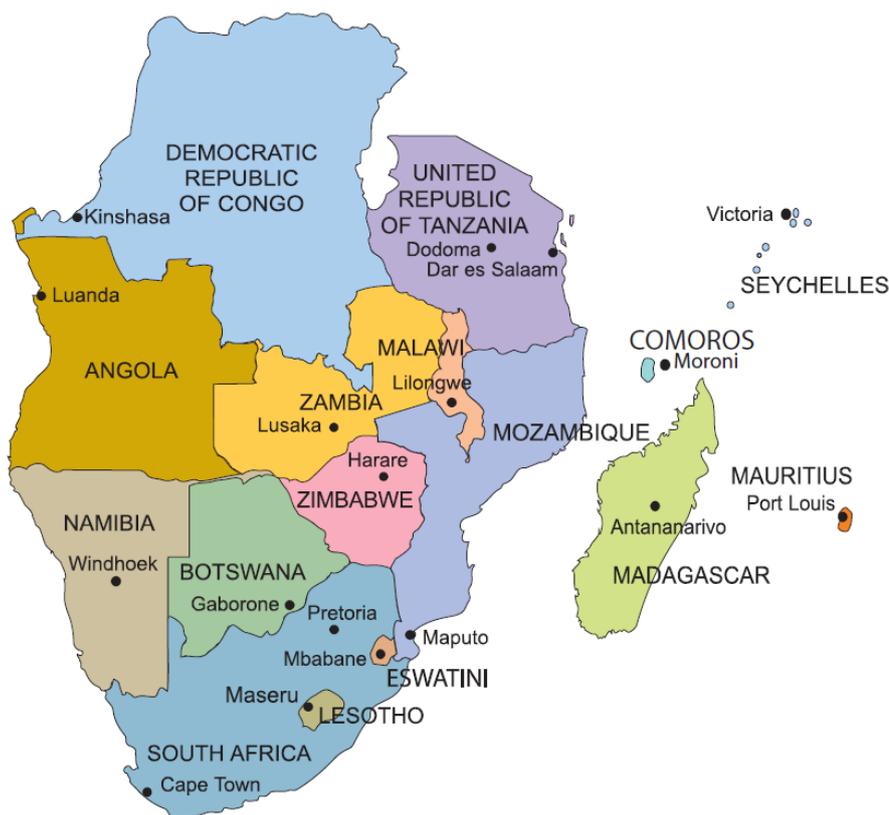




SADC MINIMUM STANDARDS FOR FOOD FORTIFICATION



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1. Preface

This SADC Minimum Standard shall protect the consumers in a way that they get a safe and nutritionally rich product while at the same time assist the producers (manufacturers) and importers to meet regional market requirements.

This SADC Minimum Standard has been developed to provide member states with guidance on micronutrient additions to staple foods and condiments within the SADC region. This is meant to

provide for minimum addition levels to target in order to allow for intra-regional trade in fortified foods and ensuring significant intake of key micronutrients within Member States. The ultimate goal is to prevent, reduce and control deficiencies in essential vitamins and minerals and improve nutritional health outcomes. It is recognized that the staple foods and condiments, are commonly consumed in SADC Member States with varying per capita consumption across countries. These foods can effectively be used as carriers for essential vitamins and minerals. Member States may add additional micronutrients of importance as long as they are within safe levels.

The development of these standards follows recommendations from Ministers of Health in 2017, during their meeting in Polokwane, South Africa and takes into consideration current micronutrient deficiencies of public health concern and per capita consumption of the target food vehicles.

The technical input was received from members of the SADC STAN, identified miller representatives, representatives of national regulatory bodies and Ministries of Health; Trade and Industry and Agriculture, UN agencies (UNICEF,WFP), development partners (GAIN,FFI,NI,IGN).

The development of the minimum standards was achieved under the support of the European Union funded Programme Estimate aimed at supporting the Operationalisation of the Regional Agricultural Policy (RAP) and facilitating implementation of some of the components of the SADC Food and Nutrition Security Strategy (2015 – 2025)

Definitions

Certificate of Analysis	a certificate provided by the suppliers based on tests conducted on the product to confirm compliance
Edible Oil	vegetable oil natural for human consumption

Food Vehicle	foodstuff that is selected to carry specific micronutrients as described in these Regulations, specifically wheat flour, maize flour, oil, ,salt and sugar
Fortificant	the prescribed compounds added to food to provide specified micronutrients
Food Fortification	addition of one or more micronutrients to foods in order to address an identified micronutrient deficiency among the population
Fortification Logo	a symbol authorized by the Ministry for use on packaging or label of certain foodstuffs to signify adequacy in terms of micronutrient fortification
Fortified Food	food to which one or more essential nutrients have been added
Fortified Oil	edible oil to which vitamin A has been added according to local standard specifications
Fortified Maize Flour	Maize flour to which vitamins and minerals have been added according to local standard specifications. This refers to both low and high extraction flour ¹
Fortified Wheat Flour	Wheat flour to which vitamins and minerals have been added according to local standard specifications. This refers to both low and high extraction flour
Iodised/Iodated Salt	Edible salt to which iodine has been added according to local standard specifications. This is salt for human consumption, animal consumption and for direct sale to food manufacturers
Manufacturer	a person engaged in production of fortified foods
Micronutrient	A natural or synthesized vitamin, mineral or trace element that is essential for growth, development and maintenance of life. A deficit of which will cause biochemical and physiological changes
Monitoring	The systematic process of collecting, analyzing and using information to track a program's progress toward reaching its objectives and to guide management decisions.
Minimum Standards	target addition levels for specified micronutrients to be added to food vehicles as a minimum requirement
Premix	a blend of food fortificant produced to be added to a food vehicle during fortification
Quality Assurance	a set of procedures put in place by the manufacturer to ensure that the final fortified product will comply consistently with the local standard
Quality Control	A set of procedures undertaken by the manufacturer to verify that a product does comply consistently with set standards. This involves sample collection and testing of final product
Refined Wheat Flour	Wheat flour from which husks have been removed and the flour yield is below 83%. This flour usually is referred to as low extraction flour
Regulatory Monitoring	the monitoring of fortified foods comprising internal monitoring, external monitoring, import and commercial monitoring
National Standard	a food standard produced or adopted by a Member State for the production of fortified foods of interest in the country
Technical Regulations	Government document that lays down product characteristics or their related processes and production methods, including the applicable administrative provisions, with which compliance is mandatory.

¹ Details provided in document

2. Background

SADC has several sectoral policies and strategies including the SADC Regional Food and Nutrition Security strategy (2015 – 2025) which was approved by SADC Council in 2014. This Food and Nutrition Security Strategy recognizes that micronutrient deficiencies contribute substantially to the global burden of disease.

The control of vitamin and mineral deficiencies is an essential part of the overall effort to fight malnutrition. Member States need to adopt and support a comprehensive approach that addresses the causes of malnutrition and the often associated “*hidden hunger*” which rest intrinsic to poverty and unsustainable livelihoods. Actions that promote an increase in the supply, access, consumption and utilization of an adequate quantity, quality and variety of foods for all population groups should be supported. The aim is for all people to be able to obtain from their diet all the energy, macro- and micronutrients they need to enjoy a healthy and productive life. Policy and programme responses include food-based strategies such as dietary diversification and food fortification, supplementation as well as nutrition education. These approaches should be regarded as complementary and their relative importance depends on local conditions and the specific needs.

Food Fortification is one of the cost effective strategies for the prevention and control of micronutrient deficiencies in countries. In the SADC region, a number of countries have adopted mandatory fortification of staples foods for the reduction and control of existing micronutrient deficiencies. The addition of micronutrients is aimed at providing consumers with equal access to nutritious fortified foods whether locally produced or imported from the region. The SADC regional standards are developed to facilitate intra-regional trade and advance wide distribution and access to high quality fortified foods.

A first step in this process of establishing regional minimum standards was to map out existing legislation in the SADC member states to inform the process of developing the regional minimum standards. The landscape analysis looked at standards for fortifying five commonly consumed foods, namely sugar, cooking oil, salt, wheat flour and maize flour. The exercise further reviewed existing micronutrient deficiencies prevalent in the Member States and the consumption patterns of the populations with respect to these specified foods. This was to inform the minimum micronutrients to be considered and levels to be added for health impact. A comparison with nutrient levels suggested by the World Health Organisation (WHO) and regional East Central and Southern Africa (ECSA) standards was made during this data review exercise. The work endeavored to determine any technical, sensory and cost implications that countries face during implementation of their national fortification programs. South Africa, for example, highlighted the need to keep levels of iron and zinc low since high levels would cause off flavor and discoloration in fortified flour based on their experience.

The analysis looked at existing legislations available for food fortification, recommended compounds used in food fortification, and levels suggested. It also assessed cost implications in terms of premix procurement. A validation exercise of the report from this mapping exercise was organized in March 2019. Furthermore, it was recommended that the process of developing the minimum standards should be done in close collaboration with Ministry Health Senior management and nutritionists who are custodians of the food fortification programs in their countries and the private sector. The major concern emanating from the consultation is the use of foods that are known for contributing to Non- Communicable Diseases (NCDs) and need to ensure that universal fortification of various

foods does not provide excess micronutrients to the population. High consumption of sugar and oil is associated with obesity which is a major risk factor for development of NCDs. Promotion of these foods as healthy foods would undermine efforts to promote reduced consumption of these foods. Therefore, national fortification program should not promote high consumption of specific foods but, when consumed, people must opt for fortified products where available.

Moving on from these findings and recommendations, the SADC Secretariat commenced with the second phase of the development of minimum standards for the fortification of the identified foods within the region taking into consideration any further information from the Member States.

3. SADC Context

In SADC, a number of micronutrient deficiencies are a public health concern with prevalence ranging from moderate to severe. Micronutrient Deficiencies of concern include vitamin A Deficiencies, Iron Deficiency Anemia, Iodine Disorders, Zinc Deficiencies and folic acid deficiency. Vitamin A deficiency in the region ranges from mild to severe in other countries. The prevalence of (iron deficiency) anemia in women of reproductive age ranges between 20 percent in Namibia to 54 percent in Mozambique indicating moderate to severe deficiencies in the member states². Iodine disorders have relatively been managed in a number of countries with median Urinary Iodine Concentration ranging from 46 to 287 indicating the fact that some countries have insufficient iodine nutrition and most of the countries are sufficient³. Out of 12 countries with data, only 2 were insufficient and these are Mozambique and Madagascar. The population at risk of Zinc deficiency in the region ranges from 13% to 54% with an average for the region of 30%⁴.

Vitamin A deficiency is linked to blindness prevention and immunity whereas iodine deficiency contributes to incidences of cretinism and low IQ. Folate deficiency is associated with high prevalence of neural tube defects and encephalopathy in the population. The deficiency of iron is a result of a long term shortage of iron intake and in its most severe cases it causes anemia which is defined as a low blood hemoglobin concentration. Symptoms of iron deficiency include fatigue, poor concentration, dizziness, and shortness of breath. Zinc deficiency is a serious public health problem causing restricted linear growth, increased infections and diarrhea, and mortality.

The SADC Minimum Standards for food fortification are intended to accelerate the implementation of sound food fortification programmes in the SADC Region and facilitate intra-regional trade in fortified foods. It is hoped the standards will support increased coverage of adequately fortified foods in the region especially for countries that import fortified foods and have low levels of industrial fortification for their local needs.

4. Purpose and Objectives

The purpose of the minimum standards for food fortification is to provide guidance to SADC Member States on mandatory prescripts for mass fortification of staple foods. These standards provide the minimal number of micronutrients and minimum target addition levels of the specified micronutrients to be added to the staple foods and condiments.

² WHO/UNICEF Joint Monitoring Estimates released 2020

³ Global Scorecard of Iodine Nutrition in 2020, Iodine Global Network

⁴ Country Profiles – Food Fortification Initiative – www.ffinetwork.org

The objectives of the harmonized minimum standards for food fortification are as follows:

- a) To present to SADC Member States specified target micronutrient levels to be added to staple foods as a minimum for fortified foods produced and traded within the region;
- b) To facilitate intra-regional trade and distribution of fortified foods among the SADC Member States in compliance to the prescribed parameters as indicated in the SADC minimum standards;

5. Key Recommendations in the Minimum Standards

5.1. Food and Micronutrients

Staple foods listed below were recommended by SADC Member States for fortification and they are to be fortified with the following as a minimum:

- Edible Salt (Iodine)⁵
- Wheat flour⁶ (Vitamin A, Iron, Zinc, Folic Acid, B12),
- Maize flour (Vitamin A, Iron, Zinc, Folic Acid, B12),
- Edible oil (vitamin A)
- Sugar (Vitamin A)

Some of the foods included are associated with other health concerns such as obesity and NCDs. However, advocating for their fortification should not imply an endorsement by Member States for increased consumption. Countries must ensure that messages for promoting consumption of fortified foods are not mistaken as a promotion for over consumption of specific foods, and must not be in contradiction with other health promotion messages. These foods are included because they are widely consumed among the population and, as such, are ideal vehicles for increasing micronutrient intake widely in the region.

It should be noted that Member States are not mandated to fortify all food vehicles; however the choice of food vehicle should be informed by national levels of deficiencies, the food consumption per capita data at national level, the proportion of the population that consume the specific food vehicles and the prevalence of obesity and NCDs.

5.2. Fortificants

Producers of fortified foods shall ensure that the micronutrient premixes used are from reputable sources whose quality standards can be validated. In some countries a list of pre-approved suppliers is compiled and endorsed by the national food fortification authorities to safeguard local producers from substandard premixes. Producers shall review and keep the Certificate of Analysis for every batch imported premixes for reference and review by inspectors.

⁵ Excludes salt used for industrial processes other than food items

⁶ Includes whole wheat flour

5.3. Amendments of Minimum Standards

SADC Ministers of Health may at any time recommend amendment to any part of these SADC Minimum Standards based on emerging information.

5.4. Quality Assurance, Monitoring and Enforcement Activities

Monitoring of fortified foods will be conducted by producers as internal monitoring, validated by external inspectors as part of external monitoring at production. The criteria for nutrient compliance at production level shall be used for determining nutrient compliance during import certification. Member states shall place emphasis on ensuring that foods comply at production levels. Monitoring for compliance at commercial and household should complement internal and external monitoring. Government authorities shall consistently and effectively enforce national food standards, including fortification requirements, in order to ensure a safe and adequate fortification for health impact.

5.5. Labelling and packaging

The purpose of a food labelling is to identify the food inside the package and to provide the consumer with information about the food and its appropriate handling and use. In addition to the labelling requirements set by national regulations, fortified foods shall be conspicuously labelled to provide nutrition information that satisfy the following:

- a. The word *fortified* immediately prior to or after the common name of the food;
- b. Specific name and amount of each micronutrients added into the foods, in milligrams per 100grams in the case of solids or mg per 100mL in the case of liquids. Information may also be provided “per serving” and the serving size must be defined;
- c. The label shall indicate percentage contribution of added nutrients to daily nutrition requirement per serving;
- d. All information printed shall be legible and in indelible ink;
- e. The label of the product shall bear the national food fortification logo;
- f. The label shall, as a minimum, include the following:
 - i. Name of the food
 - ii. Name and physical address of manufacturer or distributor, seller or exporter as is applicable
 - iii. Lot or batch number
 - iv. Net Weight
 - v. Expiry date

5.6. Use of the Fortification Logo

- a) Where the use of the fortification logo is adopted in a country, the logo shall be printed in a prominent position on the main panel, in bold print, against a contrasting or clear background on all types of packaging materials
- b) The logo may be printed in colour or black and white.
- c) The National Food Inspection Authority shall be at liberty to suspend or revoke certificate for food fortification upon satisfaction that the requirements for manufacture of fortified food, based on applicable checklist in use at the particular time, are not complied with.

6. Minimum Standards Requirements for fortified foods and premixes

6.1. Determination of micronutrient fortification levels

The tables below provide minimum fortification levels at production or import level and at retail level as proposed by Member States after extensive consultation. The levels suggested are based on calculations using the Food Fortification Formulator⁷ and information gathered from Member States. The formulator determines suggested addition levels based on per capita consumption levels, the percentage of the population that consumes a specific food items, cost implication and nutrients to be added. This tool also provides levels to be used for inspection at production and on the market. The tool further provides details of the fortification premix based on determine addition levels. There are individual fortification formulators for each food vehicles. As such, five different formulators were used for the determination of the minimum SADC harmonized levels the five food vehicles.

The chosen levels were further assessed for their adequacy to provide significant increase in micronutrient in take for those that do not consume much and safe enough for consumers with high per capita consumptions. The additional intake was reviewed so that no consumers are at risk of intakes above the Upper Tolerable levels (UTL). The safety and adequacy review was based on the intake by children under 5 years, women of child bearing age and men. These assessments were based on per capita figures that were obtained from FAOSTAT and Member States as provided in Table 1. The numbers in parentheses were provided by member states in response to a questionnaire sent out as part of this work. Very few countries were able to provide such data and hence a reliance on FAOSTAT data. Based on Member States data the average proportion of people consuming these foods was found to be the following

- Oil – 72%
- Maize Flour – 45%
- Wheat Flour – 63%
- Salt – 92%

The per capita figure used were the average of these numbers as provided in the table 1.

⁷ https://www.spring-nutrition.org/sites/default/files/a2z_materials/508-food-fortification-formulator.pdf

Table 1: Per capita Consumption of various foods in Member States⁸

PER CAPITA CONSUMPTION (GRAMS/PERSON/DAY)					
	COUNTRIES	SALT ⁹	OIL	MAIZE FLOUR	WHEAT FLOUR
1	ANGOLA	6	24.5	106	111.57
2	BOTSWANA	6	30.86	105	104.66
3	COMOROS	4			
4	DRC	6	26.01	9.9	109.79
5	ESWATINI	6	12.41	191.31 (200)	101.77 (100)
6	LESOTHO	6	2.26	254.76	144.4
6	MADAGASCAR	5	6.24	49.26	24.68
7	MALAWI	4	8.57	354.09	32.26
8	MAURITIUS	13	53.55	8.15	312.37
9	MOZAMBIQUE	6	23.93	149.8	40.14
10	NAMIBIA	7	18.2	118.9	99.35
11	SEYCHELLES	11			
12	SOUTH AFRICA	6	35.42	274.26	164.74
13	TANZANIA	7	18.74	160.19	43.67
14	ZAMBIA	6	13.2	325.15	33.6
15	ZIMBABWE	8	30.93 (34)	256.65 (170)	85.78 (80)
	REGIONAL AVERAGE SOUTHERN AFRICA		33	266	158
	AVERAGE FROM DATA	6	22	169	101
	MINIMUM	4	2	8	25
	MAXIMUM	13	54	354	312
	WEIGHTED AVERAGE BASED ON POPULATION	6	23	152	87

6.2. Target Micronutrients Addition proposed for the SADC Minimum Standards

The recommended minimum requirements provided should be complied with wherever a country fortifies for export within the region to ensure acceptance. It is expected that countries, justified by local conditions, may add higher levels of the micronutrients or add more micronutrients than those in the tables. If a country, based on sensory acceptability trials, cannot accept standards for local consumers, a distinction will have to be made during production between production for the local market and exports products into the SADC region. However when these minimum requirements are satisfied, SADC countries will be expected to accept those products even when they do not satisfy all requirements in the countries. At present, fortified foods are traded within the region despite have different fortification levels because adherence to local standard is not strictly enforced. These standards will provide for a uniform means of certifying intra-regional products while maintaining national standards. The selected target additions of micronutrients or fortification levels (FL) for the five foods are provided in Tables 2 through 8. The figures provided in the tables refer to the micronutrient content and not the fortification compound.

⁸ Data obtained from FAOSTAT

⁹ Powles J, Fahimi S, Micha R, et al. Global, regional and national sodium intakes in 1990 and 2010: a systematic analysis of 24 hr. urinary sodium excretion and dietary surveys worldwide. *BMJ Open* 2013; 3:e003733. Doi:

Table 2: Micronutrient content of Fortified Wheat Flour – Low¹⁰ Extraction (refined)

Micronutrients	Fortificant compound	Target Addition	Production Parameters			Regulatory Parameters	
		FL ¹¹	mFL ¹² (1)	Average (2)	MFL ¹³ (3)	LmL ¹⁴ (4)	MTL ¹⁵ (5)
		(mg/kg)	(mg/kg)	(mg/kg)	(mg/kg)	(mg/kg)	(mg/kg)
Vitamin A	Retinyl Palmitate- 250,000 IU/g (dry)	1.5	0.8	1.5	2.2	0.7	2.2
Vitamin B9	Folic Acid	1.3	0.8	1.5	2.2	0.7	2.2
Iron	Ferrous Fumarate	55	48	71	94	48	94
Zinc	Zinc oxide	55	44	64	84	44	84
Vitamin B 12	Vitamin B12 0.1%WS	0.01	0.006	0.01	0.014	0.005	0.014

Table 3: Micronutrient content of Fortified Wheat Flour – High¹⁶ Extraction (Whole Wheat Flour)

Micronutrients	Fortificant compound	Target Addition	Production Parameters			Regulatory Parameters	
		FL ¹⁷	mFL ¹⁸ (1)	Average (2)	MFL ¹⁹ (3)	LmL ²⁰ (4)	MTL ²¹ (5)
		(mg/kg)	(mg/kg)	(mg/kg)	(mg/kg)	(mg/kg)	(mg/kg)
Vitamin A	Retinyl Palmitate- 250,000 IU/g (dry)	1.5	0.8	1.5	2.2	0.7	2.2
Vitamin B9	Folic Acid	1.3	0.8	1.5	2.2	0.7	2.2
Iron	Iron EDTA	25	43	63	83	43	84
Zinc	Zinc oxide	55	57	84	111	57	111
Vitamin B 12	Vitamin B12 0.1%WS	0.01	0.006	0.01	0.014	0.005	0.014

Table 4: Micronutrient content of Fortified Maize Flour – Low²² Extraction

Micronutrients	Fortificant compound	Target Addition	Production Parameters	Regulatory Parameters

¹⁰ Low extraction refined wheat flour – extraction rate 72-76%.

¹¹ FL: Fortification level (target addition)

¹² mFL: minimum Fortification Level (accepted minimum content at production level or at import)

¹³ MFL: maximum Fortification Level (accepted maximum content at production level or at import)

¹⁴ LmL: Legal minimum Level (accepted minimum content at retail level)

¹⁵ MTL: Legal maximum Level (accepted maximum content at retail level)

¹⁶ High extraction wheat flour - extraction rate above 83%

¹⁷ FL: Fortification level (target addition)

¹⁸ mFL: minimum Fortification Level (accepted minimum content at production level or at import)

¹⁹ MFL: maximum Fortification Level (accepted maximum content at production level or at import)

²⁰ LmL: Legal minimum Level (accepted minimum content at retail level)

²¹ MTL: Legal maximum Level (accepted maximum content at retail level)

²² Low extraction – dehulled maize grits – extraction rate 65-85%

Micronutrient	Fortificant compound	FL	mFL (1)	Average (2)	MFL (3)	LmL (4)	MTL (5)
		(mg/kg)	(mg/kg)	(mg/kg)	(mg/kg)	(mg/kg)	(mg/kg)
Vitamin A	Retinyl Palmitate-250,000 IU/g (dry)	1.5	0.8	1.5	2.2	0.7	2.2
Vitamin B-9	Folic Acid	1.3	0.8	1.5	2.2	0.7	2.2
Iron	NaFeEDTA	30	28	41	54	28	54
Zinc	Zinc oxide	40	33	49	65	33	65
Vit. B12	Vitamin B12 0.1%WS	0.01	0.006	0.01	0.014	0.005	0.014

Table 5: Micronutrient content of Fortified Whole²³ Maize Flour – High Extraction

Micronutrient	Fortificant compound	Target Addition	Production Parameters			Regulatory Parameters	
		FL	mFL (1)	Average (2)	MFL (3)	LmL (4)	MTL (5)
		(mg/kg)	(mg/kg)	(mg/kg)	(mg/kg)	(mg/kg)	(mg/kg)
Vitamin A	Retinyl Palmitate-250,000 IU/g (dry)	1.5	0.8	1.5	2.2	0.7	2.2
Vitamin B-9	Folic Acid	1.3	0.8	1.5	2.2	0.7	2.2
Iron	NaFeEDTA	30	45	66	89	45	89
Zinc	Zinc oxide	40	41	60	79	41	79
Vit. B12	Vitamin B12 0.1%WS	0.01	0.006	0.01	0.014	0.005	0.014

Table 7: Vitamin A content of Fortified Edible Oil

Micronutrient	Fortificant compound	Target Addition	Production Parameters			Regulatory Parameters	
		FL	mFL (1)	Average (2)	MFL (3)	LmL (4)	MTL (5)
		(mg/kg)	(mg/kg)	(mg/kg)	(mg/kg)	(mg/kg)	(mg/kg)

²³ Whole Maize flour – extraction rate 100%. Results in different iron, production and regulatory parameters.

Vitamin A	Retinyl Palmitate- 1.7 (or 1.0) million IU/g (oily)	25.0	20	25.0	30	15	30
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Table 8: Iodine content of Iodised Salt

Micronutrients	Fortificant compound	Target Addition	Production Parameters			Regulatory Parameters	
		FL (mg/kg)	mFL (1) (mg/kg)	Average (2) (mg/kg)	MFL (3) (mg/kg)	LmL (4) (mg/kg)	MTL (5) (mg/kg)
Iodine	Potassium iodate	30	20	30	40	20	40

6.3. Expected Contribution of Fortified Foods to the Micronutrients Intake

Using the average per capita data in Table 1, the micronutrient intake as a percentage of the Estimates Average Requirement (EAR) was worked out for all the food vehicles and the results are provided in Table 9. The table provides EAR figures for the five food vehicles fortified with micronutrients at levels prescribed in the proposed SADC Minimum Standard. This is done with respect to requirements for men, women and children 4 to 6 years, specifically for those that consume average amounts in these groups (P50). The safety component was assessed by determining the intake by those that consume larger amounts for all the three groups and comparing that intake with the Upper Tolerable Limit (UTL) for all micronutrients. The data in parentheses provide the percentage of UTL that these people would reach, and acts as a worst scenario in each case based on the average per capita consumption in the table.

The data in Table 9 shows clearly that sugar and oil would contribute significantly to vitamin A intake as individual food vehicles, if these foods are widely consumed and fortified to the specified level. However, these two foods are linked to health problems and their consumption in many countries is not encouraged. Hence, excluding vitamin A from flours may risk the exclusion of a significant source for vitamin A for other members of the society with low consumption of either oil or sugar. A decision to add or remove vitamin A must take into account evidence of consistent and wide consumption of alternative food vehicles in amounts that provide significantly to daily requirements in terms of vitamin A. Currently in SADC, three countries add vitamin A to flours, fortified oil and sugar with vitamin A.

Table 9: Contribution of fortified foods to the %EAR of various micronutrients when fortified as per SADC Minimum Standard

PERCENTAGE EAR FROM FORTIFIED FOODS & INTAKE OF HIGH CONSUMERS AS % OF UPPER TOLERABLE LEVEL							
FOOD VEHICLE * PER CAPITA		VIT. A % EAR & [%UTL]	FOLIC ACID % EAR & [%UTL]	IRON %EAR & [%UTL]	ZINC % EAR & [%UTL]	B12 % EAR & [%UTL]	IODINE
SUGAR [Vit A 10mg/kg] Per Capita: 55 grams/day/person Per capita range: (20,101)	Women	84 , [20%]					
	Men	90 , [23%]					
	Children	57 , [40%]					
OIL [25mg/kg] Per Capita: 22 grams/day/person Per capita range: (2,54)	Women	77 , [28%]					
	Men	83 , [36%]					
	Children	51 , [56%]					
WHEAT FLOUR²⁴ [Vit A (1.5mg/kg), Zinc (55), Fe Fumarate (55). Folic Acid (1.3),B12(0.01)] Per Capita: 101 grams/day/person Per capita range: (25,312)	Women	26 , [7%]	46 , [17%]	17 , [20%]	54 , [20%]	34 , [N/A]	
	Men	27 , [7%]	58 , [20%]	27 , [24%]	48 , [24%]	43 , [N/A]	
	Children	17 , [12%]	54 , [25%]	50 , [13%]	32 , [13%]	40 , [N/A]	
MAIZE FLOUR²⁵ [Vit A (1.5), Zinc (45), Fe EDTA (30). Folic Acid (1.5), B12(0.01)] Per Capita: 169 grams/day/person Per capita range: (8-354)	Women	44 , [10%]	76 , [29%]	30, [34%]	66, [24%]	57 , [N/A]	
	Men	46 , [13%]	96 , [36%]	49 , [35%]	58 , [30%]	72 , [N/A]	
	Children	29 , [20%]	90 , [42%]	91, [66%]	40, [53%]	67 , [N/A]	
SALT [30mg/kg] Per Capita: 6 grams/day/person Per capita range: (4-14)	Women						119 ²⁶ , [20%]
	Men						143 , [27%]
	Children						119 , [51%]

²⁴ Refers to low extraction flours

²⁵ Refers to low extraction maize flours

²⁶ Reducing target to 25mg/kg give the following Children(100%), Women (99%) and Men (119%)

6.4. Premix Specifications

Table 10 provides specifications of the fortificants to be used in formulating premixes and the percentage of the nutrients of interest in the fortificant compounds used. It should be pointed out that the nutrient contents referred to in the tables above refer to the micronutrient content and not the fortificant compound. It is shown here that vitamin A forms are different based on the food vehicles. In the case of edible oil, an oily form of vitamin A is used whereas for flours and sugar, a dry form of the vitamin A is used. The oily version is provided in two different concentrations and although both may perform equally well, extra freight costs for the less concentrated product needs to be considered. Two forms of iron are recommended, specifically ferrous fumarate and sodium iron EDTA. Although the iron content is low for NaFeEDTA, it is recommended for maize flour fortification and whole wheat flour, whereas ferrous fumarate is recommended for low extraction refined wheat flour fortification.

Table 10: Percentage of micronutrients in recommended proposed Fortificants

Foodstuff	Micronutrients	Fortificant Specification	Proportion of Nutrient in Fortificant (%)
OIL	Vitamin A	Retinyl Palmitate- 1.7 m IU/g (oil)	51%
		Or Retinyl Palmitate- 1.0 m IU/g (oil)	Or 30%
MAIZE AND WHEAT FLOUR	Vitamin A	Retinyl Palmitate- 250,000 IU/g (dry)	7.5%
	Vitamin B-9 (Folate)	Folic Acid	90%
	Iron	Ferrous fumarate	33%
	Iron	NaFeEDTA	13%
	Zinc	Zinc oxide	80%
	Vitamin B 12	Vitamin B 12 0.01% WS	0.001%
SALT	Iodine	Potassium iodate	59%

The premix specification for maize and wheat flour provide a suggested addition rate linked to the specific formulation. It should be noted here that these values are minimal addition rates based on cumulative amounts of the individual micronutrients. In the case of wheat flour premix, the nutrients that would satisfy the standard amounts to 340grams per ton and hence the addition rate proposed is 350grams per ton. In a similar manner, the amount of micronutrients that would satisfy the standard for maize flour fortification comes up to 390grams for every ton of flour, and hence the proposition is to use the addition rate 400grams per ton. It is recognized that millers may have preferred addition rates higher than the suggested. High addition rates have the advantage of aiding adequate mixing and improving consistency in nutrient content between flour batches and packs. High addition rates would not be a problem as long as the fortified flour satisfies the specifications. However, high addition rates imply using diluted premixes which may incur high shipping and storage costs. The premix specification for wheat flour and maize flour are provided in Table 11 to 12 respectively.

Table11: Wheat Flour premix specification - Addition rate 350grams per ton

NUTRIENT	Fortificant Compound	Milligrams of Nutrient to add to kilogram flour	Milligrams of Fortification compound that contains required amount of nutrient	Grams of Fortificant Compound in a kilogram of premix	Grams of Nutrient in kilogram of premix
Vit. Aa	Retinyl Palmitate- 250,000 IU/g (dry)	1.5	20.0	57.1	4
Vit. B-9 (Folate)	Folic Acid	1.3	1.4	4.1	4
Vit. B-12	Vit. B-12 0.1% WS	0.01	10.0	28.6	0.03
Iron	Ferrous fumarate ²⁷	55	171.9	491.1	157
Zinc	Zinc oxide	55	68.8	196.4	157
	Filling material (at least 25%)		68.0	408.5	
		TOTAL	340.1	1000.0	
Iron (Whole Wheat Flour)		25	192.3	480.8	63
Zinc (Whole Wheat Flour)		55	68.8	171.9	138

Table 12: Maize flour premix specification²⁸ – Addition rate 400grams per ton

NUTRIENT	Fortificant Compound	Milligrams of Nutrient to add to kilogram flour	Milligrams of Fortification compound that contains required amount of nutrient	Grams of Fortificant Compound in a kilogram of premix	Grams of Nutrient in kilogram of premix
Vit. Aa	Retinyl Palmitate- 250,000 IU/g (dry)	1.5	20.0	50.0	4
Vit. B-9 (Folate)	Folic Acid	1.3	1.4	3.6	3
Vit. B-12	Vit. B-12 0.1% WS	0.01	10.0	25.0	0.03
Iron	NaFeEDTA	30	230.8	576.9	75
Zinc	Zinc oxide	40	50.0	125.0	100
	Filling material (at least 25%)		78.1	219.5	
		TOTAL	390.3	1000.0	

Table 13: Vitamin A Premix for Oil fortification

NUTRIENT	Fortificant Compound	Milligrams of Nutrient to add to kilogram oil	Milligrams of Fortification compound that contains required amount of nutrient	Milligrams of Nutrient in kilogram of premix
Vit. Aa	Retinyl Palmitate- 1.7 m IU/g (oil)	25.0	49.0	510
Vit. Aa	Retinyl Palmitate- 1.0 m IU/g (oil)	25.0	49.0	300

7. Implementation

²⁷ For whole wheat flour fortification, Iron EDTA is proposed and details provided in table

²⁸ Same premix details for fortifying whole maize flour

Member States are at different levels of implementing food fortification programmes with some having mandatory food fortification regulations, whilst others either voluntarily fortify or do not fortify at all. Through these standards, Member States will be in a position to have guidance to develop their local national regulations and or review their existing regulations whilst observing their local context.

Member States are encouraged to use the recommendations in these standards as a way to accelerate adoption of one of the most cost effective interventions towards addressing micronutrient deficiencies and meeting the World Health Assembly targets of 2025 that relates to reduction of Anaemia amongst women of reproductive age by 50% complemented by other interventions such as dietary diversification and supplementation.

Appendices

Comparison of SADC Minimum Standards with other Standards

		SADC AUGUST 2020	SADC March 2019	East Africa Stds	WHO	PER CAPITA, g/day March 2019	PER CAPITA, g/day July 2020
OIL	Vitamin A	25		35		40	22
SUGAR	Vitamin A	10	15			20 - 25	55
SALT	Iodine	30	20-30	40		5	6
MAIZE FLOUR	Vitamin A	1.5	1-1.5	1	3	117 - 150	169
	Zinc Oxide	40	30-60	49	40 Low 80 High		
	Iron EDTA	30	15-40	20 EDTA	20		
	Folic Acid	1.3	0.7-2	1.2	2.6		
WHEAT FLOUR	Vitamin A	1.5	1.5-2.1	1	3	80-175	101
	Zinc Oxide	55	25-40	60	55 Low 100 High		
	Ferrous Fumarate	55	20-80	30 EDTA/ 40Fumarate	60 Low 40 High		
	Folic Acid	1.3	0.7-2	1-3	2.6	2.6	