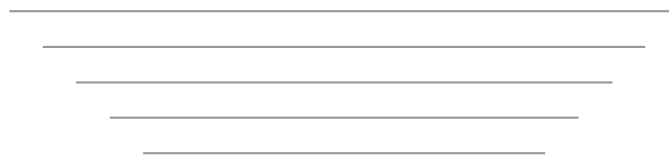


# Bioavailability of the most predominant 5-MTHF in humans using the emerging LC-MS/MS technique

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I will focus on **THREE** things today

1. **Research background**

2. **Research methodology**

3. **Results**

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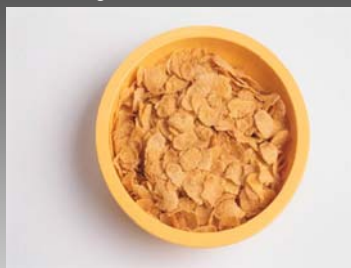
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# Research Background



The public derives its folate not only from synthetic folic acid....



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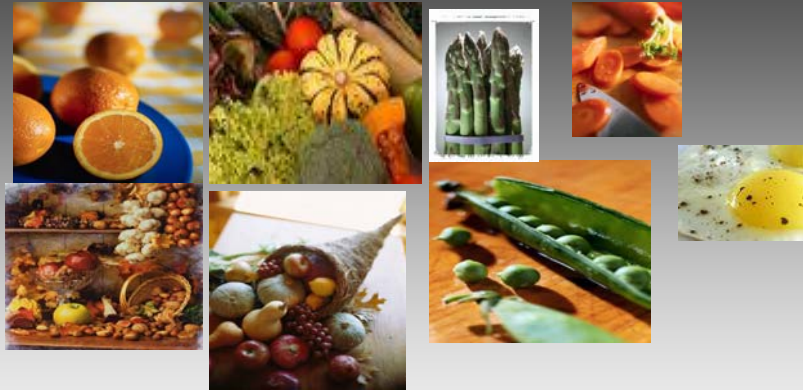


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also from natural sources!



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Despite 35 years of investigation.....

Literature to date suggests that the food folates are 10-98% bioavailable compared to folic acid (Tamura & Stokstad, 1973; Brouwer *et al*, 1999; Winkels *et al*, 2007)

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## Research Objective

- The bioavailability of dietary 5-methyl tetrahydrofolate (5-MTHF) in a whole day's mixed diet (a form predominant in foods) relative to supplemental 5-methyl Tetrahydrofolate in the selected population



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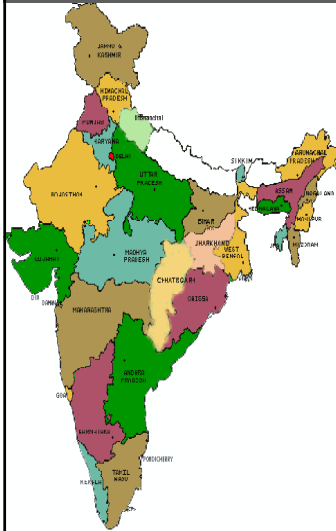
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## Research methodology



## Facts about the project country



• **Population not exposed to synthetic folic acid**

• **No data on processed (cooked) foods!**

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## Study design

### Study period: 3 Months

Screening for participants (n=200)

Unwilling to participate (n=140)

Willing to participate (n=60)

Subjects met the inclusion criteria (N=22)

Excluded due to deficiency in folate/iron/B12 (n=38)

**High folate diet group (n=11)**  
400 µg

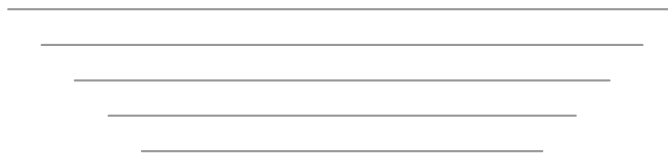
**Supplementation group (n=11)**  
400 µg



## Dietary analysis and Planning

What is the daily intake of dietary folate  
in the selected population ? ? ?

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### Typical South Indian Diet



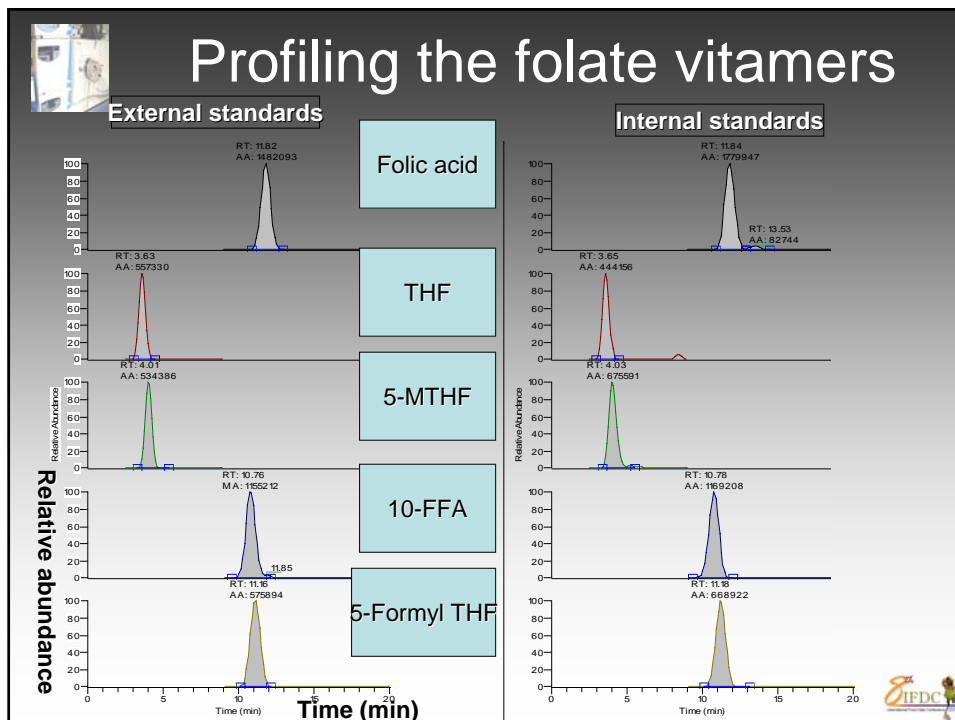
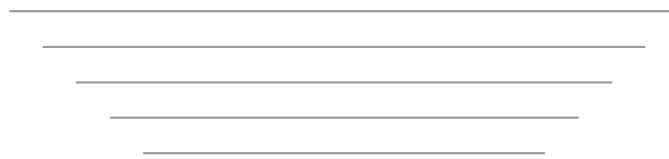
Breakfast (or )  
Dinner



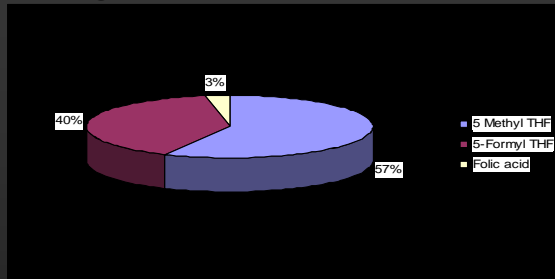
Lunch



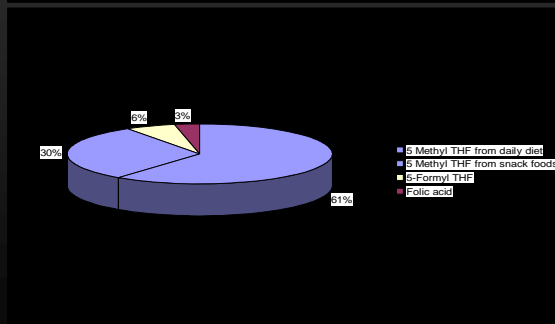
- ✓ A microbiological assay lab was set up in India in one month!
- ✓ 45 foods were prioritised based on a 24 hour dietary recall and FFQ, Standardised and analysed for total folate contents



## Using LC-MS/MS



Typical diet before entering the study (429 µg folate/day)



Experimental diet formulation  
(Diet predominant in 5-MTHF)



## What did we measure?

- Serum folate (Chemiluminescence and LC-MS/MS)
- Red cell folate (Chemiluminescence and LC-MS/MS)

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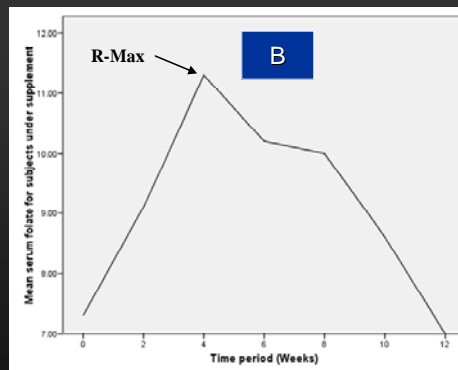
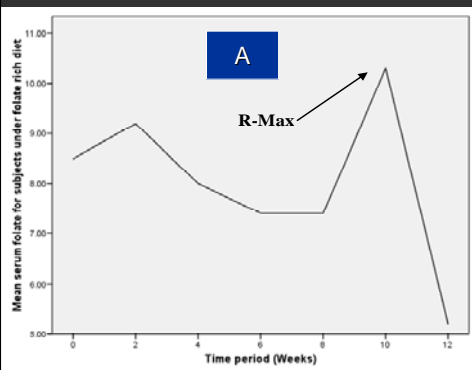
# Results



## Relative Bioavailability based on serum folate was 41%

Folate (5MTHF) rich diet group

Supplement group



Maximal bioavailability = 24%

Maximal bioavailability = 60%

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## Relative Bioavailability based on RBC folate was 45.5%

Study groups	Mean baseline RBC folate (ng/ml)	Mean W12 RBC folate (ng/ml)	Mean increase in RBC folate (ng/ml) <sup>#</sup>
Group A (5-MT diet rich group)	362 ± 87	582 ± 140	220 ± 79
Group B (5-MT supplement group)	312 ± 98	728 ± 166	416 ± 103

61%

134%

<sup>#</sup> Statistically significant P=0.001

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## Conclusion

- Relative bioavailability based on serum folate was 41%
- Relative bioavailability based on RBC folate was 45.5 %

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## Strengths of the study

- Long term study
- Population not exposed to synthetic folic acid
- Test diet representative of a mixed varied diet
- Test diet similar to traditional diet
- LC-MS/MS adds accuracy to the values generated for biomarkers and diets

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## Acknowledgement

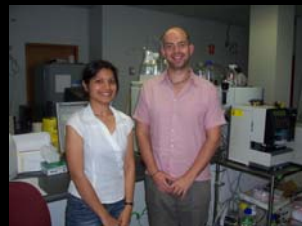


Study Participants (India)



Dr. Sheela Ramachandran, PSG college (India)

IPRS, School of  
Chemical Sciences and  
Engineering, BMSF



Dr. Russ Pickford, UNSW



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Thank you!

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Questions???

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