Asian workshop on Iron Fortification of Foods
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Research and application of complimentary food fortification in Vietnam

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Situation analysis

At the time of start of project (1996)

- **High prevalence in infants and young children of:**
  - ✓ **Growth retardation (37% in under five)**
  - ✓ **Iron deficiency anemia (60 % in infants)**
  - ✓ **Vitamin A deficiency**

National surveys
Specific

- **Low nutritional knowledge**
- **Inappropriate complementary feeding (***too early introduction, too short duration, low nutritional quality, no use of special transition foods)*
- **Low income but high interest in complementary foods**
- **Strong « social network » (Women Union…)**

Institutional framework

Willingness of Vietnamese authorities and local partners for action

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National plans of Action for Nutrition 1995 - 2000 and 2001 - 2010

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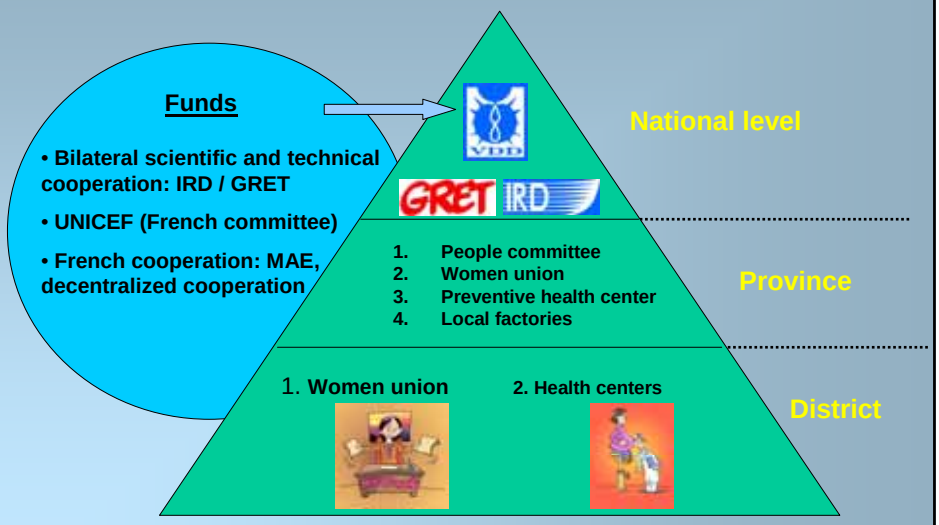
National Plan of Action for Food Fortification in Vietnam 2001-2005

Pilot Phase (1997-2003)

Partners and funds



Objective of pilot phase of Fasevie program

To promote the use of adequate feeding practices and complementary foods by infants and young children in population with limited economic resources in three provinces of the central region of Vietnam (Ha Tinh, Da Nang and Quang Nam) to reduce stunting by 10% and prevent micronutrient deficiencies in infants and young children in two years after start of implementation.

Strategy

- Production of low cost complementary foods of appropriate nutritional quality made with local raw materials
- Production in small sustainable production units disseminated in Vietnam to decrease transportations costs and cover all areas especially poor remote areas
- Social promotion including nutritional education

Places of the pilot phase of FASEVIE

Some of the poorest areas with high level of malnutrition

(center north, and center of Vietnam)

↓

Different situations and environments

Activities

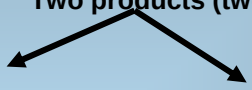
- **Production of low cost complementary foods of appropriate nutritional quality made with local raw materials**
- **Production in small sustainable production units disseminated in Vietnam to decrease transportations costs and cover all areas especially poor remote areas**
- **Social promotion including nutritional education**

Definition and formulation of the products

Characteristics

- Appropriate energy and nutrients density (to meet gastric capacity)
- Liquid or semi-liquid consistency
- Low cost

Two products (two specific uses)



Infant flour

Complete
Easy to prepare (instant flour)

Food complement

Lower cost
To complete qualitatively and quantitatively the traditional rice gruels (chao-bot)
Needs to be cooked

To meet the nutritional needs for children between 6-24 months of age when consumed 2 to 3 times per day

Organoleptic criteria

Sensorial analyse

Infant flours

Rice (52%), soybean (21%), sesame (5%), sugar (15%), dried whole milk (5%), salt (0.7%), Vitamin-Mineral premix (1.3%)

0.8 USD / 400 g

0.4 USD / 250 g

Preparation of gruel with appropriate viscosity, high energy density and digestibility, fortified with Vitamins and Minerals

Instant flour: nutrient contents (per 100 g DM)

Nutrient	Quantity	Nutrient	Quantity
Protein	> 15g	Pantothenic acid	800 µg
Lipids	> 6g	Vitamin K1	13 µg
Carbohydrates	> 68g	Sodium	290 mg
Energy	400 kcal	Potassium	500 mg
Vitamin A	400 U.I.	Calcium	500 mg
Vitamin C	9 mg	Phosphorus	450 mg
Vitamin B1	200 µg	Magnesium	75 mg
Vitamin B2	280 µg	**Iron**	**15 mg**
Nicotinamide	4000 µg	Zinc	3,2 mg
Folic Acid	12 µg	Copper	150 µg
Vitamin B12	0,12 µg	Manganese	4 µg

Food complement

soybean (87.7%), Ca3(PO4)2 (6.1%), food grade amylase, salt (3.1%), VM premix (3.5%)

Added with chao or bot, it brings an appropriate viscosity, high energy density and digestibility, fortified with Vitamins and Minerals (3 times the quantity added in instant flour)

Activities

- Production of low cost complementary foods of appropriate nutritional quality made with local raw materials

- **Production in small sustainable production units disseminated in Vietnam to decrease transportations costs and cover all areas especially poor remote areas**

- Social promotion including nutritional education

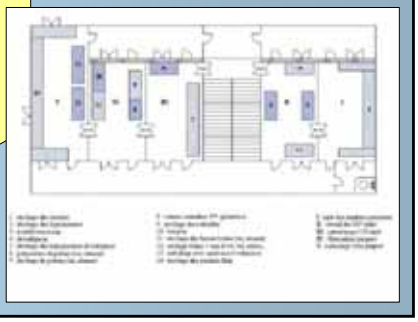
Production units

Economic criteria

Low cost production units

Capacity of production in accordance with local market

Flexibility and adaptability



Technical choice: Extrusion cooking for instant flour

Low cost locally-made extruders

Capacity of 30kg/hours

1200 euros

Capacity of 75kg/hours

1500 USD

Improvement of technology during the implementation (screw…)

Additional Technology support

Mixers

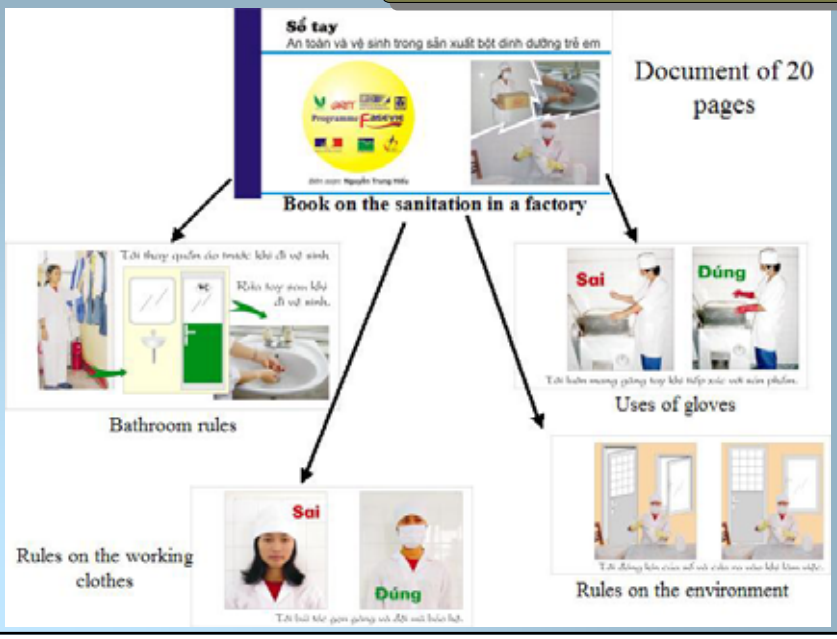
Grindings

Thermo-sealling

Roaster

Training of workers

Good production practices



Production evaluation / quality control

- HACCP: complete quality control system → Daily
- Nutrient composition and microbiology (internal + external) → Monthly+random

  Composition (Micronutrients) → IRD
- Production monitoring: hygiene, safety, workers security → Twice monthly

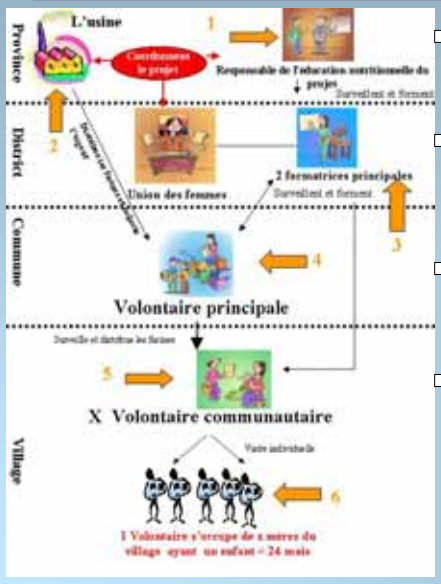
Activities

- Production of low cost complementary foods of appropriate nutritional quality made with local raw materials
- Production in small sustainable production units disseminated in Vietnam to decrease transportations costs and to cover all areas especially poor remote areas
- **Social promotion including nutritional education**

Social promotion activities

Social promotion concerns all activities of communication which goal is a voluntary change of practices to improve the nutritional status

Community volunteers network



- Province: team for nutritional education
- District: Women Union Principal trainers
- Commune: principal volunteers
- **Village**

Community volunteers

Message adapted to the age of infants

Sustainability: 10% margin on sale

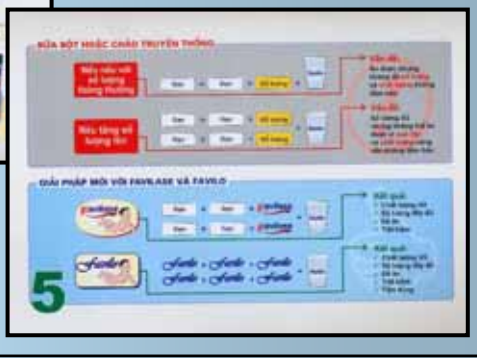
Training of community volunteers

Malnutrition, nutritional needs, good nutritional practices, breastfeeding, complementary foods…….

Social promotion booklet

Nutritional needs of infants and under 24 mo children

Social promotion booklet



How to use the Fasevie products to meet nutritional needs

Social promotion booklet

Breast-feeding and complementary foods

Social promotion newsletter


Thông tin Dinh dưỡng

Số 2
05/2002

Lời ban biên tập

Ông Bertrand SAVIGNOL kết thúc nhiệm kỳ công tác tại Việt Nam

Hội liên hiệp phụ nữ Thăng Bình mở lớp tập huấn kỹ năng viết tin cho cộng tác viên chương trình dinh dưỡng

Đoàn đại biểu tỉnh Bắc Cạn đến thăm và làm việc với Hội liên hiệp phụ nữ huyện Thăng Bình

News letter of the Women Union in Quang Nam

Volunteers

Mothers

Evaluation of social promotion impact

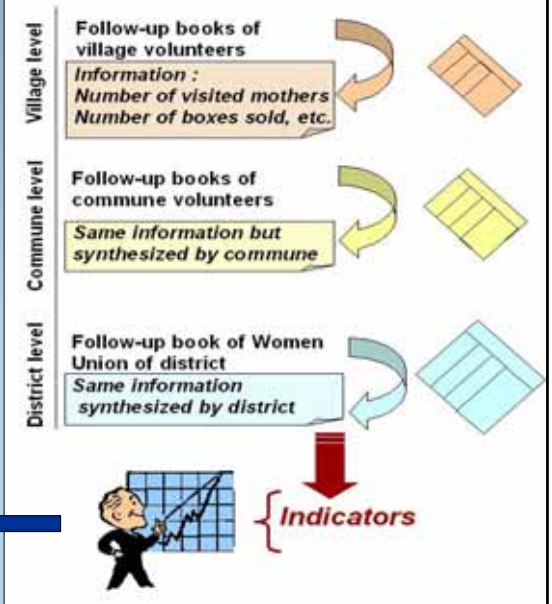
Follow-up books

(monthly indicators) followed by action

Sustainability: 10% margin on sale

Information regularly analyzed

Changes / Improvements



Other utilizations of Fasevie products

Fasevie products used by the National malnutrition program in pilot areas (Child and Mother Protection Center)

Volunteers from Women Union participate to both Fasevie and CMPC programs

Use of the Fasevie products in emergency programs (WFP, International Plan, MSF)

Impact of the program

Changes (improvement) in health, nutritional status and feeding practices related to the program

Efficacy study

Effectiveness study

Efficacy study

Objective

To test the efficacy of regular consumption of gruels prepared from instant flour or from rice with the food complement, used as complementary foods, to prevent or reduce stunting and anemia in Vietnamese breastfed infants.

Subjects

5 months ± 7 days old breastfed infants
(min. 134 per group → 102 at final)

Tam Ky district, 36 villages randomly divided in 3 groups

No intervention
Usual feeding practices

Favina gruel

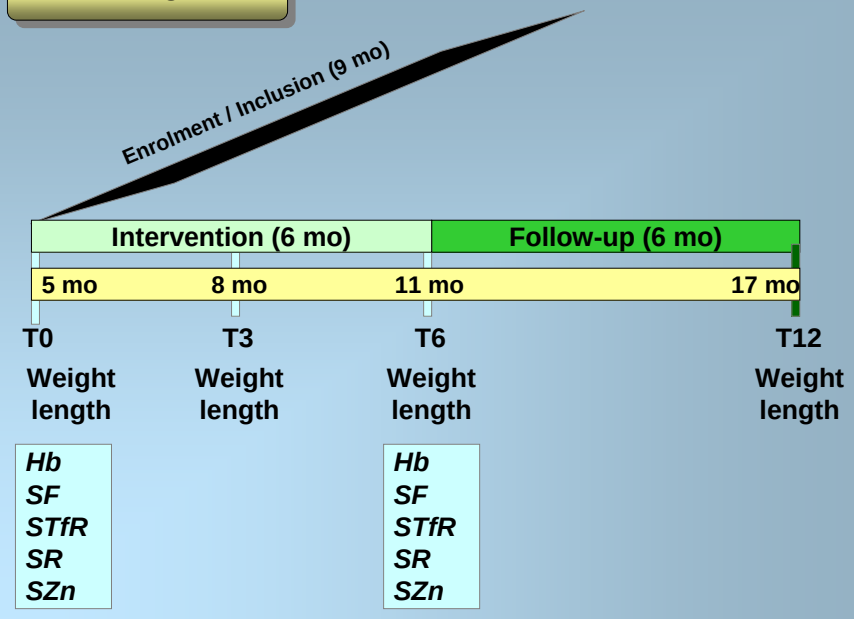
Rice gruel + Favilase

≥ 2 meals/day under supervision

Food distribution

Distribution of meals through canteens (7 AM- 6 PM)

Design



Design

Other variables:

- Quantity of instant flour / gruel with food complement consumed → Daily
- Morbidity → Daily
- Feeding practices → Weekly
- Food consumption *(Energy and nutrient intake)* → at 6, 7, 8 and 9 months of age
- Socio-economic situation of the household

Informed consent from mother / father

Agreement of Scientific Committees of Medical School of Hanoi and NIN

Methods

Blood analysis

In preventive health center of Quang Nam

- Hb: cyanomethemoglobin method with Sigma kits and Diamed controls

Micronutrient department of NIN (Dr NX Ninh)

- SF and STFR: Elisa with Ramco kits
- SR: HPLC
- SZn: FAS

Statistics

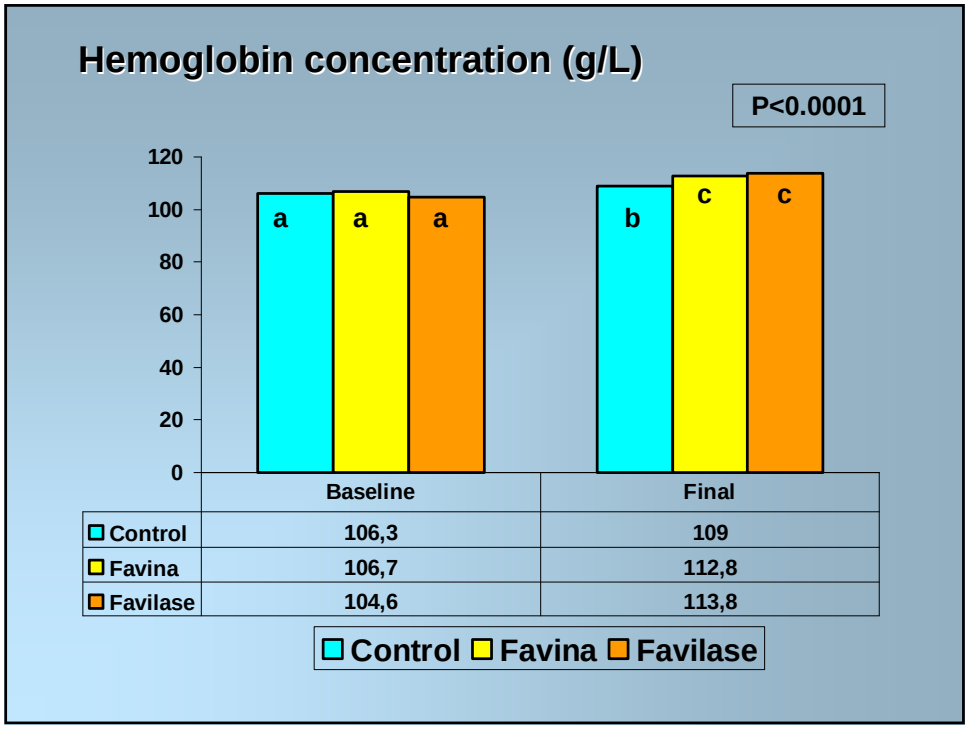
- Repeated Measure ANOVA for continuous variables
- Logistic regression for dichotomic variables

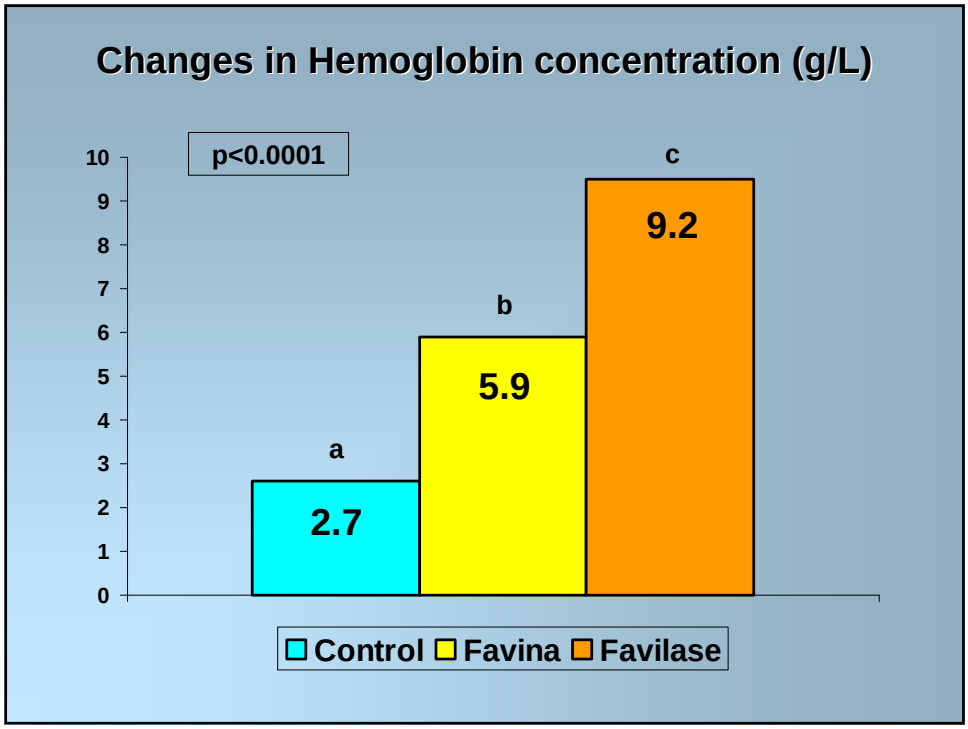
Preliminary results

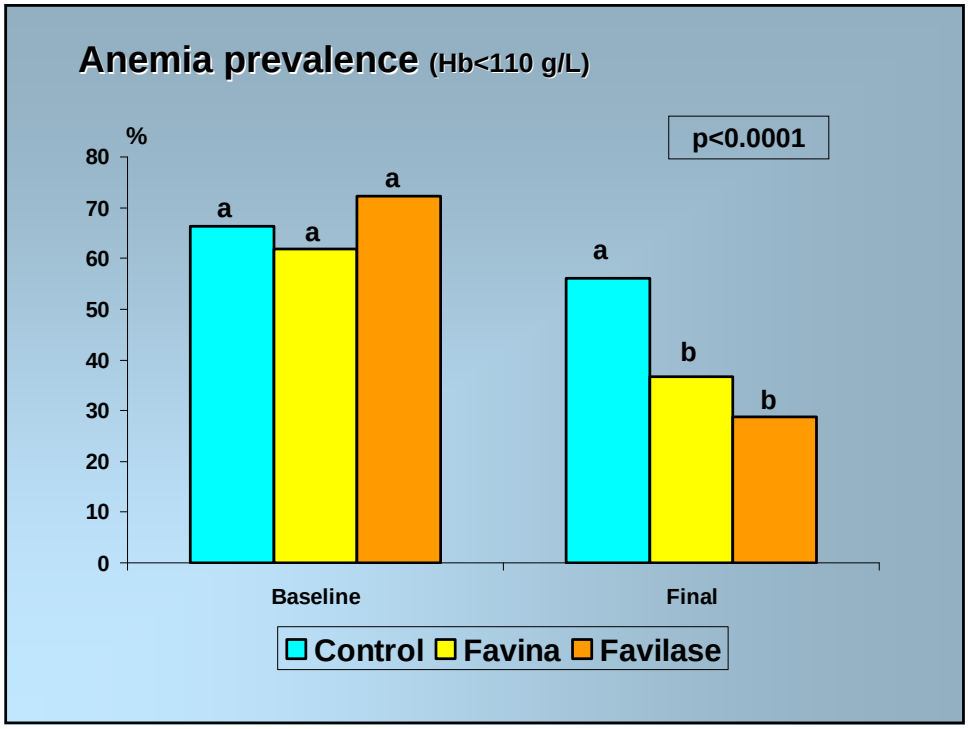
Dropouts rate : 18%

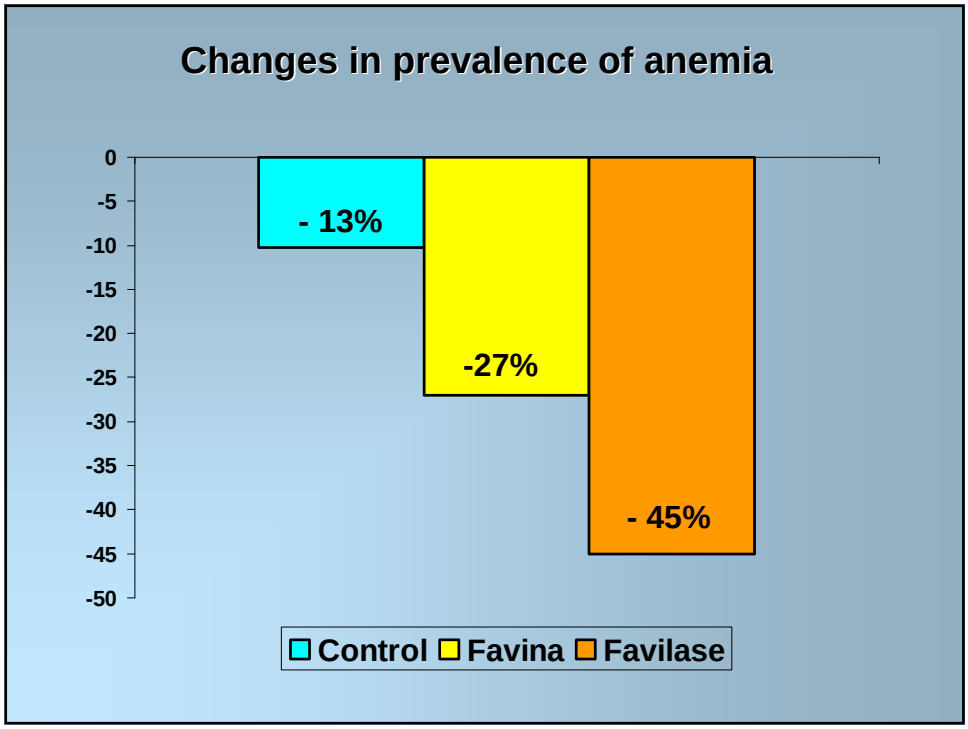
Sample size at the end of intervention period

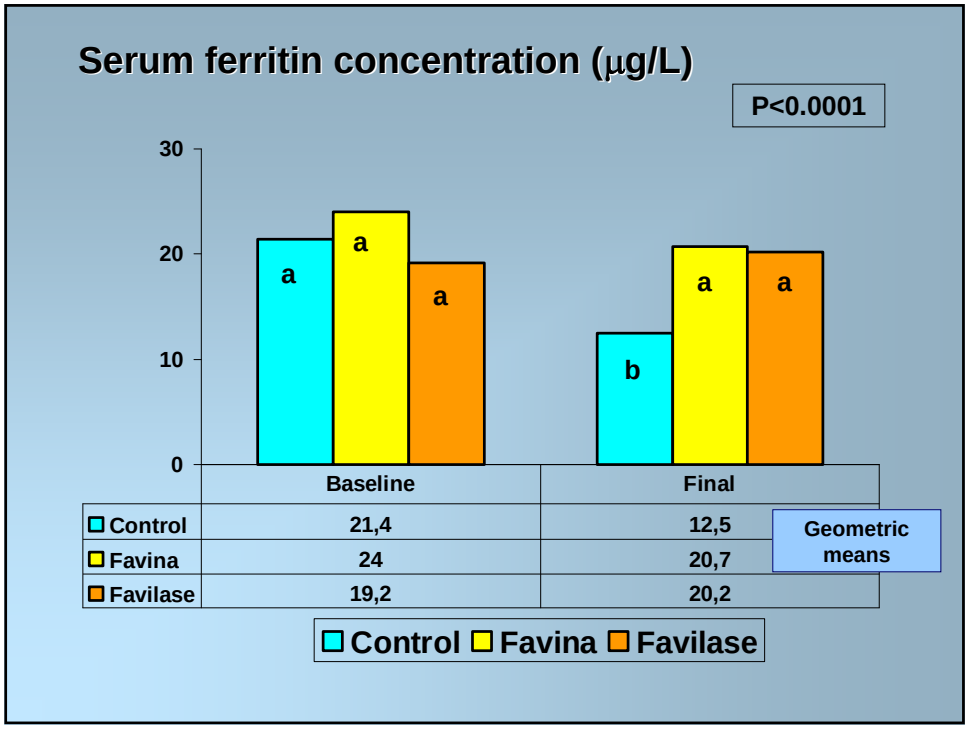
Control	Favina	Favilase
N=123	N=108	N=123

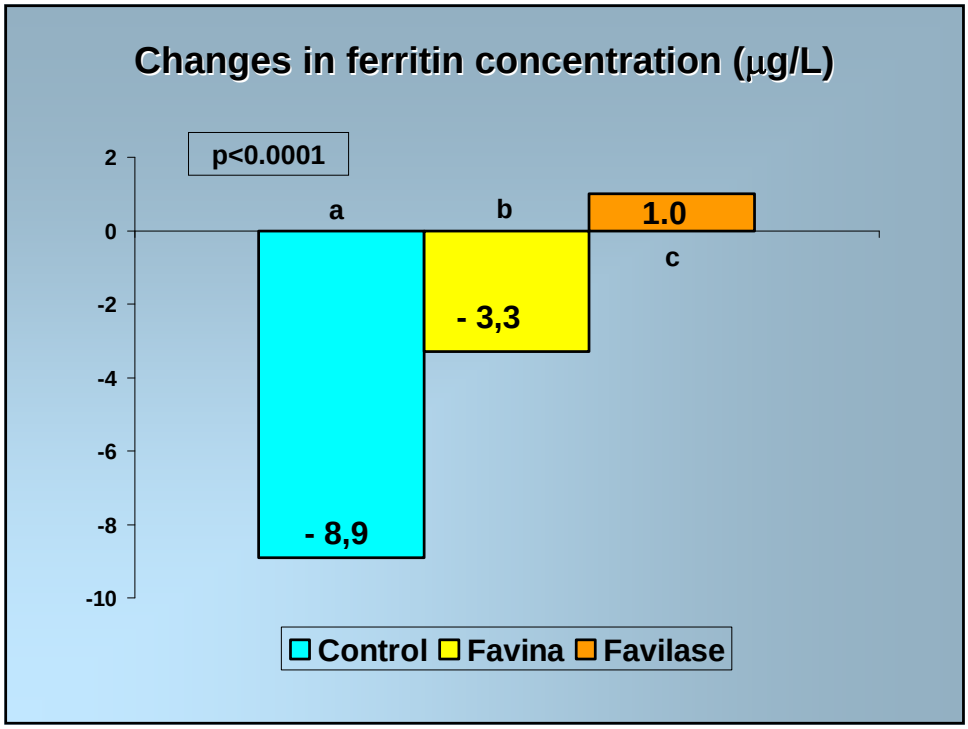

Hemoglobin concentration (g/L)
P<0.0001
120
100
80
60
40
20
0
a
a
a
b
c
c
Baseline
Final
Control 106,3 109
Favina 106,7 112,8
Favilase 104,6 113,8
Control Favina Favilase

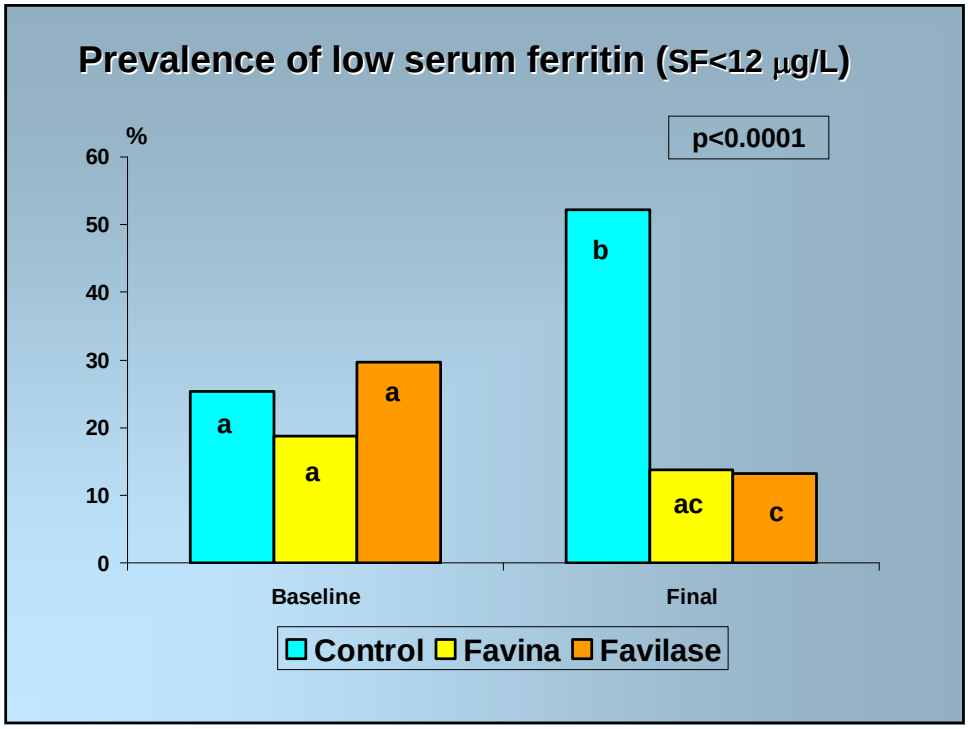

Changes in Hemoglobin concentration (g/L)
p<0.0001
10
9
8
7
6
5
4
3
2
1
0
a
2.7
b
5.9
c
9.2
Control Favina Favilase

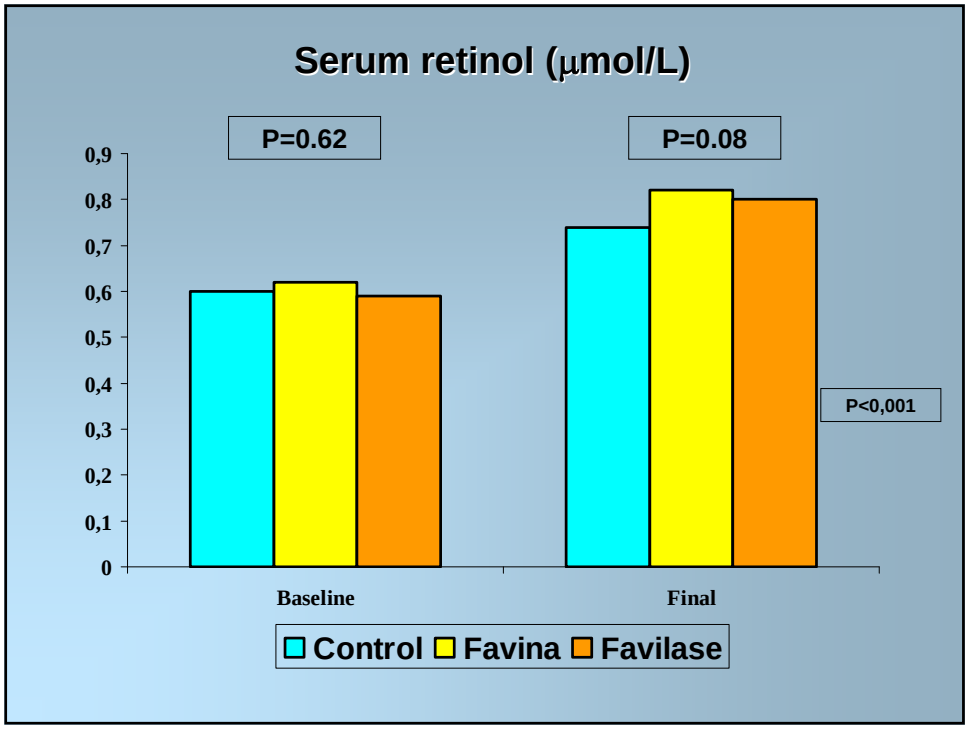

Anemia prevalence (Hb<110 g/L)
%
p<0.0001
80
70
60
50
40
30
20
10
0
a
a
a
a
b
b
Baseline
Final
Control
Favina
Favilase


Changes in prevalence of anemia
0
-5
-10
-15
-20
-25
-30
-35
-40
-45
-50
- 13%
-27%
- 45%
Control
Favina
Favilase

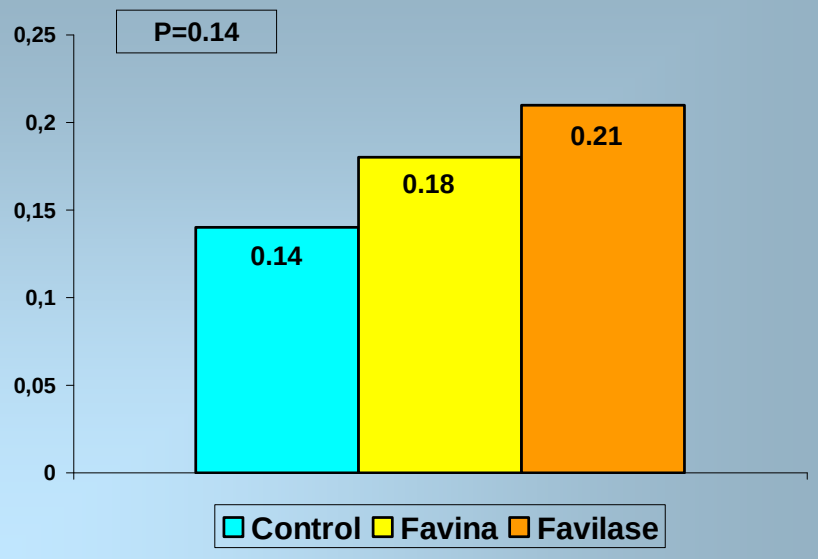

Serum ferritin concentration (µg/L)
P<0.0001
30
20
10
0
a
a
a
b
a
a
Baseline
Final
Control 21,4 12,5
Favina 24 20,7
Favilase 19,2 20,2
Geometric means
Control Favina Favilase


Changes in ferritin concentration (µg/L)
p<0.0001
2
0
-2
-4
-6
-8
-10
a
b
1.0
c
- 3,3
- 8,9
Control Favina Favilase


Prevalence of low serum ferritin (SF<12 µg/L)
%
p<0.0001
60
50
40
30
20
10
0
a
a
a
b
ac
c
Baseline
Final
Control
Favina
Favilase


Serum retinol (µmol/L)
P=0.62
P=0.08
P<0,001
0,9
0,8
0,7
0,6
0,5
0,4
0,3
0,2
0,1
0
Baseline
Final
Control
Favina
Favilase

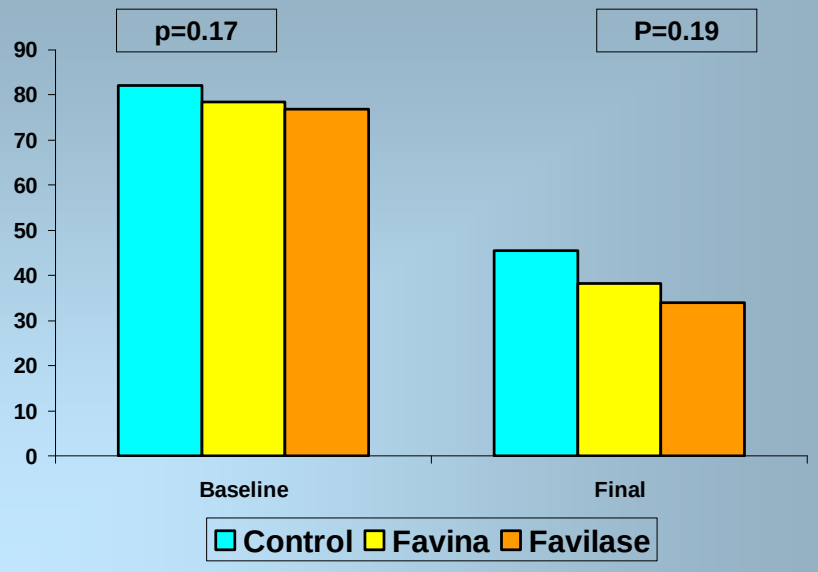
Changes in serum retinol (μmol/L)



Preliminary conclusions (I)

- High prevalence of anemia (68%) in 5 month old infants at baseline
- Mean Hb increased significantly in all groups but significantly more in both experimental groups (and significantly more with Favilase compared to Favina)
- Prevalence of anemia decreased significantly in both experimental groups (- 45 and - 27%) but not in control group (- 13%). At the end of intervention period, prevalence of anemia was about 56% in control group and about 30% in other groups.

Prevalence of low serum retinol (SR<0.7 μm/L)



Preliminary conclusions (II)

- Prevalence of iron deficiency (low iron stores) was about 25 % in 5 month old infants
- Mean SF concentration decreased significantly in the control group but did not change significantly in both experimental groups
- Prevalence of low SF decreased in both experimental groups (significantly in the Favilase group) whereas it was twice higher in control group at the end of intervention period. Final prevalence of ID was significantly higher in control group (52%) compared to both groups (about 13%).

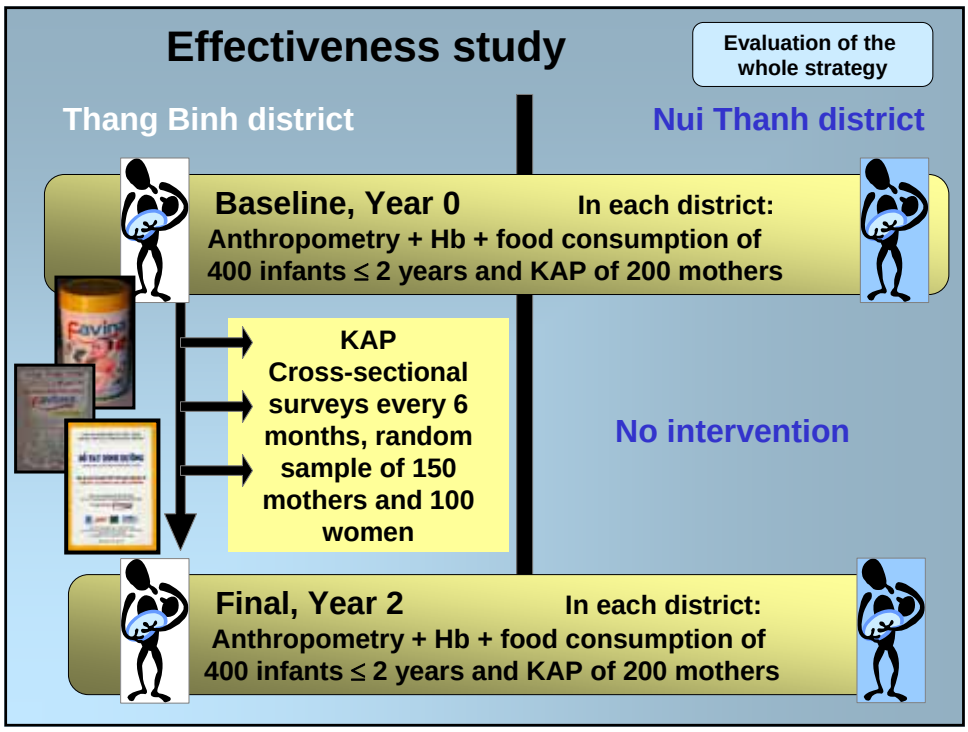
Preliminary conclusions (III)

- High prevalence of low SR concentrations (80%) in 5 month old infants (baseline)
- Mean SR increased significantly and prevalence of low SR values decreased significantly in all groups during the intervention period.
- At the end of the intervention period, prevalence of low SR was still about 30% in experimental groups and about 45 % in the control group
- Slight better effect of both Fasevie products (especially Favilase)

Further analysis

- More variables of iron status (STfR) and zinc status (Serum zinc)
- Anthropometry (nutritional indices)
- Quantity of products and food consumption
- Morbidity
- …

Effectiveness study



Some preliminary results

for the last 7 months

Number of mothers in the intervention district: about 6100/mo

- 52 % of mothers have been visited by volunteers
- 12% (18% mothers with child from 6 to 12 months) buy the Fasevie products preferably the instant flour
- 1 box is sold every 3,5 visits of the volunteer (importance for the sustainability of the Fasevie approach)
- Mothers buy about 1,2 boxes by month

➡ Social promotion and social marketing of the products should be strengthened

Next phase: extension phase of Fasevie

Expected duration 3 years

Objectives and expected results

1. **Consolidating the accomplishments of the pilot phase of the Fasevie program**

   - **Elaboration of methodological kits for field practitioners**
   - **Full autonomy for the stakeholders in the areas of pilot phase**

Objectives and expected results

2. **Preparing to upscale Fasevie's approach**

- **Dissemination of the results**
  - **Information of policy makers (report, workshops)**
  - **Information of international organizations**
  - **Scientific publications**
  - **Sharing experiences through *Interdev* website (available soon) including other IRD-GRET approaches on complementary food in other developing countries (such as in Madagascar and Burkina Faso)**
- **Provision of additional technical and managerial skills to national partner institutions**
- **Contribution to elaborating the national food fortification policy**

Objectives and expected results

3. Extension of Fasevie project to other at-risk groups

- **School children**
  - **Micronutrient fortified biscuits (Sight and Life)**
    - **Products and the social promotion supports are set**
    - **Efficacy and effectiveness studies**
- **Women in reproductive age, pregnant and lactating women ?**
- **Elders ?**