Harmonisation Workshop for Wheat and Maize Flour Fortification

Nairobi; Kenya; April 19th – 22nd

Fortifying African Products – an interim report

Philip Randall pcubed@mweb.co.za

Supported by Smarter Futures and FFI

Flour Fortification Initiative
A Public-Private-Civic Investment in Each Nation

Methodology 1

- Three Countries – Kenya, South Africa, Tanzania
- Three iron sources for wheat flour – EDTA, Fumerate, Sulphate @ WHO Guideline level for consumption 75 – 149 g/person/day
- Two iron sources for maize meal – EDTA and Fumerate @ WHO Guideline level for consumption > 300 /person/day

Methodology 2

- Wheat flour and Maize meal sourced in country – all vehicles could be considered “medium to high” extraction
- Finished product prepared and evaluated under “local rules”
- Retention samples kept in each country for re-evaluation under local millers instructions i.e. “cool and dry” conditions – after 3 or 6 months (to be decided).

Methodology 3

- Pan Bread – open top
- Chapatti
- Porridge
- Stiff “porridge” – Ugali/Posho

Wheat Flour Pre-Mixes donated by DSM South Africa

South Africa

- SAGL (Southern Africa Grain Laboratory) a SANAS accredited laboratory using an industry accepted methodology (IAM 018) for test baking wheat flour

- Due to mandatory fortification (instituted 2003) the trial used “cake” flour” instead of “bread” flour and did not use maize meal.

RSA Flour

RSA Flour

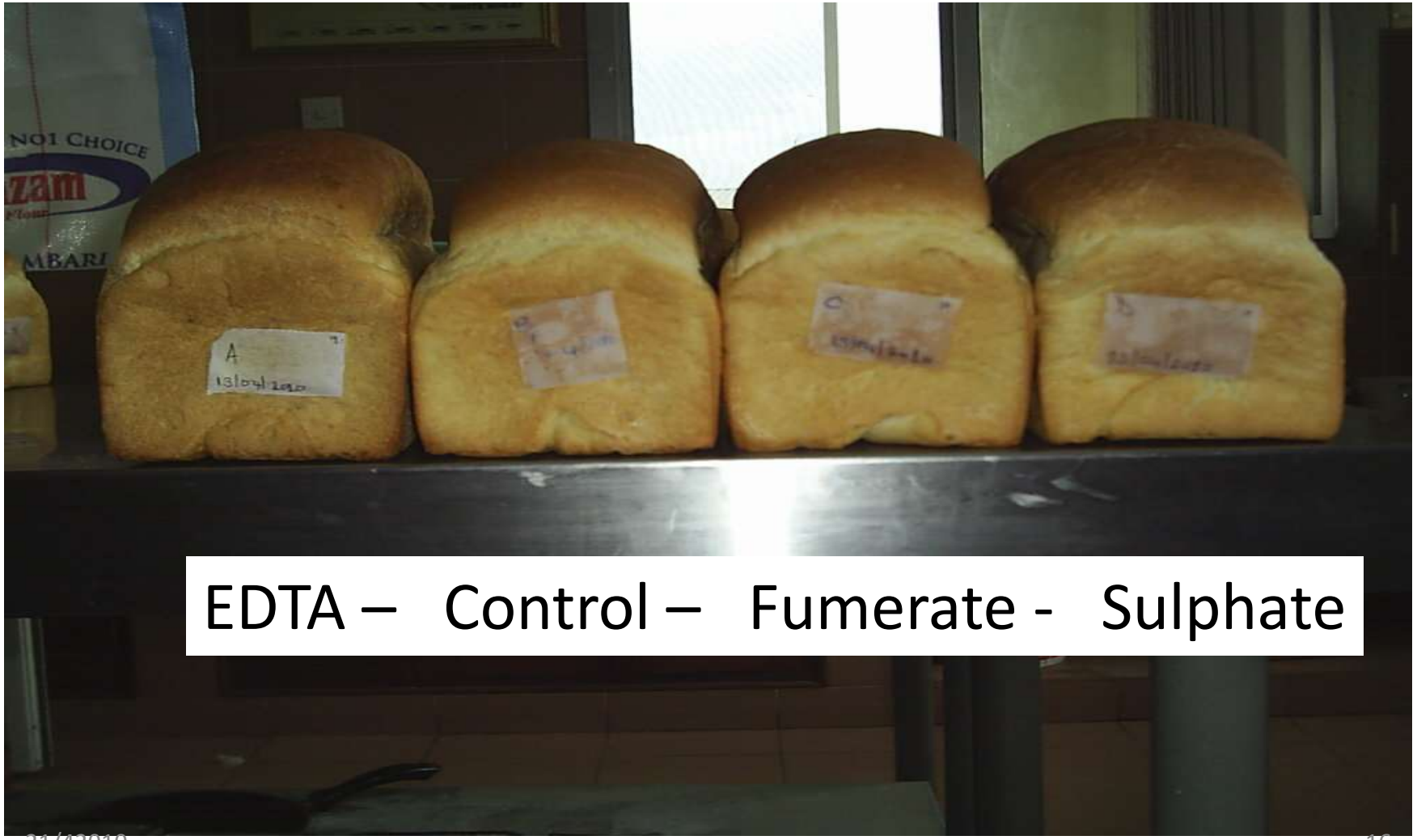
Control 2 – Sulphate – Fumerate – EDTA - Control

Tanzania

- Bakhresa – Buguruni Wheat Mill
- Bakhresa – Mzizima Maize Mill
- Tanzanian Food & Nutrition Centre (TFNC)

- All used in-house Nationally accepted methodology based on recognised international practice

Tanzanian Wheat Flour - Mill



Tanzanian Wheat Flour - Mill

EDTA - Control

Fumerate - Sulphate

Tanzanian Flour - TFNC

Bakhressa TFNC

EDTA–Control–Fumerate-Sulphate

Sulphate-Control-EDTA-Fumerate

Tanzanian Flour - TFNC

Bakhressa

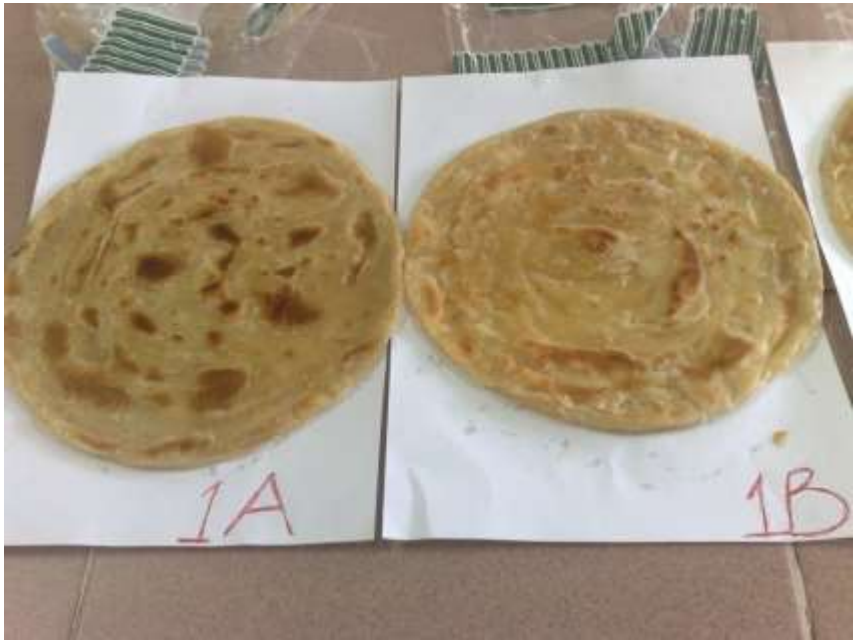
TFNC

EDTA–Control–Fumerate-Sulphate

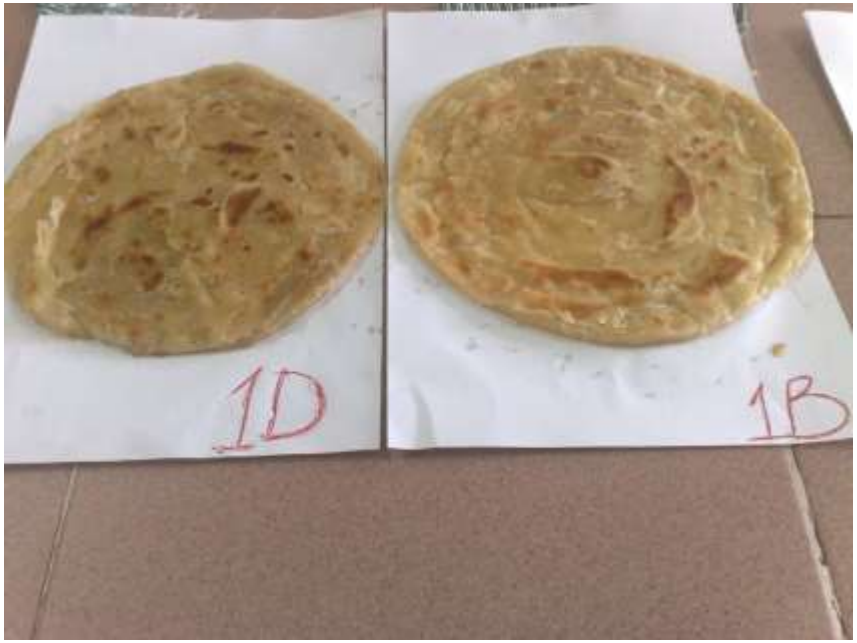
Sulphate-Control-EDTA-Fumerate

Tanzanian Wheat Flour - Mill

EDTA - Control



Sulphate - Control



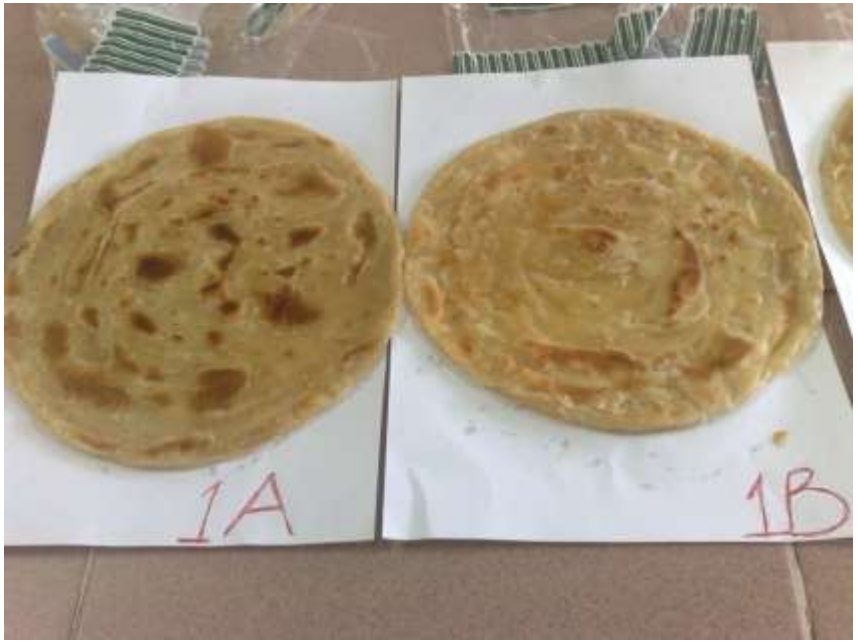
Tanzanian Wheat Flour - Mill

Fumerate - Control

Tanzanian Wheat Flour - TFNC

Mill - TFNC

EDTA - Control



Sulphate- Control
EDTA - Fumerate

Tanzanian Maize Meal - Mill

EDTA - Control

Control - Fumerate

Tanzanian Maize Meal - TFNC

Tanzanian Maize Meal - TFNC

BREAD

	Control	EDTA	Fumerate	Sulphate	Control 2
SAGL	Satisfactory	Slightly dark. Spotting. Faint taste but satisfactory	Satisfactory	Satisfactory	Slightly dark
Tanzania Mill	Satisfactory	Spotting. Satisfactory	Faint taste but satisfactory	Satisfactory	N/A
Tanzania TFNC	Relative colour intensity – Sulphate/Control/EDTA/Fumerate Nothing significantly detectable and none considered rejectable				N/A
GROUP					

BREAD

	Control B	EDTA E	Fumerate D	Sulphate A	Control 2 C
SAGL	Satisfactory	Slightly dark. Spotting. Faint taste but satisfactory	Satisfactory	Satisfactory	Slightly dark
Tanzania Mill	Satisfactory	Spotting. Satisfactory	Faint taste but satisfactory	Satisfactory	N/A
Tanzania TFNC	Relative colour intensity – Sulphate/Control/EDTA/Fumerate Nothing significantly detectable and none rejectable				N/A
GROUP +ve	16%	11%	8%	26%	0%
GROUP -ve	11%	34%	11%	11%	30%
Group Undecided	63%	56%	71%	63%	70%

Chapatti's

	Control	EDTA	Fumerate	Sulphate
Tanzania Mill	Satisfactory	Slight green brown colour and faint aroma	Satisfactory	Faint green brown colour
	All samples had satisfactory eating characteristics			
Tanzania TFNC	Control "shinier" (more attractive) All samples had satisfactory eating characteristics			

Porridge

	Control	EDTA	Fumerate
Tanzania Mill	"Some slightly different colour" with EDTA and Fumerate described as faintly "greenish white" when directly compared to each other but all considered acceptable.		
Tanzania TFNC	No differences noted – all acceptable.		

Impacts on Asian Food Products

(preliminary data)

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Annoek van den Wijngaart

11 November 2009

Results (noodles)

Foods	Results
Wet noodles	Overall insignificant changes. NaFeEDTA slightly darker (Indonesia), no other differences in texture, taste, aroma. Spots on dough sheet (Philippines), but no differences texture, taste, aroma
Yellow alkaline noodles	Slight but acceptable differences in sensory characteristics of noodles
Instant noodles	No significant differences in processing properties, slight but acceptable changes in sensory characteristics, firmness and colour

Results (bread)

Foods	Results
Steamed bread	Acceptable end product. Slight changes: NaFeEDTA slightly darker, ferrous fumarate slightly lighter (Indonesia), no differences in texture, taste aroma. Grayish brown spots in dough (Philippines) but acceptable end product.
Pan bread	No differences in colour, texture, flavour, taste and overall acceptability (Sri Lanka) Slight difference in colour- NaFeEDTA slightly darker, no differences texture, taste aroma (Indonesia).
Sandwich bread	No sensory differences, slight colour differences (more yellow) between control and fortified, firmness same (Malaysia) - Normal but grayish spots were visible, slight differences in crust but acceptable (Philippines)
Soft rolls	In dough normal but grayish brown spots (Philippines), acceptable finished product
Hard crust rolls/baguettes	In dough normal but grayish brown spots, acceptable finished product (Ph)

Results (others)

Foods	Results
Martabak	Colour slightly darker with NaFeEDTA, no differences for texture, taste aroma (Indonesia)
Roti (canai)	No differences in sensory (Malaysia)- No differences in terms of colour, texture, flavour, taste and overall acceptability of the product (Sri Lanka)
Chapatti	NaFeEDTA is overall preferred
Puri	Control least preferred, ferrous sulphate most prefered overall
Pittu	all acceptable, slight colour differences
Godamba roti	all acceptable, slight colour differences
String hoppers	all acceptable

Conclusion

- Overall minimal differences between fortified and non-fortified products.

- Minimal reported differences between products fortified with different iron compounds.

- Overall acceptibility of fortified products same as control.

- It appears to be possible to fortify Asian foods with flour fortified as per the new WHO recommendations.

Current Thought Patterns 1

- This initial set of trials incomplete and have focussed on differences within a closed sample set and panels advised there are differences i.e. direct comparisons possible
- In Asia and Africa some within set differences have been noted
- Overall opinion is nothing objectionable or significant except .....

Current Thought Patterns 2

- ... 2 respondents (“NO” – “NO” – “YUCK”) comments to Control 2 – EDTA – Control
- ... 2 respondents clearly preferred EDTA

- More work needed especially in area of lower and higher levels (with normal mill variability)
- Wider evaluation by respondents without direct comparison