



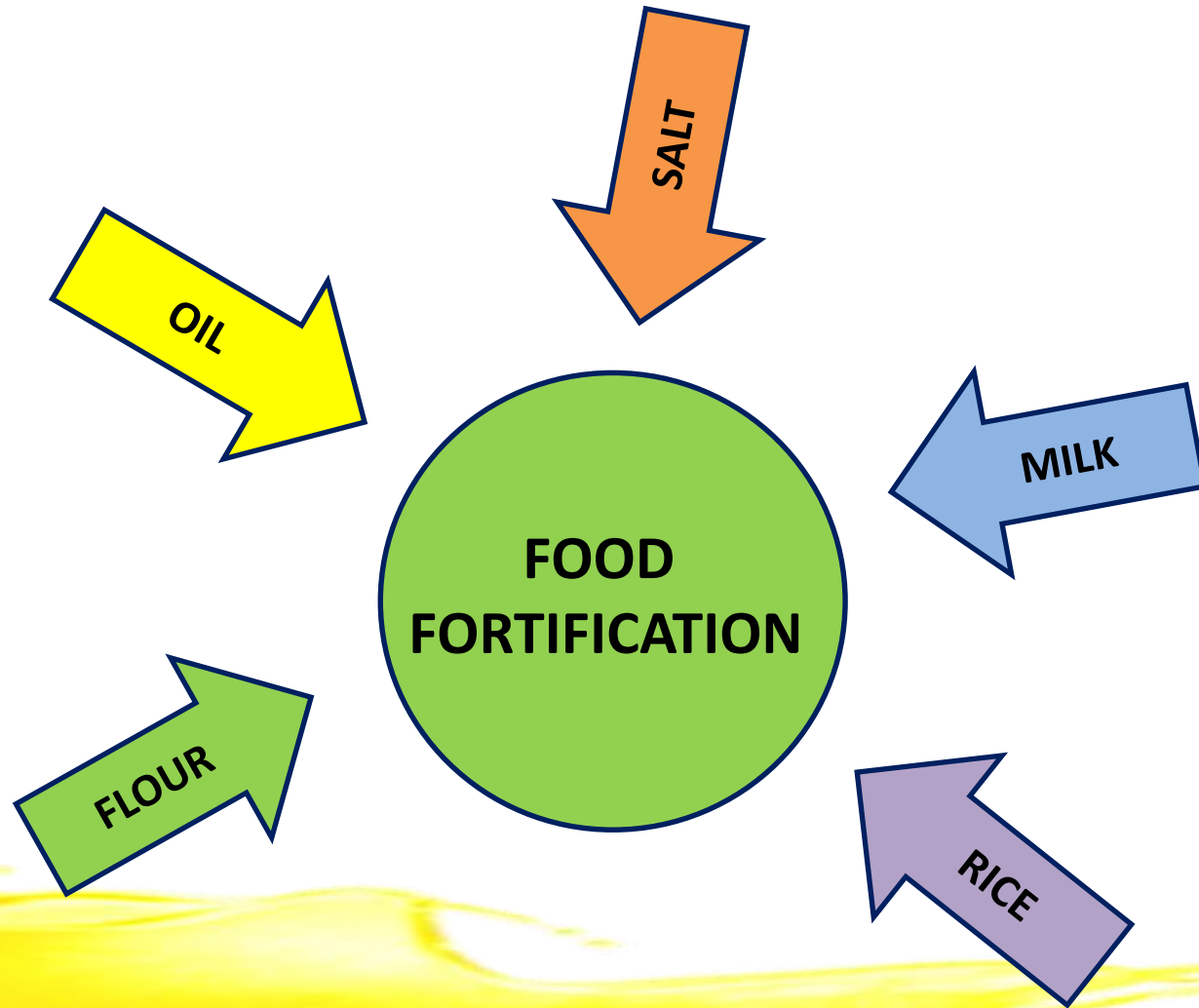
FOOD FORTIFICATION

**Presentation By – Mr. Prashant Babu Bhat – Chief R&D Officer
Mother Dairy Fruit and Vegetable Private Limited, Delhi
9th August 2019**

Why Fortification?

“Millions of people suffer and may die from lack of minute traces of nutrients. Methods of prevention are cheap and simple. Their universal application could yield health and economic benefits comparable to those achieved by the smallpox eradication”.

Food Fortification



FOOD FORTIFICATION

Means deliberately increasing the content of essential micronutrients in a food so as to improve the nutritional quality of food and to provide public health benefit with minimal risk to health (FSSR).

Micronutrient Deficiencies

Vitamin and Mineral Deficiencies	Impact on health
Vitamin A	Night blindness ,Visual impairment and blindness
Vitamin D	Rickets, Osteoporosis
Iodine	Stillbirth , Spontaneous abortion, Cretinism, Mental impairment
Iron	Anemia, Ill health ,premature death
Zinc	Skin eruption(rashes) ,Diarrhea
Folic acid	Neural tube defects of birth(Spina bifida)

Prevalence of Micronutrient Malnutrition

- Vitamin D – up to 94%
- Vitamin A- 62 %
- Iron – 40 %

Global Evidences of Food Fortification

Iodine

- Switzerland 1923
- USA 1930
- India 1964

Vitamin D

- Denmark 1918, India 1953
- Indonesia 1996, New Zealand 2007
- Mexico 2002

Vitamin A

- USA, UK 1923, Malaysia 1985, Thailand 1993, Mexico 2002
- India 1953, Chile 1997, Mexico 1974
- Central America 1974, Philippines 2000

Iron, B1, B2, Niacin, Folic Acid

- Canada 1933, USA 1941
- Chile 1954 | Australia 2009
- Costa Rica 1991, Philippines 2001

Zinc

- Indonesia, 1998
- Costa Rica, 1991



Fortification is not new – it's a century old technology

Milk Fortification Regulation

- FSSR gazette standards for fortification of Milk (DTM, TM, SM, STD) with Vitamin A or Vitamin D singly or combination

Nutrient	Minimum level per litre	Source of Nutrient
Vitamin A	270 µg RE - 450 µg RE (900 - 1500 IU / Lit)	Retinyl acetate, Retinyl palmitate and Retinyl propionate
Vitamin D	5 µg - 7.5 µg (200- 300 IU per Lit)	Cholecalciferol, Ergocalciferol

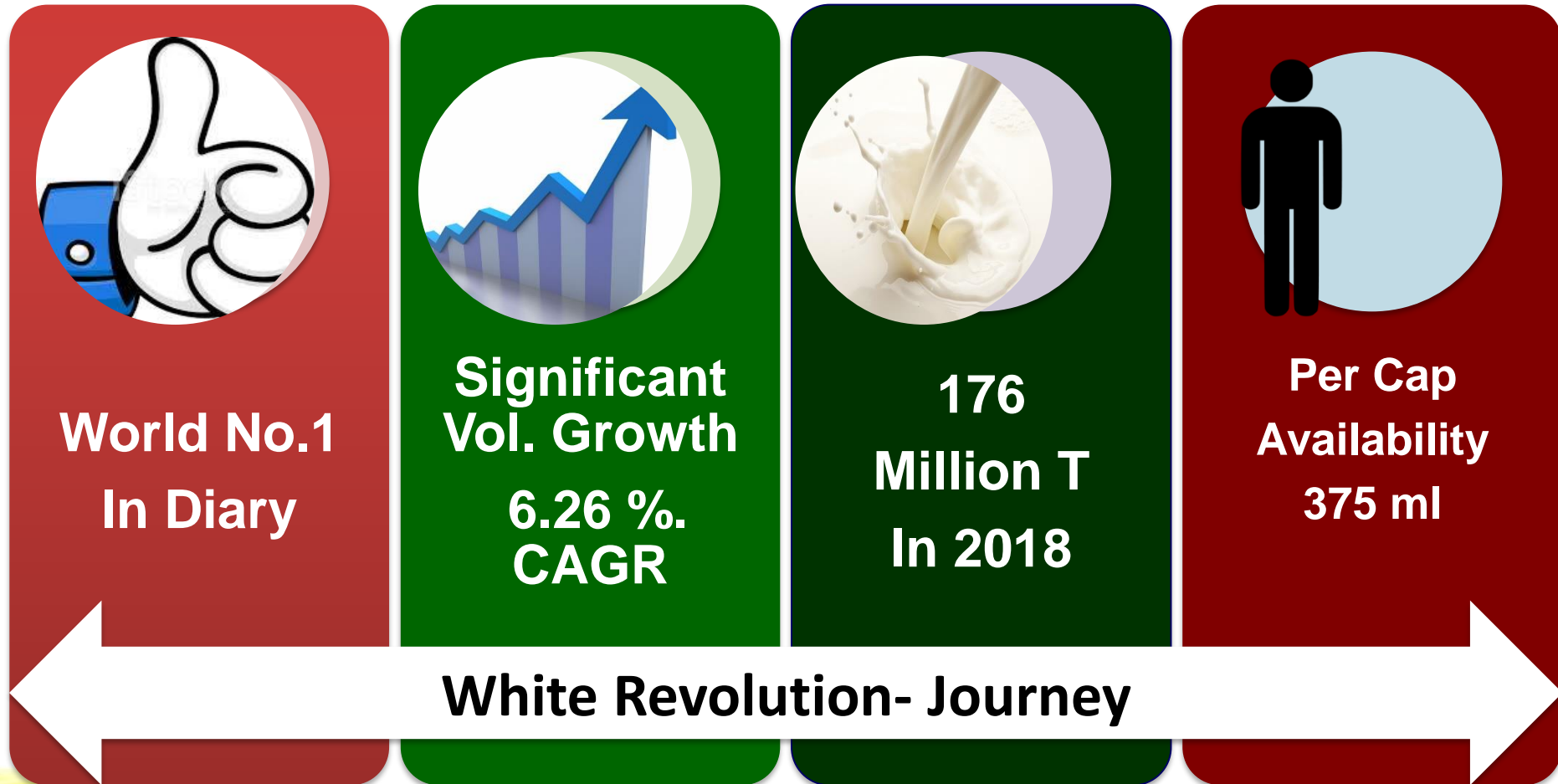
Oil Fortification Regulation

Nutrient	Minimum level	Source of Nutrient
Vitamin A	6 µg RE - 9.9 µg RE per gm of oil (20-33 IU / g)	Retinyl acetate, Retinyl palmitate and Retinyl propionate
Vitamin D	0.11 µg- 0.16 µg per gm of oil (4.4 - 6.4 IU per g)	Cholecalciferol, Ergocalciferol

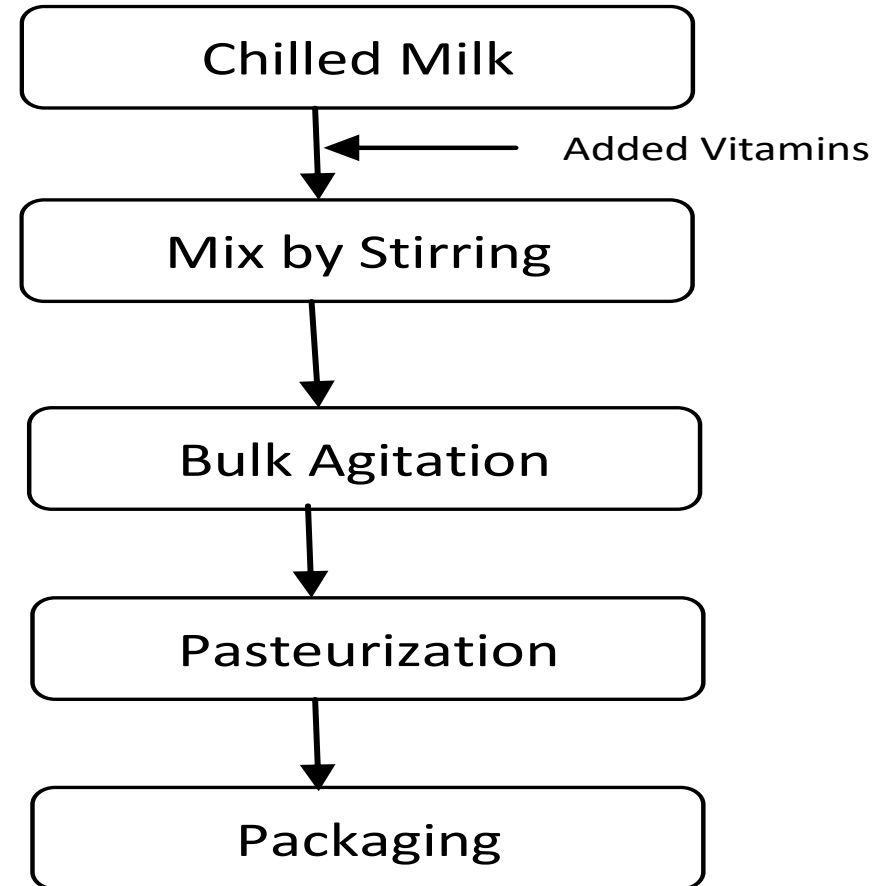
Milk as a Vehicle of Fortification



Growth of Dairy Sector in India



Fortification in Milk : Process



Fortification Journey @ Mother Dairy



Bulk Vended Milk
Vitamin A - @2000
IU/LTR

1984



DHARA - Oil
Vitamin A- 25 IU
Vitamin D-2.0 IU
Per gm

2006



Bulk Vended Milk
Vitamin A - 770 IU
Vitamin D - 550 IU
Per LTR

Nov' 2016



Poly Pouch Milk
Vitamin A - 770 IU
Vitamin D - 550 IU
PER LTR

Jan' 2017

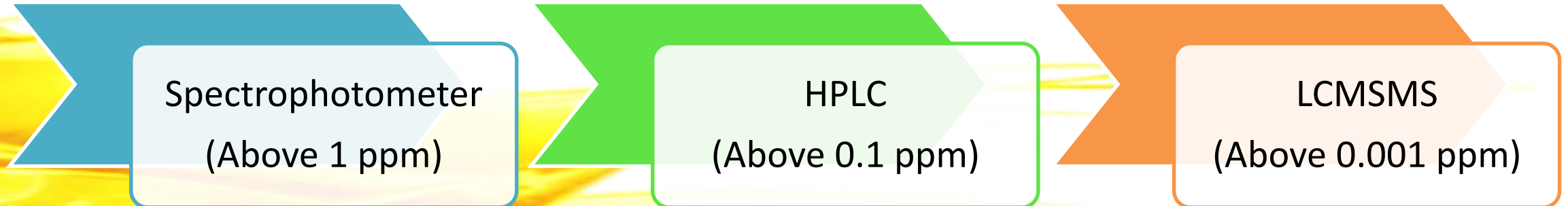


Bulk Vended Milk
Vitamin A - 1200 IU
Vitamin D - 250 IU
Per LTR
As per New Regulation

Dec' 2018

Total Production 30 Lakh Liters per Day- Fortified Milk
Entire range of Dhara is Fortified

Nutrients	Form of fortification	Commodities	Level of fortification (as per FSSAI)	Analytical Detection Techniques
Vitamin A	Retinyl acetate , Retinyl palmitate	Milk	270 µg RE - 450 µg RE per Litre	Spectrophotometer, HPLC, LCMSMS
		Oil	6 µg RE - 9.9 µg RE per gram	
Vitamin D	Cholecalciferol or Ergocalciferol (From plant sources)	Milk	5 µg -7.5 µg RE per Litre	HPLC, LCMSMS
		Oil	0.11 µg – 0.16 µg per gram	



Strengthening for making Healthier INDIA



Mother Dairy Fortified Milk within
10 days soon after
Operationalization Regulation

FSSAI accreditation **Mother Dairy** as 'Early Adopters'

THANK YOU

