excessive aeration, sunlight, heat, relatively high acidity or the presence of impurities in the salt. The adverse effects on potassium iodide caused by oxidation can be reduced by the addition of stabilizers like sodium thiosulphate and calcium hydroxide and/or drying agents such as magnesium or calcium carbonate.

However, in most cases, potassium iodate is the preferred compound because it may not require the addition of stabilizers. The salt fortified with the iodide salts (e.g. potassium

iodide) is called iodised salt, whereas, the salt fortified with iodate salts (e.g. potassium iodate) is called iodated salt.

### **Industrial Salt Fortification Process**

At industrial level for salt fortification there are three different ways used for adding iodine

- a) Dry Mixing: A premix of potassium iodate and an anti-caking agent like calcium carbonate, tricalcium phosphate, or magnesium carbonate is prepared in a ratio of 1:9. One part of the stock mixture is then mixed with 10 parts of salt and the premix is introduced into a “cement” mixture or screw conveyor at prefixed rate. Salt is also introduced into the drum or conveyor. Mixing takes place as the drum rotates or the material moves through the conveyor. This process is suitable for dry powdered salt only. Dry mixing is widely adopted in several countries.
- b) Drip Feed Addition: Drip feed addition is commonly used for iodazation of salt crystals. The salt is fed into a hopper that discharges at a uniform rate into a belt conveyor inclined at an angle. The  $KIO_3$  solution continuously drips at the desired rate onto the salt crystals. The iodated salt fall into a discharge hopper from which it is collected in bags.
- c) Spray Mixing: This is more applied to fine salt. The sheet of salt from the belt discharging into the spray chamber receives a fine spray of  $KIO_3$  solution from two specially designed nozzles at a pressure. The spray nozzles are designed to deliver a flattened spray that spreads over the entire width of the salt stream. The concentration of the solution and the spray are adjusted to yield the required dosage of iodate in the salt. The salt along with the  $KIO_3$ , falls into a screw conveyor and uniformity of mixing is ensured.

### **Local Salt Production and Fortification Process**

Salt production often takes place during the hot, dry season when the solar evaporation of water is rapid and when the demands for agriculture are low. Virtually all operations are carried out by hand, with no modern technology available. No records on production and distribution are maintained, and there is generally no government intervention or control in terms of registration, supervision or taxation.

The salt production and fortification process involves the following;

- a) Salt Production  
Salt is produced by leaching soil scrapping, and ash of burnt matter such as dried algae locally known as Jolela and Mushilapyra respectively in Kasempa district.
- b) Preparation of the filtration bed and filtrate receiver  
Small sticks, stones and sand are spread on top of a basin (filtrate receiving) with a polypropylene bag to prevent the material from escaping.

- c) Dissolution of the salt in the feed material (Jolela and Mushilapya(, leaching and filtration  
The feed materials are placed on the filter bed. Water is poured on the filter bed which dissolves the salt in the feed material. This filtrate (salt solution) drips into the basin (filtrate receiver).
- d) Crystallization of the salt by evaporating the water using firewood  
When enough filtrate is collected in the basin, it is sent for precipitation. Salt crystallization is accomplished by heating the filtrate (salt solution) in the basin, using firewood. The salt solution in the basin is evaporated until salt crystals form and become almost dry.
- e) Sun drying the precipitated salt  
The formed crystals are then sun-dried in an open air by spreading them on sacks.
- f) Addition of Potassium iodate to salt  
To every 20 kg weight of salt, one (01) tea spoon of potassium iodate is added. The mixer top is covered with a lid and the salt is mixed with the potassium iodate for about 10 min. After mixing, a small amount of salt is placed on a clean plate and the reagent is added. This reagent is supposed to change colour to deep blue, if there is enough potassium iodate in the salt. If it does not change colour, another tea spoon of potassium iodate is added and the process is repeated until positive results are obtained.
- g) Packaging of salt  
Salt is normally rapped in leaf wrapping in quantities of about half a kilogram

## SECTION 2

### 2.0 INFORMATION, EDUCATION AND COMMUNICATION (IEC) FOR MICRO NUTRIENTS

#### 2.1 COMMUNICATION

##### 2.1.1 Introduction

The overall goal of Information, Education and Communication effort is to influence peoples behavior and reduce the morbidity and mortality due to micro nutrients deficiency through the dissemination of targeted IEC messages.

##### 2.1.2 Behavior Change

In the communications to increase the consumption and use of micronutrients the objective will involve altering of peoples behavior towards micronutrients. Before attempting to do this, it is important to understand the target audience, what they know, how they feel and how currently behave towards these nutrients.

It is well known that micro nutrients benefits are not appreciated by most people in our communities, the major reasons for this is lack of information and knowledge of what micro nutrients can do in the promotion of health and prevention of diseases. It is therefore our challenge as health worker to bridge this gap.

##### 2.1.3 Process of Behavior Change

For community member to start to appreciate Vitamin A or Iodine and start buying fortified foods there are characteristic steps associated with the process of change

###### *Knowledge*

Knowledge of the benefits of fortified foods by the target audiences is key and starting point for any of them to start seeking fortified foods. If the target audience does not know any benefits for them or their families they may not use fortified foods. Therefore to start the process of change they have to be informed.

###### *Approval*

Knowledge alone will not make our audience change their behavior. For community members to use fortified foods they need to be confident that other people like friends and relatives approve the consumption of fortified foods.

###### *Intention and Practice*

The message and materials produced must appeal to the audience. A mother in Lukulu should identify with the message or find some relevance of the message to her situation, this may motivate them to want to buy fortified sugar or iodated salt. It is there for a challenge for us to make sure the message appeal to a cross section of our community.

###### *Advocacy*

Advocacy is communicating with other people to gain their support for fortified foods and asking them to influence others towards use of fortified foods. To insure that

community member know and appreciate the benefits of the consumption of fortified foods and how important micro nutrients like Vitamin A and Iodine, are in the promotion of good health there is need for advocacy at all levels. Without advocacy at all levels it will be difficult to achieve the intended goals. These level will include Health Center, District, Province, Central and partnerships with other ministries, NGOs and private sector.

### *Approaches*

#### Dissemination of information

Increasing awareness by providing information to the members of the community on the benefits of fortified foods and micronutrients.

#### *Education*

Promotion of learning and acquisition of skills needed to practice a behavior , like looking for the A on the sugar packet.

#### *Entertainment*

Any materials produced for the promotion of micronutrients should be appealing and promote enjoyment, emotional stimulation and excitement, like exposing the community to a message through popular music.

#### *Behavior Change Problems*

Not all people exposed to information will change behavior and adopt the new behavior and therefore it is not every one who will receive information on the benefit of fortified foods will make an effort to buy and use them. The challenge for communication therefore is how to motivate a large percentage of people who will listen to the message adopt these new behaviors.

#### *Communication and Behavior change*

It is important to understand that communications and behavior change is a process. This will occur over a time. Communication consists of wide range of behaviors that include listening, reading , writing and thinking. When communicating with communities on fortified foods we have to allow people to internalize the messages and be able to answer all the question that they may have within the message that we disseminate.

#### *Targets*

It is important segment the audience for fortification messages . This will assist the refining, targeting and channeling the messages to reach a wide range of the target group. The primary target for vitamin A is Children 6 months to 6 years. To reach these we need to use a secondary target which are mothers.

Iodine has a very wide target group which makes it more difficult to make messages specific and targeted.

## **Key Messages**

### **Vitamin A**

**Buy only sugar that is fortified with vitamin A**

**Look for the A on the packet**

**Vitamin A is important for a healthy body, good eye sight and prevention of diseases**

### **Iodine**

**Use only salt that is iodated**

**Check the salt packet for the iodine label**

**Home produced Salt should be iodated**

### *Media Mix*

The communications campaign for fortified food will use variety of media. This will increase message reach and enhance synergy. These will include:

- Radio and TV spots
- Posters
- Pamphlets
- Information Cards
- Stickers
- Danglers

## **SECTION 3.0 LEGAL ENFORCEMENT**

# **THE FOOD AND DRUGS ACT CAP 303**

## **INTRODUCTION TO FOOD LAWS**

### **Objectives of the Food Laws**

The Food Laws are meant to achieve three basic elements:

- a) To protect the health of the consumer
- b) To Protect consumer from commercial fraud. It prohibits the sale of food not of nature substance or quality demanded by the purchaser.
- c) To facilitate trade, both national and international standards play important role in the facilitation of trade.

The first two elements of the Food are the primary purpose of food legislation, hence of concern for the Health Ministries because many human illnesses are food related. Therefore with fortified foods, there is need to ensure that the population is not at risk of receiving toxic doses of any micronutrient.

### **The Principal Food Law**

Under the Food Law issues addressed are:

- a) Legal aspects
  - Penalties
  - Warranties
  - Offences
  - Obstruction
- b) Power to make Regulations/Standards
- c) Subsequent amendments and appeals

### **Food Regulations**

The Food Laws set out board principles while the regulations contain details provisions governing the different categories of the food or its product. When setting Regulations it is important to note that they can be monitored and enforced. Therefore, procedures for monitoring premises where food is prepared, packed, stored or held as well as mechanisms for penalising defaulters must be clearly defined within the Food Regulation.

## **Food Standards**

Standards- This defines the food commodity, its safety, quality and labelling and advertising parameters.

- a) Safety Standards: These are of primary importance to the Health Ministries. Included are standards for toxicological and microbiological hazards and instituting procedures and practices to ensure that the standards are achieved..
- b) Quality standard: Included is food attributes that are of public health and market concern. Government should focus the attention and resources on the public health aspects of quality and on those market-related aspects of quality that will protect consumers against fraud and misleading claims.
- c) Labelling and advertising standards: Consumers must be provided with the necessary information about a product so as to be able to make an informed choice. The standard should also protect the consumers against fraud and misleading claims. Therefore, general labelling and specific rules on nutrition labelling and health claims should apply. However, it is important to note that manufacturers should be allowed to make relevant claims in order to enhance the success of the programme. But care should be taken that these claims do not result in practices that could mislead or deceive the consumer or distort the value of the fortification.

## **Implementation of the Food Laws**

The successful implementation of the Food Laws requires an efficient Food Control Organisation. Basically the Food Control Organisation consists of three basic elements:-

- a) Management: These supervise and administer the Food Control Organisation, develop compliance polices and standards.

- b) Inspectorate:- These are responsible for inspecting food premises, collecting samples and evidence of infringement of Food Laws and Regulations, assisting in prosecution and advising the industry.
- a) Analyst:- These examine food samples sent to the laboratories by the Inspectorate and prepare analytical and evaluation reports, which could form the basis for further action against those who flout the law, they also carry out monitoring and research.

### **Food Laws in Zambia**

The government statement of intent for food control and safety has been and is still “to provide Zambian consumers with a food commodity which when consumed would not cause ill health or harm and that the production and marketing practices took due cognisance of the promotion of health, prevention of contamination and protection of consumers against fraudulent practices which are prejudicial to the consumer.

The above statement is supported by several laws which address food quality and safety issues and these are;

- a) Food and Drugs Act and its Regulations Cap 303
- b) Public Health Act Cap and its regulations Cap 295
- c) Standard Act Cap 416
- d) Food Reserve Act Cap 225
- e) Local Government Act Cap 281
- f) Environmental Protection and Pollution Act Cap 204
- g) National Health Service Act Cap 315
- h) Constitution of Zambia Cap 1
- i) Market Act Cap.....

The Food and Drugs Act Cap 303 and the Public Health Act Cap 295 form the main basis for enforcement of food, since this is where the powers of an inspectorate are derived, hence will be discussed in detail in this manual.

# **FOOD AND DRUGS ACT CHAPTER 303 OF LAWS OF ZAMBIA**

## **1 Introduction**

Zambia has one of the best Food Safety Laws in the Region. The problem has been their enforcement by the “Authorised Officers” who are empowered to enforce these pieces of Legislation. The main purpose of Food Safety Laws are to protect the consumers against health hazards and fraud in the sale and use of food.

It is imperative that those charged with the responsibility of enforcement of these Laws take their mandate seriously in view of the liberalised economy in the country and avoid sub-standard foodstuffs reaching the consumer. The Ministry of Health through its enforcement organs namely the Central Board of Health (CBOH) and Local Authorities ( City, Municipal and Rural Councils) have the mandate to protect the country from unscrupulous traders.

## **2. Objectives of the Food and Drugs Act**

*The main objectives of the Act is to protect the public against health hazards in the sale of food, drugs, cosmetics and medical devices and to provide for matters incidental thereto and connected there with.*

## **3. Components of the Food and Drugs Act**

The Food and Drugs Act is divided into five (05) parts, namely;-

### **a) Interpretation**

i) *‘Authorised Officer’* as stipulated under the Food and Drugs Act

- *Medical Officer of Health (MOH)*----- (for the whole Act.)
- *Health Inspector* -----(for the whole Act)
- *Any suitably qualified person authorised by the Minister or the Local Authority* ----- (for the whole Act)

- *Police Officer* ( above the rank of Assistant Inspector)-----  
(for taking samples and receiving reports from the Food and Drugs Laboratories)
- *An Officer* ( authorised by the Controller of Customs and Excise) ----for taking samples
- *An Inspector* as defined by the Dangerous Drugs Act and may include persons enforcing Pharmacy and Poisons Act who have been specifically authorised by Minister under this Act.
- *Principal Officer* as defined in the Local Government Act---  
---- (for proceedings under Section 30).

**ii) Article**

- Any food and any labelling or advertising materials and anything used for the preparation, packaging or storing of any food.

**iii) Public Analyst**

- Person appointed by the Minister or a Local Authority with the approval of the Minister to act as an Analyst for the purpose of this Act

**b) General Provisions**

- i. Prohibitions against the sale of poisonous, unwholesome or adulterated food.
- ii. Deception in the labelling, packaging, treating, processing, selling
- iii. Standards of food to be complied with
- iv. Prohibition against the sale of food not of the nature, substance and quality demanded
- v. Prohibition against the sale and preparations of food under insanitary conditions

**c) Importation and Warranty**

- i. Importation which does not comply with the provisions is prohibited
- ii. Re-labelling and reconditioning within specified period allowed
- iii. Manufacturer and distributor to give warranty in writing about the nature and quality of food

**d) Administration and Enforcement**

i) Food and Drugs Board

The Board who function were to advise the Minister has never be functional for many years.

ii) Powers of `Authorised Officers` (Section 24)

- Enter any premises and examine anything including taking samples
- Stop or search an Aircraft, ship or vehicle to examine and take food samples
- Open and examine any food receptacle / package
- Examine books or any other records in connection with foods in question
- Seize and detain food as may be necessary if he believes food has contravened the Act.
- Authorised Officers to have Identity Cards
- Reasonable assistance to be given to the Authorised Officer
- Nobody to obstruct Authorised Officer in the course of carrying out his duties
- No false or misleading information to the Authorised Officer

- Seized foods can only be released if satisfied that all provisions of the law are complied with.
- Confidentiality of information collected by Authorised Officer

iii) **Seizures and procedures of disposal**

- Authorised Officer to dispose off articles as he deems fit if the owner consents
- If owner does not consent Authorised Officer to apply to Subordinate Court for the destruction or disposal of seized foods
- No person to remove, interfere with seized foods without authority from Authorised Officer
- Seized articles to be stored where Authorised Officer orders
- Authorised Officer to sample and take these to Public Analyst (Ministry of Health Food and Drugs Control Laboratory)
- Public Analyst to furnish Certificate to Authorised Officer after analysis.
- Director of Medical Services to appoint a Public Officer to procure samples
- Local Authorities to exercise all powers conferred upon it by the Act.

e) **Legal Proceedings**

- i. Power of court on conviction to order licence to be cancelled and foods to be disposed off
- ii. If offence appears to have been committed and supported by the Public Analyst Certificate, Authorised Officer to take proceedings before Magistrates Court.

- iii. Penalties for first offenders are not exceeding 1,000 penalty units or imprisonment not exceeding 3 months. For second offenders not exceeding 2,000 penalty units and imprisonment not exceeding 6 months
- iv. Public Analyst certificate is `Prima facie` in the court of law.

#### **4. Offences and Prosecution Procedure Under the Food and Drugs Act**

- a) Action or conditions which constitute offences under the Food and Drugs Act are set out in Sections 3 to 19, 21, 24 and 28. Prosecutions of offences under Sections 3 to 19 will usually be based on the result of inspection evidence and or laboratory analysis of samples, since these Sections deal mainly with production, composition and labelling requirements of food, drugs, cosmetics and device.

Section 21 states that failure to give a warranty or the giving of false warranty is an offence, but this section only applies to wholesale dealings meant for re-sale and does not apply to retail sales to consumers. It is determined that no warranty. Or a false warranty has been given by the seller of an article, this constitutes an offence under the Act.

- b) Section 24 defines the power of an Authorised Officer and defines what constitutes an offence with regard to persons who obstruct or otherwise hinder the Authorised Officer in the performance of his duties.
- c) Section 28 declares it an offence to refuse to furnish information to the Minister which he/she may require under Section 28 (1) and (2).
- d) When a violation has been established under these categories, Authorised Officers may take proceedings under the Act before a subordinate court.
- e) Section 30, concerning prosecution, states that action based on the Public Analyst examinations of any article to which the Act

applies certifying that an offence has been committed should be taken before a subordinate court having jurisdiction in a place where the article sold was actually delivered to the purchaser or where the sample was taken.

- f) Since certain offences do not require analysis of samples to prove to a violation such as inspection proof of insanitary conditions, failure to give a warranty, presence of foreign matter or hindering an Authorised Officer these offences can be brought before an appropriate court without involvement of the Public Analyst.
- g) Since Section 21 requires that all manufactures and wholesalers give a guarantee or a warranty for goods which they sale to other dealers, it will be necessary in each action to determine which firm involved in a violation is the responsible party and if the warranty exists between the dealer who supplied a sample to an Authorised Officer and the purchased of those goods to the dealer. If the facts show that the dealer purchased in good faith under a warranty merchandise that was in violation to the Act, prosecution of the original seller of the violate goods would be indicated since that seller will have furnished a false warranty.
- h) Prosecuting procedures will vary from Local Authority to Government Authorised Officers. With Local Authorities, a review by the City/Municipal Legal Officer or Town Clerk may be required before action is taken to court. Government Authorised Officers will take action through the office of the Public Prosecutor.

However, in the last few years the Ministry of Health, has trained the Public Prosecutors in the Health Sector from the Local Authorities, Mines and the Ministry itself. These officers need to become proactive in the area of legal enforcement in view of concerns expressed by the top MOH/CBOH leadership, partners and civil society on the poor record of enforcement by the Authorised Officers. The MOH has appointed a co-ordinator for prosecution and his advise should be sought.

## **5.FOOD AND DRUGS REGULATION OF 1978 (Subsidiary Legislation)**

These Subsidiary Legislation prescribe the standards of composition, strength, potency, purity, quality or other property of the article / food.

The Regulations control the type and quantity of food additives that can be added to a food including micronutrients.

The Regulations in addition to the standards also deals with the Food Hygiene aspects of the Food Establishments and under Regulation 410-422 details the conditions which the Licensing Local Authorities should follow when issuing a licence to Food Establishments.

The Food and Drugs Regulations 1978 are still in force although they have been reviewed after extensive consultations with stakeholders. The draft Food and Drugs revised Document has been deposited with the Ministry of Legal Affairs with the view to having it processed as the new Food and Drugs Regulation.

## **6. REVISED FOOD AND DRUGS REGULATIONS OF 2001**

### **6.1 Introduction**

In 1997 the Ministry of Health realised the need to revise the Food and Drugs Regulations of 1978 which were 19 years old at the time. The main reasons for revision were;-

- a) To respond to emergencies requiring quick action to protect the public health.
- b) To accommodate changes and new scientific knowledge
- c) To accommodate changes in processing technologies
- d) To include new foods coming on the market
- e) To develop standard which are in line with the international standards

### **6.2 The Revision**

- a) Arrangement of the Regulations.  
There were no change in the arrangements of the Regulations.
- b) Part1 Preliminary and General:  
This part now deals with food only. Other articles such as drugs and devices have been removed and are to be place in the relevant regulations.
- c) Part II Food:-  
This part has two main components
  - i) Main regulation total number 493
  - ii) Schedules total number 26
- d) Deletion of Standards-  
Some standards were appearing in the in 1978 F&D Regulations do not appear in the revised Regulations.
- e) Modification of standards-  
To some standards modification were made, these included, adding, quality, safety or labelling and advertising standards.
- f) Addition of new standards, food commodities and their standards.

The new commodities included

- i) Legumes and their products
- ii) Game meat and its preparation
- iii) Irradiated foods
- iv) Twenty-Second Schedule Part XV food additives that may be used as water retention agents-phosphates
- v) Twenty-Fouth Schedule Dose limits
- vi) Twenty-Fifth Schedule Food irradiation symbol
- vii) Twenty-sixth Schedule Quality of water for use in food processing plants

## PUBLIC HEALTH ACT CHAPTER 295 OF THE LAWS OF ZAMBIA

### **Objective of the Public Health Laws**

- a) Public Health Act is to provide for the prevention and suppression of diseases and generally to regulate all matters connected with the Public Health in Zambia.
- b) The Public Health Act further seeks to safeguard and promote Public Health and seek to create a physical environment conducive to health.

### **Definitions**

- a) **Public Health**--- is an `ART and `SCIENCE` of;  
Preventing diseases,  
Prolonging life,  
Promoting physical health and efficiency

Through community organised effort for;

- Sanitation of the Environment ( also known as `Environmental Health`)
- Education of an individual in principles of personal hygiene
- Control of communicable diseases
- Organisation of Medical and Nursing services for the early diagnosis and preventive treatment of diseases
- Development of a social machinery which will ensure every individual in the community a standard of living adequate for the maintenance of health.

*(Winslow 1951)*

### **a) Environmental Health` `**

- Environmental Health comprises of those aspects of human health, including quality of life, that are determined by physical, chemical, biological, social and psychosocial factors in the environment.
- It also refers to the theory and practice of assessing, correcting, controlling and preventing those factors in the environment that can potentially affect adversely the health of the present and future generation.

## **Factors Affecting Environmental Health**

Basically these involve all aspects of man`s requirement for living;

- a) **Safeness of the Food**
  - Sources of food
  - Storage of food
  - Preparation, cooking and handling
  - Food Hygiene in food establishments
  
- b) **Safeness of the Air**
  - Pollution sources
  - Occupational hygiene
  - Factories Act compliance
  
- c) **Adequacy and Wholesomeness of Water**
  - Sources of water
  - Siting and selection
  - Sanitary inspections
  - Quality monitoring
  - Operation and maintenance
  
- d) **Adequacy and Soundness of Housing**
  - Siting / zoning
  - Scrutiny of plans
  - Housing standards
  - Overcrowding
  - Sanitation and drainage
  
- e) **Health Conditions of the Surrounding**
  - Solid waste management
  - Statutory nuisances
  - Drainage
  
- f) **Protection from Epidemics and General Education on Matters of Health**
  - Control of infectious diseases

- Control of quarantinable diseases
  - Vector and Rodent control
- g) **Suitability of Premises for Work, Studying and Leisure**
- Working conditions
  - Occupational health
  - Factories, workplaces
- h) **Public Health Nuisances**
- Public Health Act Section 67 (a) – (s)

### **Arrangement of the Public Health Act**

The Public Health Act is divided into 15 parts (Part I – XV). For the purpose of the manual the following parts are of major concern;

- PART I: Preliminaries ( definitions)
- PART II: Administration (repealed by the Act No. 22 of 1995)
- PART IX: Sanitation and Housing (Statutory Nuisances)
- PART X: Protection of Food stuffs
- PART XI: Water and Food supplies

### **Part IX Sanitation and Housing – Statutory Nuisances**

#### a) **General Definition of Nuisances**

*A general definition of a nuisance can be summed up as an “Act not warranted by law or an omission to discharge a legal duty which act or an omission obstructs or causes inconvenience or damage to any member of the Public in the exercise of their rights common to all subjects of the public”.*

In general terms therefore, there are two kinds of Nuisances namely:-

- i) **The Nuisance of Common Law**
- These cover all the General Acts which affect ‘private’ or ‘public’ at large and include such things as:-
- Excessive noise

- Barking dogs
- Uncontrollable children etc. and all other actions which are anti-social and which make life more difficult for others.

#### Remedies for Nuisances at Common Law

These require a private action in Court to obtain an ‘injunction’ which requires the Author of the nuisance to refrain from further offence. Should the offence recur the Author is guilty a Court order and the penalties of these are much greater than simple nuisances.

- iii) **Statutory Nuisances Under the Public Health Act Cap 295**  
 The Statutory Nuisances is a nuisance which is defined by statute whether or not it is a common law nuisance. It is a nuisance which either injures or likely to injure health and which permits a special remedy involving action by the Local Authority or the District health Board rather than by the individual who are involved by the nuisance.

#### Remedies for Statutory Nuisances

Being statutory in nature the above nuisances can only be effectively and amicably dealt with by the judicial system as stipulated in the Public Health Act. Since these Nuisances affects health and that Public Health is threatened an action by the Local Authority District Health Board rather than by an individual is the only course of action to abate the Nuisance.

### **Statutory Nuisances as Provided for Under the Public Health Act**

There has been unsatisfactory record by authorised officers in the field of Law enforcement in most Local Authorities and District Management Board to the extent that most general and food establishments are operating in insanitary conditions and below stipulated standards.

Statutory Nuisances are clearly dealt with in the Public Act Cap 295 under Part IX: *Sanitation and Housing* and all the District Health Management Boards and especially the Local Authorities should become familiar with these provisions if they have to be identified and abated in daily routine environmental health inspections. Below are important sections of the Act which deals in details with the various nuisances.

a) Prohibition of Nuisances – Section 64

No person shall cause a nuisance or permit a nuisance to exist which is or may be injurious or dangerous to health or any land or premises owned or occupied by him under his control.

b) Duties of the Local Authority - Section 65

Both the Public Health Act Cap 295 and the recently introduced national Health Services Act 22 of 1995 have given heavy responsibilities as exemplified in Section 65 and in particular Section 6 (I) under the National Health Service Act as follows:-

“6(I) Every Local Authority shall take necessary and reasonable measures to prevent occurrence of any outbreak or prevalence of any infections, communicable or Preventable diseases to promote Public Health as conferred upon it by Public Health Act or any other written law.....”

c) Health Management Boards to Perform Functions of a Failing Local Authority

Section 6(2) of the National Health Services Act mandates the Management (Health) Boards to perform the functions of failing Local Authority if all facts point to endangering Health.

d) Proceedings at Law - Section 65

The Public Health Act Cap 295 Section 65 authorises the Local Authority to take proceeding at Law against any person causing or responsible for the existing of any nuisance.

It is further advisable to the Local Authority having staff problems (lacking Authorised Officer to use the provisions of the Food and Drugs Act to appoint serving qualified Environmental Health Officers at District Health Boards to assist in routine Environmental Health Inspections whilst their senior staff deal with legal proceedings once it becomes necessary.

e) Nuisances from Unsuitable Buildings - Section 66

It is a further duty of the Local Authority to take action in respect of nuisances arising from erection or occupation of unhealthy dwellings

or premises, erection of dwellings and premises on unhealthy sites, overcrowding etc.

f) List of Statutory Nuisances - Section 67

The following shall be deemed to be nuisances to be dealt with under this part of the Public Health Act and are covered as follows from Sections 67 (1) (a) to (s):-

- i. Any vessel railway carriage or other conveyors in such a state or condition as to be injurious or dangerous to health.
- ii. Any dwelling or premises or part thereof which is or are of such construction or in such a state or so situated or so dirty or so verminous as to be injurious or dangerous to health or which is or are liable to favour the spread of any infectious disease.
- iii. Any street, road, stream, pool, ditch, gutter, water course, sink, water tank, cistern, water closet, earth closet, privy, urinal, cesspool, soakaway pit, septic tank, cesspit, soil pipe, waste pipe, drain, sewer, gabbage, dust bin, dung pit, refuse pit, slop tank, ash pit, manure heap, which is so foul or in such a state or so situated or so constructed as to be offensive or to be injurious or dangerous to health.
- iv. Any Well other Source of Water Supply or any cistern or other receptacle for water whether public or private the water is used by man for drinking purposes or in connection of any Dairy or Milk shop or with the manufacturer of food for human consumption which is polluted or otherwise liable to render any water injurious or dangerous to health.
- v. Any noxious matter or waste water flowing from or discharging from any premises wherever situated into any public street or gutter of any street or into any water course, irrigation channel which is not approved for the reception of such discharge.
- vi. Any stable cowshed or other building or premises used for the keeping of animals or birds which is so constructed or situated, so used or so kept as to be offensive or which is injurious or dangerous to health.

- vii. **Any animal** so kept as to be a nuisance or injurious to health.
- viii. **Any Accumulation** or deposit of refuse, offal, manure or other matter whatsoever which is offensive or which is injurious or dangerous to health.
- ix. **Any Accumulation** of stones, timber or other building materials if it is likely to harbour rats or other vermin.
- x. **Any Premises** in such a state or condition and any building so constructed as to be likely to harbour vermin
- xi. **Any Dwelling or Premises which is:-**
- So overcrowded as to be injurious or dangerous to health of the inmates
  - Dilapidated
  - Defective in Lighting
  - Defective in Ventilation
  - Not Provided with Sanitary Accommodation
  - So situated that it cannot be provided with Sanitary Accommodation
- xii. **Any Public or other Building** which is:-
- So situated
  - So constructed
  - So used or kept, as to be:
  - Unsafe (Engineering Department)
  - Injurious or dangerous to health
- xiii. **Any Occupied Dwelling** for which such a proper sufficient and wholesome water supply is not available within a reasonable distance as under the circumstances it is possible to obtain.
- xiv. **Any Factory or Trade Premises**
- Not kept in a cleanly state
  - Not free from offensive smells arising from any drain privy, water closet, earth closet or urinal

- Not ventilated so as to destroy or render harmless and in offensive (as far as practicable) any gases, vapours or dust or other impurities generated.
  - So overcrowded
  - So badly lighted
  - So badly ventilated
  - As to be injurious or dangerous to the health of those employed therein.
- xv. **Any Factory or Trade Premises** causing or giving rise to smells or effluvia which are offensive or which are injurious or dangerous to health.
- xvi. **Any Area of Land** kept or permitted to remain in such a state:-
- As to offensive
  - As to be liable to cause any infectious, communicable or preventable disease or
  - As to cause injury or danger to health
- xvii. **Any Chimney** sending forth smoke:-
- In such a quantity
  - Or such a manner (low chimney) as to be offensive or injurious or dangerous to health.
- xviii. **Any Cemetery, Burial Place or Place of Sepulture** which is so situated, crowded or otherwise so conducted as to be:-
- Offensive or
  - Injurious or dangerous to health
- xix. **Any Act, Omission or Thina** which is or may be offensive, dangerous to life, or injurious health.

### **Notice to Remove Statutory Nuisance - 68**

- a) The Local Authority or indeed the Health Board if satisfied of the existence of any of the nuisances listed under Part 4 Section 67 shall serve a statutory notice on the **“Author of Nuisance”** (The Author is the person whose act, default or sufferance the

nuisance is caused, exists or its continued or can be the occupier or the owner or any other person). If the owner cannot be found the notice can be served on the owner occupier.

- b) If the nuisance is caused by any defect of a structure or the premises are occupied, notice should be served on the owner.
- c) If the “Author of the Nuisance” cannot be found and it is clear that neither owner or occupier are in any way to blame the Local Authority shall remove the nuisance themselves.

### **Specifications of a Statutory Nuisance Notice (see Appendix II)**

The Statutory Notice shall specify:-

- What is nuisance is
- Period of time given to remove it
- Intervention/works to be done to abate the nuisance (Appendix I)

### **Service of Statutory Nuisance Notice – Section 105**

- a) The above notice and other documents under this Public Health Act Cap 295 may be served in one of the following ways.
  - Personal delivery into the hands of the person whom they are addressed to his residence.
  - Where addressed to the owner or occupier of premises by delivery to some person on the premises.
  - If no person can be found on the premises by fixing to some conspicuous part of the premises (i.e. fixing on front door).
  - By pre-paid post in an ordinary or registered letter.
- b) Registered Post is the best as there is both record of postage and deliver. If the ordinary post is used, obtain a receipt from Posts and Telecommunication company as proof of postage. The date of service shall be deemed to be the day the letter would normally be expected to arrive in the ordinary course of the post.

### **Validity of Statutory Nuisance Notice - 107**

Provided the requirements of the notice are substantially and intelligibly set forth it shall not be invalid if there is small defect in the form of the notice.

### **Procedures in Case of Non-Compliance after Serving a Statutory Nuisance - 69**

- a) Complaint to Magistrate  
If the statutory notice is not complied with the Local Authority/District Health Management Board shall make a complaint to the Magistrate through the available judicial administrative systems.
- b) Issuing of Sammons  
Normally the Magistrate shall issue a summon requiring the Person (Author of nuisance) on whom the notice we served to appear before him.
- c) Court Orders  
After the Court Case, if it has been proved that the alleged nuisance, exists the court shall make a 'Court Order' requiring a person to comply with the requirement of the notice within time specified in the order. The court may impose a fine and may require the payment of costs incurred by the Local Authority or by the court.
- d) Recurring Nuisances  
The same procedure as elaborated above may be followed if this nuisance, though abated is likely to recur and the court may issue another order requiring extra work to prevent the re-occurrence of the nuisance.
- e) Closing Court Orders (Closure of Insanitary Building)  
Where the nuisance is so bad as to render the dwelling or premises so bad for human habitation the court may issue, what is known as a "Closing Order", which prohibits the use of the building until the premised is made fir again.

- f) Opening Court Order  
Once the nuisance has been abated by the Author of nuisance, the court once satisfied may issue another order, the 'Opening Order' terminating the closing order and declaring the dwelling habitable once more.

### **Demolition of Unfit Dwelling Section – 73**

- a) Demolition Court Order  
Where the Local Authority/district Health Board find a Statutory Nuisance in dwelling which is so dilapidated or so defectively constructed or so situated that repairs or alterations are unlikely to remove the nuisance and make the dwelling fit for human habitation a statutory notice should Not be served but the Local Authority/Board should go directly to the court to obtain the "Demolition Order".
- c) Specifications of Demolition Order  
Normally the above order should specify:-
- The date on or before which demolition must be commenced (being at least 30 days from the date of issue of Order).
  - The date on which demolition is to be completed and the rubble removed from the site.

### **Procedures Required from the Authorised Officer with Regard to Statutory Nuisance**

#### *Step one*

Inspect the premises, make notes including details of nuisance and the circumstances surrounding it.

#### *Step two*

Return to office and send a standard informal letter (normal inspection letters) mentioning the nuisance and that it will be reported to the Health Board/Council with a view of serving a statutory Notice if the nuisance is not abated.

#### *Step three*

Include, if deemed necessary, the nuisance on the agenda of the District health Management Team meeting or Health sub-committee in the Local

Authority, also requesting authorisation to continue the legal proceedings if the notice is not complied with.

*Step four*

After the District Health Board/Local Authority has ratified the minutes, revisit the premises to see if the letter has been complied with.

*Step five*

If the letter has not been complied with serve statutory notice.

*Step six*

The day after the notice expires revisit the premises to check with nuisance has been abated.

*Step Seven*

If the “Author of Nuisance” is still stubborn, prepare complaint and present it to the Magistrate Clerk’s office. This must include:-

- (a) Complaint
- (b) Copy of the notice
- (c) Copy of Council/Board minutes authorising service of notice and the taking Legal Proceedings.

*Step Eight*

The Court will then issue a summons to the Author of nuisance and inform the Council Board of the date of hearing.

*Step Nine*

Revisit the Premises before the hearing and if the work is done consider the question of calling off the case or continuing in order to claim expenses.

*Step Ten*

If the work is not done, continue with the case and appear in Court on the specified day.

*Step Eleven*

Once satisfied, the Court will issue Nuisance/Court order to the Author of nuisance to comply with the Local Authority/Board statutory notice.

### *Step Twelve*

Once satisfied the Court will issue Nuisance/Court order to the 'Author of Nuisance' to comply with the Local Authority/Board Statutory notice.

### *Step Thirty*

On expiry of Court Order revisit the premises and if the work has not been done, inform the Magistrates Clerk of the fact, and the Court will follow up with fines for contempt of Court.

### **REMEMBER**

If it is thought necessary the job can be given to a Building contractor or to the Council Works Department and civil action taken against the Author of Nuisance to recover the costs.

### **CONCLUSION**

Experience has shown high degree of compliance once steps are being followed irrespective of outcomes of court decisions.

## **SUBSIDIARY REGULATIONS UNDER PUBLIC HEALTH ACT**

The Minister of Health is empowered by the Principal Act to make Regulations; the following are Regulations under the Public Health Act:-

- Public Health ( **Infectious Diseases** ) Regulation
- Public Health (**Drainage and Latrine**) Regulation
- Public Health (**Sale of ice and aerated** waters) Regulations
- Public Health (**Sale of Bakery** Products) Regulations)uses
- Public Health (**Tearooms, Restaurants, Boarding-Houses and Hotels**)
- Public Health (**Buildings** ) Regulations
- Public Health (**Control of Habitation in Factories, Workplaces, and Trade Premises**)
- Public Health ( **Abattoir and Transport of Meat** ) Regulations
- Public Health (**Milk**) Regulations
- Public Health ( **Ice-cream**) Regulations
- Public Health (**Crematoria and Cremation**) Regulation
- Public Health ( **Food in Airtight Containers**) Regulations

## SECTION 4

### 4.0 QUALITY ASSURANCE/CONTROL AND MONITORING

#### 4.1 Introduction

Establishing a food fortification programme would be incomplete if the efficiency of the intervention is not determined. The efficiency of fortification is determined. The efficiency of fortification is determined through quality control and monitoring.

*Quality Assurance/Control:* refers to the procedures need to guarantee that the premix and fortified food meet the stipulated norms at the site of production.

*Monitoring:* The process of determining the adequacy of fortification at the wholesale, retail and household level and includes inspection activities at production and retail outlets.

The quality assurance/control and monitoring systems for fortification programmes do not only involve the means to ensure that food meets the quality standards upon completion of the production process but also include state inspection and monitoring activities of the fortified food in production, distribution and marketing centres. The overall concept is a continuous process that is complemented by the *process surveillance and evaluation system*. The objective of this system is to measure the *process indicators* which measures the quality of food fortification at the consumer level and *impact indicators* which are the biological effects on humans attributable to the food (Appendix...).

Obtaining impact indicators is a function of *epidemiological surveillance*, which can be as extensive and complex as the food fortification programme quality assurance and of monitoring systems themselves. It is important to understand that the final test of the food fortification programme efficiency is its effectiveness in achieving positive physiological changes within the population.

Ideally food producers assume most of the responsibility for food quality assurance which the state is responsible for monitoring quality by ensuring that products comply with the set standards and what is stated on the label. However, this ideal situation is far removed from the reality because once food products are marketed little can be done of their level of fortification is inadequate, as mechanisms to ensure compliance with the low are weak. Given the current degree of industrial development and the limited capacity of governments to control food quality, constant monitoring of the production process at factories and by customs authorities at points of entry are required. Consequently, the need for state participation at the level of production and at the time food imports are received at customs cannot be over emphasised.

#### **4.1.1 Quality control and assurance**

The basis of any quality assurance systems is constituted by producer's quality control and quality assurance activities. Both should be designed in such a manner as to facilitate quick and timely correction providing written documentation of all activities carried out in this regard. Quality control is defined as the techniques and assessments used to document compliance with established technical standard through the use of objective and measurable indicators, while quality assurance refers to the implementation of planned systematic activities necessary to ensure that products or services meet quality standards.

One important element of quality control and assurance involves ensuring the quality of micronutrient compounds and their proper storage and handling at production sites. Although these products are generally imported from reputable companies and rarely pose any problems, it is always recommendable to require a quality assurance certificate, and to conduct chemical analysis with a view to verify their vitamin content.

With respect to fortification procedures, the most practical cause of action for industry is to introduce quality guidelines for food fortification within routine quality control procedures of other product characteristics. Analytical methods that provide fast information enabling procedures of other product characteristics. Analytical methods that provide fast information enabling procedures to make corrections during the process should be used. Producers must record the results of analysis as part of their control practices. Documentation of results of analysis is extremely important as to a large extent, Government role is based on reviewing producer quality assurance and control documentation.

#### **4.1.2 Quality Inspection and Technical Auditing**

Quality inspection and technical auditing activities on foods at production centres (processing plants, fortification sites and packaging facilities) and at the point of entry for imported foods need to be carried out periodically.

*Quality Inspection-* The act of measuring, examining, testing or verifying one or more characteristics of a product or service for the purpose of comparing results with established requirements.

*Technical Auditing-* These are systematic and independent examinations aimed to determine if the activities and results associated with product quality meet pre-established requirements and further, that these activities have been effectively implemented and achieved the proposed objectives.

Due to constraints met by developing countries such as lack of sufficient human and financial resources it is generally not possible for them to comply with international standards that require systematic food sampling during each quality- monitoring visit, as it is required by technical norms. Thus CORROBORATING TESTS have been proposed as more simple yet equally effective means to achieve this objective. CORROBORATING TESTS – have been defined technical assays conducted on a small

number of individual samples in order to quickly verify that the information on product labels is consistent with product content. The results obtained from these tests are complemented by technical auditing of the producer quality assurance mechanisms. Therefore, the emphasis of quality inspection and technical auditing emphasises more on confirming of fortified foods rather than on analytical verification of product compliance with standards in a statistically representative number of samples. However, when circumstances warrant, it may be appropriate to require formal statistical sampling in accordance with the criteria established by international organisations, for example the CODEX ALIMENTARIUS, in order to determine whether or not a product meets the conditions set out in technical standards. Examples of such situations might include attempts to have the source of corroborating test errors, or information on product labels that merit sanctions.

With respect to both pre-packaged and bulk imported foods, these must undergo a similar quality assurance process to described locally produced foods before being released from customs warehouses. This should be based on corroborating tests. In this case, a quality assurance certificate issued by the country of origin would be used in place of the quality control and assurance documentation required by domestic producers. In one event that a food importer contests a decision taken by food safety authorities, it may request a quality audit for compliance assessment, the cost of which is borne by the importer.

#### **4.1.3 Monitoring**

Monitoring refers to the periodic and systematic verification of quality from the moment food is produced or imported to the point of sale (marketing stage). Monitoring provides an adequate mechanism for ensuring the quality of fortified foods reaching consumers, as well as means of determining the efficiency of food safety units actions and quality assurance activities at production centres.

If a country is able to carry out food sampling at distribution and monitoring centres this helps verify the quality of product fortification products that fail to meet standards at this level warrant a quality audit for compliance assessment at production centres responsible for the brand in question. The use of fast analysing qualitative field kits can be used to detect the presence of a particular nutrient in a food product. However, it is important to bear in mind that more intensive qualitative tests are needed to justify the inspection of sanctions.

#### **4.1.4 Process surveillance and evaluation system**

Process surveillance and evaluation system while not an integral part of the quality assurance and monitoring systems for food fortification programmes, is nevertheless useful for documenting programme, development and its effects on the health of the population. State nutrition departments in co-operation with other government agencies (e.g. bureau's, of statistics, and census, academic institutions, consumer protection groups, non-governmental organisation (NGOs) as well as regional and international technical co-operation agencies, should ideally be responsible for process surveillance and evaluation of food fortification programme at consumer level. For this activity, it is recommended that samples of fortified foods be collected from households throughout

the country on an annual basis, employing a sampling framework that is representative of the country as a whole. Moreover, regional sampling should also be used whenever possible, samples can be analysed in a government laboratory, or that of any organisation, although it is important that the analysis be conducted in only one or very few laboratories in order to reduce variations attributed to the use of different laboratories and to improve result forecasting.

#### **4.1.5 Basic elements of the system**

The following five basic elements should be incorporated in the quality assurance and monitoring systems.

a) Fortified foods to be pre-packaged and labelled for retail sale  
To establish an effective quality assurance and monitoring systems product labels should clearly disclose the product responsible for the product and also help consumers to identify fortified food brands.

b) Fortified food product labels to indicate the guaranteed date of minimum fortification level

A minimum level micronutrient content be adopted to remain in force throughout the entire marketing stage of fortified food products. It is also necessary to include the guaranteed date of minimum fortification level on the product label. The term guaranteed date of minimum fortification level is similar to yet different term, the minimum “expiration date” recommended by the CODEX ALIMENTARIUS for perishable food product. This term is not very useful for most fortified foods, because the “useful life” of them is very long e.g. in the case with salt and sugar, whose extensive storage life for .....the stability of added micronutrients. For this reason, the term guaranteed date of minimum fortification level is proposed specifically to refer to nutrient stability in fortified foods specifically to refer to nutrient stability in fortified foods.

The recommended establishment of a minimum level of micronutrient, content facilitates interpretation of results and ultimately governments monitoring tasks. However, in order to avoid excess nutrient levels in fortified foods, the maximum tolerable level should be used as a guide for quality control and inspection, purposes which defines the acceptable range (minimum and maximum levels) of micronutrient content. It is important to emphasise that the inclusion of a guaranteed date of minimum fortification level protects producers with respect to their obligation for ensuring the quality of their products and thus provides an incentive to include this date on food packaging labels.

c) Quality control founded of fast analysing methodologies

The results obtained from quality control should provide a basis for timely corrective decision – making. It is crucial to provide producers with fast methods of analysis. Such methodologies can be quantitative in nature, for example those used in the production of iodised salt or “semi-quantitative” as those used in vitamin A fortified sugar and flour fortified with vitamins of the B-complex

group. With respect to semi-quantitative methods, ..... should be taken to ensure that these tools have the sensitivity required to differentiate among critical indicator levels of the nutrient in question, but above all else the size of the sample analysed must be representative when semi-quantitative analytic tests must be carried out, it is important to determine the actual micronutrient content of fortified food at periodic intervals. In this ensure, the state can collaborate with producers using quantitative methods to measure the micronutrient content of food samples obtained in quality inspection and technical auditing visits.

d) Inspection and process surveillance founded on quantitative analytical methodologies

When, for legal purposes the state verifies the level of fortified food compliance with technical specifications, it should ..... Do this task the greatest precision possible and employ quantitative analytical methods. From a public health public perspective, it is important to determine the effectiveness and efficiency of food fortification programmes. Consequently not only is it crucial to determine coverage, but also the quality of fortified food products. For this reason, qualitative analytical methods are recommended.

e) Programme supervision by a national food fortification committee

Adequate supervision and documentation, quality inspection, technical auditing and monitoring activities, process surveillance and evaluation activities are very important in food fortification programmes. National food fortification committees must be established, which would be made up of representatives from the industry, officials of government agencies responsible for programme supervision and evaluation, and advisors of national and international technical co-operation agencies. Such a committee should provide a forum for discussing problems that arise and seek their solutions, preferably through consensus. These committees would also be charged with general supervision of programmes, issuing and disseminating periodic reports on programme status. Appendix... provide a diagram with the proposed flow of information to be established at these institutions.

### **4.3 Food Inspection Protocol**

#### **4.3.1 Introduction**

- Food and Drugs Act Cap 303 Section 24 (1) provides four basic authority for plant inspection and authorises him/her to enter any premises at any reasonable time for plant premises inspection.
- Under this Section the, Authorised Officer is also empowered to seize and detain for such time as may be necessary any article which he/she deems has contravened to Act or Regulations.
- The Authorised Officer in the inspection process has power of collecting samples in order to assist identify articles/food which violate the Food and Drugs Act and Regulations.

#### **4.3.2 Objective of Inspections**

The purpose of food establishment inspections and food sampling basically to determine if foods are in compliance and can also be undertaken for issue or renewal of licence.

#### **4.3.3 Management Relations**

- During inspection, the owner, agent or operator of the establishment should be approached in an authoritative, cordial and dignified manner .....the normal identification protocol (name, organisation and purpose of the visit).

#### **4.3.4 Inspection of the Manufacturing Establishment**

The plant infrastructure with the usual “wall-floors-roof-system, should be followed by evaluation methods, facilities and control used in the manufacture and storage of food. Compliance with the Act or Regulations to ensure consumer protection is the ultimate aim. Special attention be paid to the following parts.

- Raw materials (their source and storage conditions).
- Manufacturing process (to identify critical control points \_CCPs)
- Quality control |(what quality controls are put in place and functionality).

#### **4.3.5 Inspection at wholesale, Warehouse and distribution Points**

The objective is to identify and remove foods which violate the Act, Regulation or Statutory Instruments (SI). For sugar , it is important to satisfy oneself whether it is meant for domestic consumption (which should be fortified with vitamin A) or for food manufacturing. Re-conditioning and re-labelling within specified period is allowed.

- Always report any packaging or re-packing operations for surveillance and sampling to determine compliance with the provisions of the Act.
- Description of the insanitary conditions as provided for in the Food and Drugs Regulations 410 – 422 on food hygiene is a must.

In the distribution, when foods has violated the Act, Regulation or SI, give consideration for follow up.

The violative mecharidise should be removed through either voluntary removal or legal process using the necessary *seizure* and *disposal forms* suggested in the Food Inspection Manual.

#### **4.3.6 Inspection at Retailers**

In addition to the general “wall-floor-roof” inspection system consideration should be made to sample and remove the violative foods from reaching the consumers as this is the last point of check. As for sugar and salt the provisions of packaging, labelling and fortification and composition details should be observed.

#### **4.3.7 Inspection at Households level**

Since sugar and salt are normally re-packed at this level, the Authorised Officers should make sure that only fortified salt and sugar are used. Evidence should be found that the population have been educated to use only sugar and salt which is fortified.

#### **4.3.8 Health Checks at Border Controls**

- Under the Food and Drugs Act Cap 303 Section 2 officers of the Zambia Revenue Authority (ZRA), authorised by the Controller of customs are empowered to collect samples as advised by the relevant health officials.
- Experience has shown that the ZRA staff are inadequate in number at borders and it becomes imperative that the health inspectors from the MOH/CBOH and the Local Authority take up the responsibility of sampling.
- The samples are normally done when the bill of Entry is submitted by the Inspector or his agent, and that an information from the MOH/CBOH on a particular product has been suspected as having violated the legal provisions on as a routine food safety monitoring control.
- Pending an analysis by the Public Analyst, the goods may be released to the Inspector with an embargo by the ZRA that goods cannot be distributed till the results are known.
- The samples should be sent to the Ministry of Health Food and Drugs Control Laboratory. Plans are under way to operationalise Livingstone, Chirundu, Chipata, Nakonde and Mufulira districts to Food and Drugs Laboratories.
- Upon receipt of the results, the importer should be informed accordingly for sugar or salt which are violations of remediable nature like re-conditioning, re-labelling etc. the goods can be released on condition that those are first re-conditioned and re-labelled to the satisfaction of the Authorised Officer.

## SECTION 5

### 5.0 HAZARD ANALYSIS OF CRITICAL CONTROL POINTS (HACCP)

#### 5.1 Introduction

There is an international movement towards a food safety assurance and regulatory scheme based on the principle of HACCP. For example, the European Union (EU) has adopted several product specific (vertical) directives that will require specific foods introduced into commerce within the EU (including imports) to be product in accordance with HACCP principle. Such directive include:

- Directive on fishery products (91/93/EEC)
- Directive on milk, heat-treated milk and milk products (92/46/EEC)
- Directive on meat products (92/5/EEC)

The EU has also adopted a “horizontal” directive (93/43/EEC) which require consistency with HACCP principles for a wide range of food items. Countries outside the EU e.g. Australia, New Zealand, Canada, Japan, Egypt, South Africa and many others have also adopted or are considering HACC-based food safety control systems.

The growing importance of HACCP as a tool to judge the acceptability of food traded internationally is illustrated by agreements and treaties that support the General Agreement on Tariffs and Trade (GATT). The agreements give guidance to GATT nations about how to establish sanitary and phytosanitary requirements without creating technical trade barriers (an illegal practice under the terms of these agreements).

#### 5.2 What is HACCP

HACCP is a food safety management system, which concentrates prevention strategies on known hazards and the risks of them occurring at specific points in the food chain. It is this specificity which makes HACCP so effective and the approach easily integrates into Total Quality Management or ISO 9000 (International Standard Organisation). Developing HACCP assist companies to comply with legislation, support due diligence and fulfils customer requirements for a food safety management system (Dillon and Griffith, 1996)..

#### 5.3 Origins of HACCP

The concept was began in 1958 by Pillsbury company to describe the systematic approach to food safety it developed in response to requirements imposed by National Aeronautics and Space Administration (NASA) and the US Military Natick Laboratory for foods produced for space program. In order to approach the goal of 100% assurance that these foods would be safe to consume, a system had to be developed which went well beyond the limited effectiveness of sampling and analysis finished goods for the presence of hazardous biological, chemical or physical hazards.

The HACCP concept was first published in 1971 in the USA by H E Bauman and other scientists at the Pillsbury Company in collaboration with NASA and US Laboratory Military Natick Laboratory. In 1985, there was a recommendation of the use of the HACCP system by the National Academy of Science (NAS). International Commission on Microbiological Specifications developed the HACCP system to seven principles for Foods (ICMSF) and National Advisory Committee on Microbiological Criteria for Foods (NACMCF). Worldwide, the system became used and the FAO/WHO Codex Alimentarius incorporated the seven HACCP principles in the Codex. By 1993, the EU as well, introduced regulations such as EC 93/94 recommending the use of HACCP in food production.

#### **5.4 The Need for HACCP System**

The widespread public health problem of food borne diseases and new challenges have prompted for the consideration of adopting a HACCP based food safety system. The needs therefore includes;

- a) Increasing number of new food pathogens
- b) Increasing public health concern about chemical contamination
- c) Increasing number and diversity of new food products
- d) Increasing volume of world traded food
- e) Increase in the number of vulnerable people
- f) Increased knowledge and awareness of the serious and chronic health effects of food borne diseases
- g) Increased consumer awareness of food safety
- h) Increased awareness of the economic consequences of food borne diseases
- i) Introduction of new technologies in food processing
- j) New consumer request for food quality and safety
- k) Changing lifestyles
- l) Increased tourism and international trade in foodstuffs
- m) Lack of or decreasing resources for food safety

#### **5.5 HACCP Prerequisite programmes**

Each segment of the food industry must provide the conditions necessary to protect food while it is under their control. This has traditionally been accomplished through the application of Good Manufacturing Practices (GMP's). These practices and conditions are considered to be pre-requisite to the development and implementation of effective HACCP plans. In the Food and Drugs Regulations these prerequisites are covered under Food Hygiene, Regulations 410 to 422 It is imperative that the food industry has the prerequisite in place for a HACCP plan to be effective.

Below is a summary of the prerequisite programs which a food industry should undertaken and what the food inspector should verify that are in place during inspection.

- a) *Facilities:* The establishment should be located, constructed and maintained according to sanitary design principles. There should be linear product flow and traffic control to minimise cross- contamination from raw to finished products.
- b) *Supplier Control:* Each facility should ensure that its suppliers have in place effective GMP and food safety programs. These may be the subject of continuing supplier guarantee and supplier HACCP verification.
- c) *Specifications:* There should be written specification for ingredients, products and packaging materials.
- d) *Production equipment:* All equipment should be constructed and installed according to sanitary design principles. Preventative maintenance and calibration schedules should be established and documented.
- e) *Cleaning and sanitation* All procedures for cleaning and sanitation of the equipment and the facility should be written and followed. A master sanitation schedule should be in place.
- f) *Personal hygiene* All employees and other persons who enter the manufacturing plant should follow the requirements for personal hygiene
- g) *Training:* All employees should receive documented training personal hygiene, GMP, cleaning and sanitation procedures, personal safety, and their role in the HACCP program
- h) *Skilled Manpower:-* The involvement of qualified/skilled manpower in the food industry gives a higher chance of success of the HACCP system
- i) *Chemical control* Documented procedures must be in place to assure the segregation and proper use of non-food chemicals in the plant. Those include cleaning chemicals, fumigants, and pesticides or baits used in or around the plant.
- j) *Receiving, storage and shipping* All raw materials and products should be stored under sanitary conditions and the proper environmental conditions and the proper environmental conditions such as temperature and humidity to assure their safety and wholesomeness
- k) *Traceability and Recall* All raw material and products should be lot-coded and a recall system in place so that rapid and complete traces and recalls can be done when a product retrieval is necessary
- l) *Pest control* Effective pest control programs should be in place

In general Good Manufacturing Practice (GMP), includes, hygienic practices and cleaning and disinfection, in-factory monitoring, inspection and checks and end product analysis by examining a representative samples.

## 5.6 Essential Knowledge

The first step towards establishing the HACCP system is an understanding of the types of hazards that cause foodborne diseases, illness or injury. Similarly in order for to use HACCP as an inspection tool, inspectors will need to have ample knowledge and understanding of the type of hazards and how they can be controlled.

### 5.6.1 Types of Hazards in Foods

There are three main types of hazards in food:

#### a) Biological Hazards

##### Common Biological Hazards

---

###### Bacteria

<i>Clostridium botulinum</i>	<i>Clostridium perfringens</i>
<i>Salmonella spp</i>	<i>Listeria monocytogenes</i>
<i>Shigella spp</i>	<i>Vibrio cholera</i>
<i>Cibrio parachemolyticus</i>	<i>Brucella sp</i>
<i>Camplobacter sp</i>	<i>Streptococcus sp</i>
Enterovirulent <i>Escherichia coli</i> group	

###### Parasitic Protozoa and Worms

<i>Giardia lamblia</i>	<i>Entamoeba histolytica</i>
<i>Cryptosporidium parvum</i>	<i>Cyclospora cayetanensis</i>
<i>Anisakis sp and related worms</i>	<i>Diphyllobothrium spp</i>
<i>Nanophyetus spp.</i>	<i>Eustrongylides sp.</i>
<i>Acanthamoeba and other free- living amoenae</i>	
<i>Ascaris lumbricoides and Trichuris trichiura</i>	

###### Viruses

<i>Hepatitis A virus</i>	<i>Hepatitis A virus</i>
<i>Rotavirus</i>	<i>Norwalk virus group</i>
<i>Other viral agents</i>	

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#### b) Chemical Hazards

##### Types of Chemical Hazards

---

1. Agriculture Chemicals: These types of compounds are pesticides, antibiotics, growth stimulators, growth hormones and fertilizers
  2. Industrial Chemicals: these include cleaners, and sanitizers, materials used in equipment as oils, gasoline, lubricants and greases, ammonia and polychlorinated biphenols (PCB's)
  3. Environmental Contaminants: These includes chemicals compounds such as lead, cadium, mercury, arsenic and PCB's
  4. Food Chemicals: These include all food additives when used in excess.
  5. Naturally occurring toxicants: These are products of plant, animal or microbiological origin a for example , mycotoxins.
-

c) Physical Hazards

Common Types of Physical Hazards

---

Glass	Wood
Stone	Metal
Insects	Bone,

---

5.6.2 Food technologies and effect on hazards

In order to carry out an effective HACCP inspection, the inspector needs a good understanding of the Food technologies and their effect on the identified hazards (Motarjemi *et al*, 1995). Food technologies play a pivotal role in ensuring food safety and preventing foodborne diseases. However, there are some hazards which can not be eliminated by any type of technology hence such hazards have to be prevented from entering the food chain.

Common Technologies Used in Food Processing

- 
- Heat
  - Refrigeration
  - Packaging
  - Drying
  - Use of salt/sugar
  - Acidification/fermentation
  - Hygienic design of food processing equipment
- 

5.7 Definitions

The following terminologies are important in understanding HACCP

*Hazard* – The potential to cause harm. This may be an object, Examples

- (a) Bacteria, toxin, virus, parasite, chemical or physical hazard.
- (b) Operational malpractice or other operations can also constitute a hazard if they lead to unacceptable contamination or growth and survival of organisms or micro-organisms

*Critical Control Point (CCP)* A point, step or procedure at which control can be applied and a food safety hazard can be prevented, eliminated or reduced to an acceptable level.

*Risk* The chance (probability) that a given hazard will occur. Judgement of risk should be made so that level of concern for CCP can be made.

*Preventative measures:* Activities that eliminate hazards or reduce occurrence to an acceptable level.

Monitoring observations or measurements to assess whether preventive measures at a critical point and being implemented effectively

*Critical limit*{ The value of a preventative measure, determined during monitoring, that distinguishes acceptable and unacceptable

## **5.8 HACCP Principles**

The HACCP which identifies specific hazard(s) and preventative measures for their control consists of seven (07) principles.

### Principle 1 Hazard Analysis

The process of identifying hazards associated with the food under consideration and deciding which are significant and must be addressed in the HACCP plan.

### Principle 2 Determine Critical Control Points (CCPs)

These are points, steps or procedures in the food process at which control can be applied to eliminate or minimise the likelihood of the hazard to occur.

### Principle 3 Establish Critical Limits

These are maximum or minimum values to which a biological, physical or chemical parameter must be controlled at a critical control point to prevent, eliminate or reduce to acceptable level the occurrence of the identified food hazard.

### Principle 4 Establish Monitoring Procedure

Planned sequence of observations or measurements are conducted to assess whether a CCP is under control and to produce an accurate record for future use in verification.

### Principle 5 Establish Corrective Actions

Actions to be taken when monitoring indicates that a particular CCP is not under control.

### Principle 6 Establish Verification Procedures

These include supplementary tests and procedures to confirm that the HACCP system is working effectively.

### Principle 7 Establish Record-Keeping and Documentation Procedures

Records and documentation concerning all procedures and application of all these principles.

## **5.9 HACCP Plan Implementation**

The application of HACCP principles requires that the following steps be carried out in a logical sequence.

Step 1            Select an assemble an HACCP team

It is essential that the right blend of expertise the consist the team as these will collect collate and evaluate technical data and identify hazards and critical control points

- The following people constitute the team
  - Quality assurance / control staff
  - Production personnel
  - Engineer
  - Microbiologist

Note that in small companies one person may fulfil several roles or even constitute the whole team. Where such expertise is not available on-site, expert advise should be obtained from other sources.

Step 2:            Describe the Product

A full description of the product should be drawn up, this includes information on composition , processing, packaging, storage and distribution condition, required shelf life and instructions for use.

Step 3:            Identify Intended Use

The intended use should be based on the expected uses of the product by the end-user or consumer. These may include, hospital, children, general population, old

Step 4:            Construct Flow diagram

The flow diagram should be constructed by the HACCP team. The flow diagram should cover all steps in the operation.

Step 5            On Site Confirmation of Flow Diagram

The HACCP team should check the following;

- correctness of information
- whether important information was not overlooked
- all periods of operations and cleaning and also during idle hours
- and the team should discuss practises with the operator.

Step 6:            Identify and list all relevant hazards and preventive measures  
(Principle 1)

The HACCP team should list all the biological, chemical or physical hazards that may be expected to occur at each. Conduct a hazard analysis to determine which hazards are of such a nature that their elimination or reduction to acceptable levels is essential to the production of a safe

Once the hazards and how they get into the food have been identified then preventative measures are actions or activities that can be used to prevent or eliminate a food safety hazard or reduce it to an acceptable level.

Step 7            Identify CCPs (Principle 2)

The determination of a CCP in the HACCP system can be facilitated by the application of a decision tree, which indicates a logic reasoning approach. CCPs can be related to;

- Raw materials
- Locations
- Processes
- Procedures
- Practices
- Product formulations

Step 8            Establish Critical Limits for Each CCP (Principle 3)

Critical limits a criterion which separates acceptability from unacceptability  
Critical limits can be:

- Values of pH Aw (water activity) temperature, time
- Maximum residue limits
- Maximum level (of contamination)
- Limits in microbiological criteria
- Level of cleanliness
- Sensory parameters such as visual appearance and texture

Step 9:            Establish a Monitoring System for each CCP (Principle 4)

Monitoring is the series of observations or measurement to ensure that the preventative measures are being implemented correctly. Monitoring should therefore be able to detect loss of control at a CCP.

Step 10            Establish Corrective Actions (Principle 5)

Corrective actions should ensure that only safe products reach the consumer.

- Actions to be taken when the results of monitoring at the CCP indicate a loss of control.
  - a) Immediate action to be taken, who is to be informed and the type of report to be produced.
  - b) What to do with the product that has been produced.
  - c) Investigation of how loss of control has occurred.
  - d) Who is to assume responsibility for decision making

Step 11            Establish Verification Procedures (Principle 6)

Establish producers for verification that the HACCP system is working correctly. Monitoring and auditing methods, procedures and tests, including random sampling and analysis, can be used to determine if the HACCP system is working correctly.

## Step 12      Establish Documentation and Record Keeping

Efficient and accurate record keeping is essential to the application of a HACCP system. These include:

- Records – Nature, source and quality of raw materials
- Processing records – include storage and distribution
- Cleaning and disinfection record
- Product safety decisions
- Review and verification data
- Records of modification to the HACCP

### **5.10 HACCP as an Inspection Tool**

Legislative or regulatory objectives of HACCP plan should concentrate on what is to be achieved and not how they should be achieved. The major role of regulatory agencies for HACCP is to verify that the food industries are in compliance with the regulations. Agency verification would include the following;

- a) Review of the HACCP plan
- b) Review of the CCP records
- c) Review of and determination of the adequacy of corrective actions taken when a deviation occurs
- d) Review of the critical limits
- e) Review of other records pertaining to the HACCP plan or system
- f) Direct observation or measurement at a CCP
- g) Sample collection and analysis to determine the product meets all safety standards
- h) On-site observations and record review

### **5.11 Limitations of HACCP**

Despite, currently HACCP being regarded as the best system available for designing programmes to assist food firms to produce safe foods, it has its own limitations. These include;

- a) HACCP requires the education of non-professional food handlers, especially in the food services and homes; the failure of these individuals to get a proper understanding of HACCP could lead to its failure.
- b) To be effective, this concept must be accepted not only by food processors but also by food inspectors and the public. Its ineffective application at any level can be detrimental to its overall success for a product.
- c) It is anticipated that experts will differ as to whether a given step is a CCP and how best to monitor such steps. This has a potential of eroding the confidences of other in HACCP.
- d) Adaptation of certain hazard agents such as micro-organisms can cause difficulties in setting up of critical limits in a HACCP plan

## SECTION 6

### 6.0 LEGAL PROVISIONS ON THE STANDARD OF SALT AND SUGAR

#### 6.1 SALT

##### 6.1.1 Introduction

The problem of goitre in Zambia and a range of physiological and mental handicaps can not be over emphasised and the fortification of salt to overcome these health problems need to be supported.

##### 6.1.2 Regulation on Salt

Under the Food and Drugs Regulations of 1978 No 335 the standards of salt were further re-examined and articulated in the Food and Drugs Regulations 1994 and issued under SI No 97 of 1994 which is appended to this manual

##### Standard for Salt

Under SI No 97 of 1994 salt is solid, white crystalline sodium chloride and shall contain;

- a) not less than 97.0% w/w sodium chloride
- b) not more than 45 w/w moisture
- c) not more than 0.25 w/w of matter insoluble in water
- d) iodine in form of potassium iodate at levels indicated below:-

Place	As iodine (ppm)	As Potassium iodate (ppm)
At ex-factory	80 - 100	135 - 168
At port of entry into Zambia	50 - 80	84 - 135
At retail sale	30 - 50	50 - 84

##### Labelling

The label declaration applied to a retail packet and bulk sack or containers of salt shall carry the following additional information;

- a) the words “**IODATED SALT**” in bold letters
- b) levels of iodine in parts per million (ppm)
- c) lot or batch number and
- d) expiry date (best before..).

##### 6.1.3 Monitoring of Salt Standards

What is good in accordance with laws of the country may not be good in accordance with the laws of another.

Great vigilance is required from the Health Inspectors in respect of imported goods and locally manufactured salt especially in Kaputa and Kasempa districts to ensure they comply with the laws of the Food and Drugs in Zambia.

##### Registers of Food Safety Monitoring

The Health Inspectors shall maintain registers pertaining to food safety monitoring including sampling schedules, results and action. Some information for those registers should include:-

- Type of food establishment
- Schedule of food safety monitoring including sampling
- Results and action on violative foods
- Seizures and disposal information
- Legal enforcement information – (nature and outcome of the cases handled).
- Any other information to facilitate effective food safety monitoring system.

In monitoring of salt standards the National Food and Nutrition Commission (NFNC) has trained and provided salt monitoring kits to border Health Inspectors. Consistency and record keeping should be cardinal to systematic the monitoring activities.

The food safety monitoring in Zambia can only be successful if the sub district Environmental Health Staff will be trained and actively followed up through documented monitoring indicators.

#### **6.1.4 Proposed Standards in the Food and Drugs Regulations**

Under the revised Food and Drugs Regulations which is not yet passed the following amendments and additions have been proposed;

##### Standards for Salt

Salt for human consumption shall be solid, white crystalline sodium chloride and shall contain:-

- a) not less than 97.0% w/w sodium chloride
- b) not more than 2.8% w/w moisture
- c) not more than 0.2% w/w matter insoluble in water
- d) 15 – 40 ppm as iodine and 25 – 66 ppm as potassium iodate

##### Standard for Table Salt

Notwithstanding the provisions contained in the proposed regulations. Table salt shall be grained crystalline salt in with the addition of harmless anti-caking agents to ensure free running properties (as per proposed schedules).

##### Packaging and Labelling for Salt

The **packaging** for salt has been addressed which shall be of such design and quality as to protect the salt from contamination, degradation of the added fortificant or alteration of the sensory properties.

On **labelling** without prejudice to the provisions of proposed regulations the label for salt shall carry the word “Iodated Salt” in bold letter on the main panel.

## 6.2 SUGAR

### 6.2.1 Introduction

The detrimental nature of Vitamin A Deficiency (VAD) and its effects on growth and development especially in children requires concerted efforts to control the malady.

The night blindness rates of 11.6% for women and 6.2% for children placing Zambia in the severe clinical and sub-clinical VAD category according to WHO population cut off requires vigilancy on the part of monitoring and enforcement of fortification legislation. The health authorities have a duty to reverse the serious nutritional disorders by religiously enforcing the Food and Drugs Act, Regulations and the SI on the matter.

### 6.2.2 Regulations on Sugar

The problem of VAD necessitated the issuance of SI No 155 of 1998 which gives the standard of sugar

Sugar shall be fortified with Vitamin A premix and shall have the following compositional specification.

#### a) Refined Sugar

Polarisation	Not less than 99.7°
Sucrose	Not more than 99.7%
Invert sugar content	Not more than 0.04% m/m
Conductivity ash	Not more than 0.1% m/m
Humidity (after 3 hours at 105°C)	Not more than 0.1% m/m
Colour	Not more than 150 ICUMSA units
Vitamin A content (as retinol)	Not less than 10mg/kg

#### b) White sugar

Polarisation	Not less than 99.5°
Sucrose	Not more than 99.5%
Invert sugar content	Not more than 0.1% m/m
Conductivity ash	Not more than 0.1% m/m
Humidity (after 3 hours at 105°C)	Not more than 0.1% m/m
Colour	Not more than 450 ICUMSA units
Vitamin A content (as retinol)	Not less than 10mg/kg

- b) the standard for brown sugar, yellow sugar or golden sugar and the contaminants are detailed in the SI No 155 of 1998 which is in Appendix....

With the above compositional specification no Person shall sell, display or distribute sugar unless the sugar complies as above.

c) **Labelling and Packaging**

Sugar shall be packed in plastic film or paper bag made of non-toxic material and the label shall indicate

- Retinol content
- The words “**Fortified with Vitamin A**” in bold letters

**6.2.3 Revised Food and Drugs and Standards for Sugar**

Under the revised Food and Drugs Regulations most, compositional specification indicated in the SI have been incorporated into the regulations including the labelling and packaging.

The standard for vitamin A premix and labelling if vitamin A fortificant Premix have also been included in the revised Food and Drugs Regulations.

**6.2.4 Monitoring Sugar**

- The health authorities need to establish an effective food safety monitoring system in order to enforce the SI No 155 of 1998 on sugar fortification register need to be maintained.
- The monitoring will be organised on the basis discussed under enforcement of SI No 97 of 1994

a) **Manufacturing Plant**

The requirements of food hygiene under the Food and Drugs Regulations 410 – 422 will have to be followed during all monitoring activities. Summary of the food hygiene include the following;

- Growing and harvesting of raw materials to be of clean and sanitary nature.
- Grounds in or adjacent to food plant to be free from contaminating conditions
- Plant and facilities to be suitable in size construction and design to facilitate maintenance and hygienic food operation.
- Construction and design in terms of floors, walls and ceilings in the plant shall be of such construction as to be adequately cleanable and shall be kept clean and in good repair.
- Equipment and utensils should be suitable for their intended purpose and so designed and of such material and workmanship as to be adequately cleanable
- Sanitary convenience and control should be provided where food is manufactured, processed handled, packaged labelled and stored for sale.
- Personnel to follow all disease control code of conduct including cleanliness, education and training.

b) **Wholesale/Bounded Warehouses**

In close consultations and partnership with ZRA the sugar in the warehouse will have to be monitored. The sugar for domestic use should be fortified or seized

until proof is provided to health authorities that it shall be re-conditioned and re-labelled.

The MOH/CBOH will appoint an officer to work closely with the ZRA to monitor the imported sugar. The warranty certificate as provided for in the Food and Drugs Act will be a useful document to verify the use of imported sugar. Only sugar meant for food manufacturing will be allowed on condition that this has been declared.

c) Border Controls

In consultation with ZRA the sugar imports will need to comply with the laws of the country.

The Food and Drugs Act allows for reconditioning and re-labelling of the foods within a certain period. During the period of reconditioning the article/food will not be allowed to be sold in the country.

Sugar sampling will be required from both the health authorities and the ZRA as provided for under the Food and Drugs Act Cap 303.

d) Retail Level

The health authority will use a combination of routine inspection/spot checks and sampling. It is quite common to find that most retail shops repack the sugar into smaller packages.

e) Household Level

The households level need constant health education on the need to use fortified sugar at that level as the commodity is aimed at tackling Vitamin A deficiency at that level.

**APPENDIX I**

**EXAMPLE OF STATUTORY NOTICE**

Ref:.....

Address of Local Authority or  
District Health Board

.....  
.....  
Date.....

**PUBLIC HEALTH ACT CAP 295 SECTION 68**  
**Statutory Nuisance Notice No..... of 1998**

To: (a).....of (b).....  
The: (b).....of the Premises (d).....  
In the (e).....

**TAKE NOTICE** that under the provisions of the Public Health Act this Local  
Authority/District Health Board, being satisfied of the existence of a statutory nuisance  
**At (f).....in the (g).....**  
**Arising from**

- 1.....
- 2.....(h).....
- 3.....
- 4.....

**DO HEREBY** require you within period of (i).....from  
the service of this notice to abate the same and that purpose to:-

- 1.....
- 2.....(j).....
- 3.....
- 4.....

and to execute such other works and take such other steps as may be necessary.

5.0 If you make default in complying with the requirements of the notice or if a nuisance  
though abated is likely to recur, a summons will be issued requiring your attendance  
to answer a complaint which will be made to a Magistrate Court for enforcing the  
abatement of the nuisance and prohibiting a recurrence thereof and for recovering the  
costs and penalties that may be incurred thereby.

**Dated this (d).....day of (m).....200....**

**Signature.....(n).....**

**Title of Authorised Officer**

## Legend

- (a) .....Name of “Author of Nuisance”
- (b) .....Address of “Author of Nuisance”
- (c) .....Status of Author (i.e. owner or occupant)
- (d) .....Address where the nuisance exists
- (e) .....Area name of the Local Authority/District Health Board (City, Manicipality or District Council.
- (f) .....Place where the nuisance exists
- (g) .....Area/Local Authority
- (h) .....Space to write list of nuisances
- (i) .....No of days (usually 28 days)
- (j) .....Space to write list of works required to abate the nuisance
- (k) .....Day
- (l) .....Month
- (m) .....Signature of Authorised Officer
- (n)

**APPENDIX II**

**FORM**

(to be used in case of seizure or “articles” where the “articles” are to be removed from the premises of the vendor).

To (Name and address of the vendor)

.....  
.....

Whereas I have reason to believe that the stock of articles detailed below which is in your possession or the premises of .....

situated

at.....

contravenes the provisions of the Food and Drugs Act (22 of 1972)

Now, therefore, I.....

As an Authorised Officer hereby seize the said articles under provisions of Sections 24 (1) (e) of the said Act.

(Details of the “articles” seized with quantity and/or number).

If you consent to the destruction or disposal thereof as I direct, you should sign your name to the following declaration and return this paper to me.

.....Date.....Signature.....

Name, designation and address of the Authorised Officer in bloc letter

I consent to the destruction or disposal of the articles seized mentioned above.

.....Date.....Signature of the owner or his

representative or the person in whose possession the article was at the time of seizure.

**FORM**

(to be used in case of seizure of "articles" where the "articles are to be kept or stored in the premises whereby they were seized).

TO:

Name and address of the vendor

.....  
.....

Whereas I have reason to believe that the stock of articles detailed below which is in your possession at the premises of ..... situated at..... contravenes the provisions of the Food and Drugs Act (22 of 1972).

Now, therefore, I..... as an Authorised Officer hereby seize the said articles under the provisions of Sections 24 91) (e) of the said Act, and direct you to keep the said sealed stock in safe custody subject to such orders as may be issued subsequently in relation thereto.

Be it known to you that removal or alteration or interference in any way with the said article without my authority or an authority superior to me in am offence under Section ( 24 (a) of the said Act.

(Deatails of articles seized with quantity and/or number).

Date.....Signature.....  
Name.....  
Designation.....  
Address.....  
.....  
.....

**FORM**

While releasing the seizure the following form of letter may be used:

To:

Name and address of Vendor

.....  
.....

The stocks of articles detailed below which were seized by me on.....  
Are hereby released under Section 24 (6) of the Food and Drugs Act, as I am now  
satisfied that the articles do not contravene any provisions of the said Act.

(Details of articles released with quantity and/or number).

Date.....Signature.....  
Name.....  
Designation.....  
Address of Authorised Officer.....  
.....  
.....

**FORM**

If the owner of violative goods is agreeable to voluntary destruction of the article, obtain  
a statement from the owner in the following form and witness the destruction.

I consent/refuse to the destruction of the following articles which I agree contravenes the  
provisions of the Food and Drugs Act and Regulations framed thereunder.

Details of the article with quantity or number

.....

Signature of the owner

Name, designation and address of the owner or his representative or the person in whose  
possession the article was.....

.....

**FORM**

If the owner is reluctant to destroy violative goods it will be necessary to seize the goods. If after seizure the owner of the goods is agreeable to voluntary forfeiture of the goods under Section 24 (7) of the Act, you should obtain a signed statement from the vendor or the owner of the article. The letter below may be used for guidance in this case:

To the Authorised Officer:

(Designation and full address of the Authorised Officer)

I hereby agree to the voluntary forfeiture of the articles mentioned below located at the premises of .....

Situated at.....I agree these may be.....

Destroyed or otherwise disposed of as may be directed pursuant to Section 24 (7) of the Food and Drugs Act.

.....  
Signature  
(Name, designation and address of the owner or his representative or the person in whose possession the article was)

Name of articles with quantity or Number

Signed.....  
(Name and address of the owner or his representative the person in whose possession it was at the time of seizure).

**FORM**

If the owner does not consent to the destruction the Authorised Officer has to apply to the destruction or disposal of such article to a subordinate court whose jurisdiction of the place the article seized falls. A specimen form for such application is given below:

TO:

The Subordinate Court

.....  
under powers vested in me as Authorised Officer in Section 24(1) of the Food and Drugs Act 1972 (No.....of 1972 I have seized the under mentioned articles from.....(name and postal address) at the premises situated at.....

.....  
(Name(s) of article(s) with quantity or number)

The article(s) is/are in my opinion contravene(s) Section(s).....of the Food and Drugs Act may be verified from the sample(s) provided herewith. Mr.....who is the owner or in whose possession the article(s) was/were at the time of seizure does not consent for destruction of the article(s). As the sale of the article(s) is/are in contravention of the Food and Drugs Act, it is required that orders may be issued under Section (24 97) of the Food and Drugs Act for the destruction or other disposal as the court may deem fit.

Date.....Name and Designation and address of Authorised Officer in block letters.

In the case of all actions under this section, whether a voluntary destruction or reconditioning without seizure, voluntary destruction or reconditioning after seizure, or procedures following court actin, samples of the goods which contravene the Act should be collected for possible subsequent prosecution action.

## Glossary

**Fortification:** is the addition of nutrients to commonly eaten foods to improve the quality of a diet. The nutrients are added at levels higher than those found in the original or comparable food.

**Vehicle:**Is the food that carries the nutrient

**Fortificant:**Is the nutrient added to the food

**Premix:** Is the product made by mixing the fortificant with a small quantity of the food vehicle, which is then added to the bulk of the food vehicle.

**The Codex Alimentarius Standards and the Revised Food and Drugs Regulations:** **“Fortified Food” or “enriched food”** means any food to which one or more essential ingredients, such as vitamins, minerals, protein, essential amino acids or fatty acids, or other nutritional substances have been added in order to increase the nutritive value of the food and which are absent from the food in its original state. Fortified foods shall not be considered as drugs.