BRIDGING THE PULSES (PROTEIN) GAP THROUGH PROCESSED SOY PRODUCTS

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ASA American Soybean Association International Marketing®

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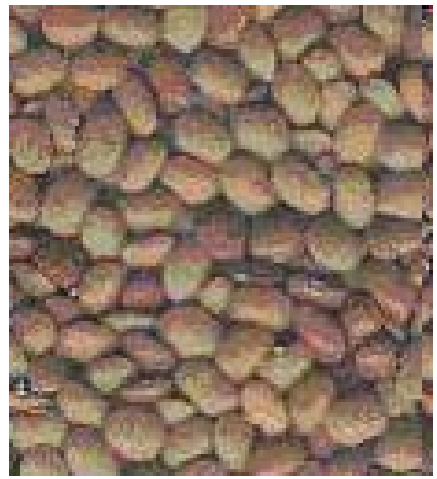
ROAD MAP

- India – Pulses scenario
- Soy Solutions for bridging the pulses gap
- Positioning Dal Analogue
- Market opportunity

India – Major Pulses



India – Pulses status

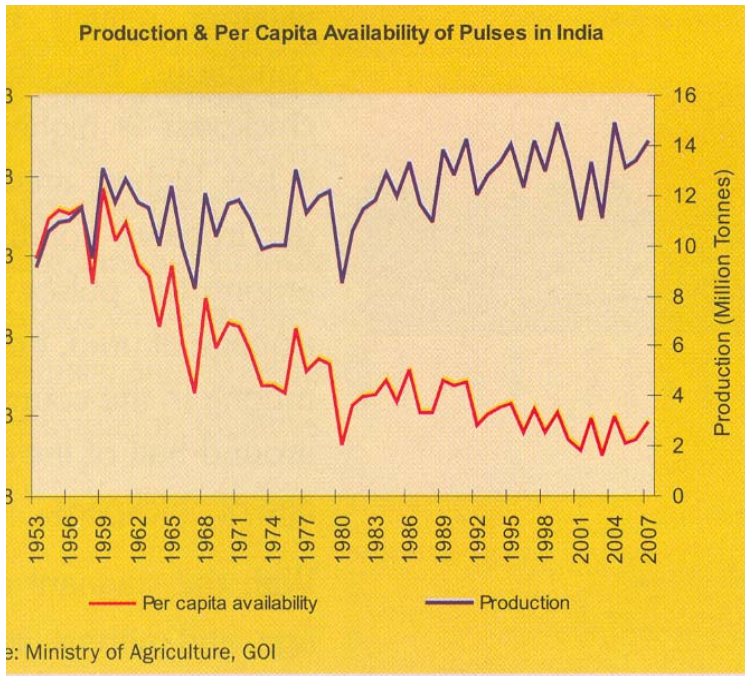
- Pulses along with cereals like rice or wheat are universal staples in Indian Diet
- Pulses are the only major source of protein especially for the poorer sections of the people
- India's pulses production remained erratic over the last 50 years

Pulses – Production and Imports

Year	Area (lakh hectares)	Prodn (lakh tons)	Yield (kg/ha)	Import (lakh tons)
1970	225.4	118.2	524	-
1980	224.6	106.3	473	1.17
1990	246.6	142.6	578	3.13
2000	203.5	110.8	545	3.5
2010 **Estimated**	270.0	160.0	545	30.00

Indian Pulses Situation

- Drastic decline in per capita availability
  - 27.3kg/year in 1958-59
  - 16 kg/year in 1989-90
  - 12.7kg/year in ’2006-07
  - 13.9 kg/year in 2007-08*



Pulses Supply Constraints

- Stagnant acreage and production over the years. Pulses have been relegated to the status of a residual crop or a second crop
- Sluggish yield improvements - There has been no significant **Green revolution** effect or impact of the Technology Mission on oilseeds and Pulses on India’s pulses yields.

Growth in yield of crops since inception of Green Revolution

Crop	Yield CAGR (%)
Pulses	**1.14**
Maize	**1.72**
Oilseeds	**1.86**
Rice	**2.23**
Wheat	**2.79**

India – Pulses Supply constraints

- Pulses production is restricted to relatively poor and rain- fed lands which further constrain productivity.
- Per capita production and consumption of Dal is declining steadily year after year and is a matter of concern for vegetarians
- Since pulses are not important crops in other countries, the availability for imports is rather restricted.

Pulses import situation in India

- India’s pulses production grew at less than 1.3% during the last 30 years while the population grew at 1.8%
- India is a **major importer** of pulses in the world. Paradoxically, India is a leading producer of pulses in the world.
- India’s pulse imports grew at CAGR 10.38% - from 1,17,000 MT in 1980-81 to 2.26 MMT in 2006-07

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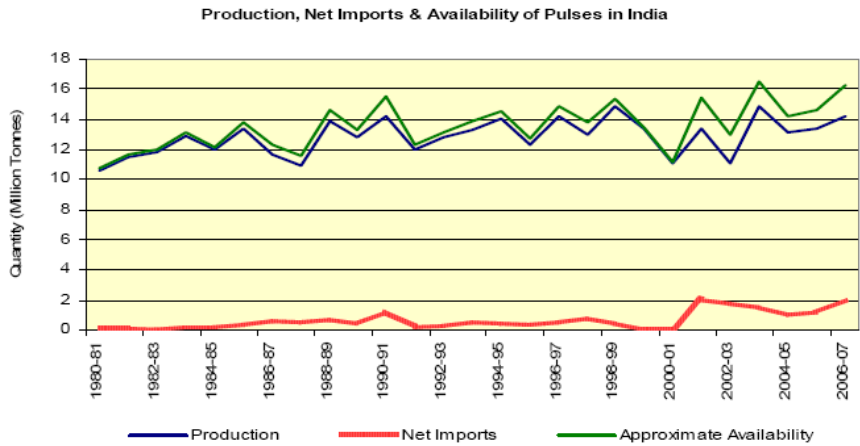
Indian Pulses Situation

- Increased imports
  - 117 TMT in 1980-81
  - 500 TMT in 1989-90
  - 2250 TMT in 2006-07
  - 3000 TMT in 2010
- Increased prices
  - More than 100% increase in the last ten years



Pulses and prices in a Grocery in Delhi

India’s Pulses Demand 2018 (Projected)

- Pulses demand is projected to be over 40 million tons by 2020 by GOI and FAO
- This means an additional annual production of 25 MMT in the next 9 years.
- This calls for at least **doubling the area** under pulses or **doubling the yield** per hectare
- Both options are not practical.
- India will have to look at other vegetable protein sources to be able to bridge such huge gap between production and demand.
- **Soy** is the only economic and nutritional alternative to address the long term nutritional needs.

Soy solutions to bridge the Pulses gap

- Whole Bean based Protein Products
- Defatted Soy flour
- Textured Soy Protein Products
- Soy based Analogues
  - Meat Analogues
  - Pulses Analogues

Texturized Protein Products

- High Protein Snacks
- Chunk-style TVP
- Structured Meat Analog (SMA)
- Fibrous Vegetable Proteins
- High Moisture Meat Analog (HMMA)
- Low Moisture Meat Analog (LMMA)
- Textured Meat Protein (TMP)

DAL (Pulse) ANALOGUE

What is a Dal Analogue?

- Dal Analogue is a concept product which closely resembles the natural product in physical, nutritional, organoleptic and functional characteristics of Dal. The concept product is produced by extrusion technology and is based on a protein source and a cereal based carbohydrate source

Dal Analogue

Proteins

Defatted soy flour

Bean flour

Pea flour

Broken lentil flour

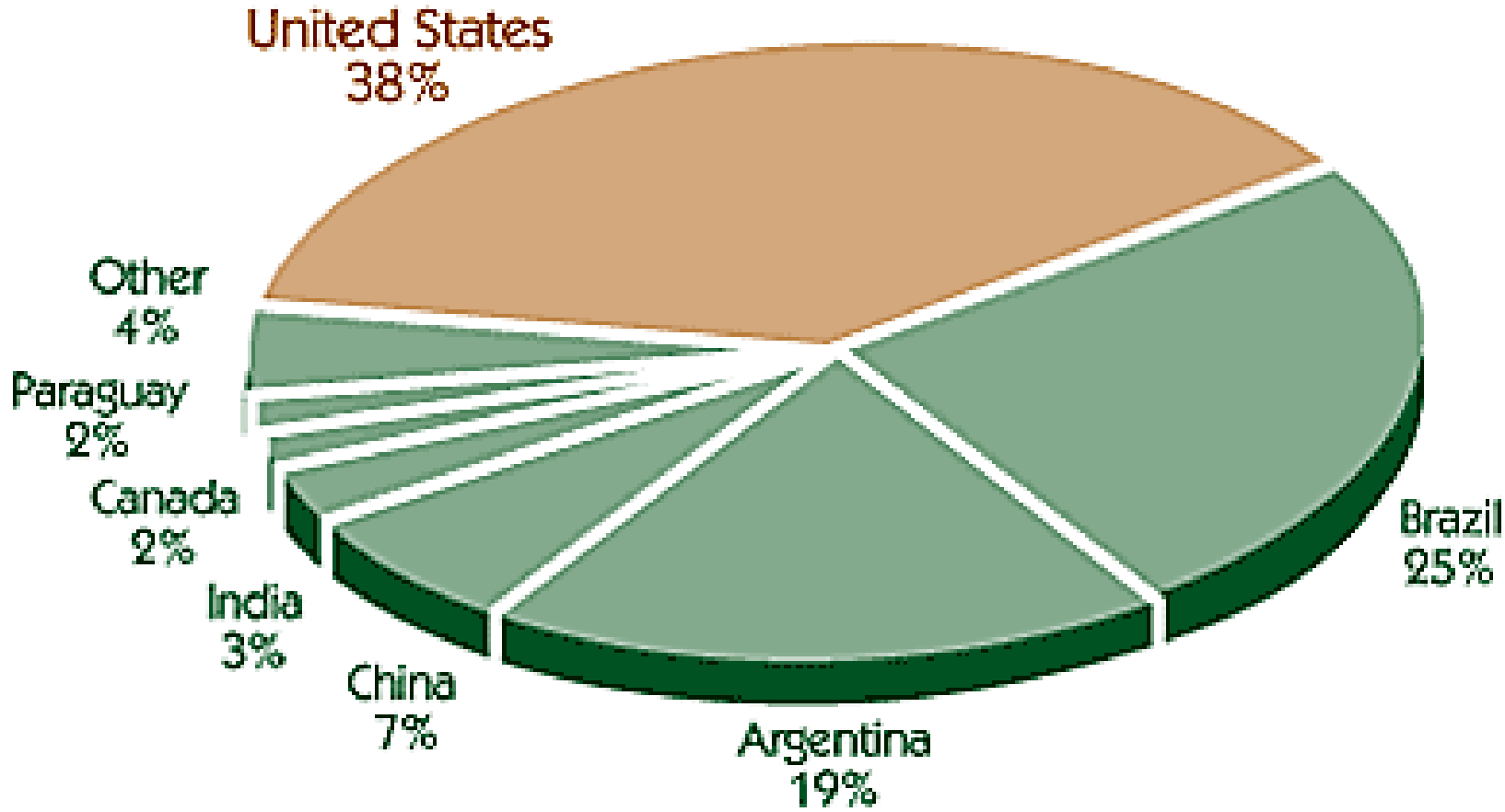
Carbohydrates

Wheat flour

Corn flour

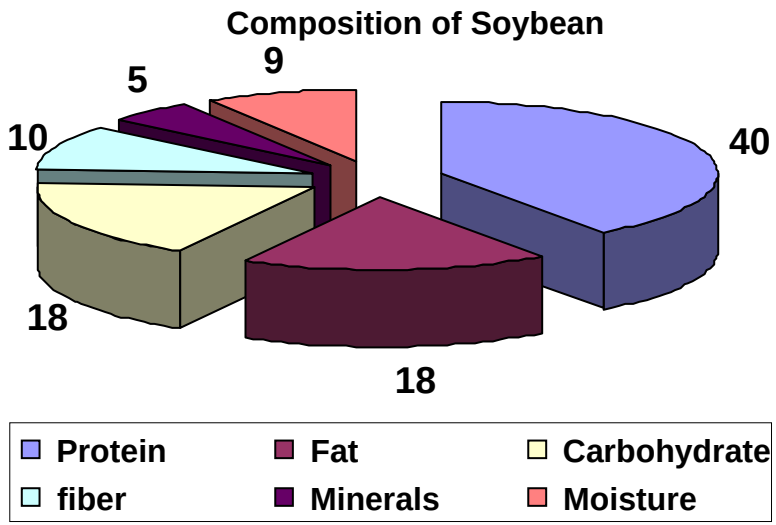
Rice flour

WHY SOY ??

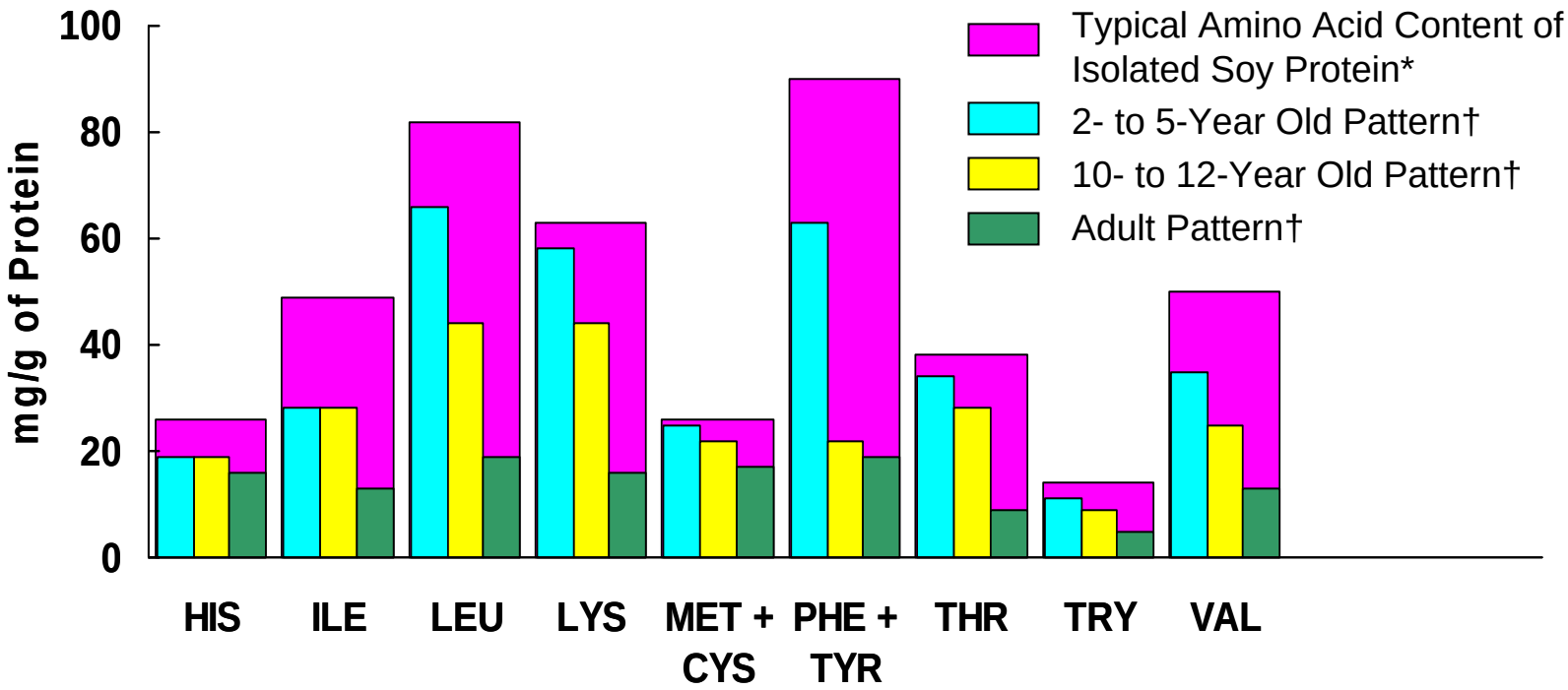

United States
38%
Other
4%
Paraguay
2%
Canada
2%
India
3%
China
7%
Argentina
19%
Brazil
25%

Soy - High Protein Density

- Protein content as high as 40%



Meets/Exceeds the Essential amino acid requirements for different age groups



HIGHEST PROTEIN QUALITY

Soy Protein	**1.00**
Casein and Whey	1.00
Egg white	1.00
Beef Protein	0.92
Pea Protein	0.73
Peanut meal	0.52
Rice	0.47
Corn	0.42
Whole Wheat	0.40
Wheat Gluten	0.25

WHY SOY ?

- Around 3MMT of de-oiled SBM exported from India
- Highly economical – Low cost of protein compared to any other source
- Health Benefits – Heart/Cancer/Osteoporosis/Cognition Etc
- High acceptability – Already it is consumed in several forms – Soy sauce, soy milk, Soy nuts, Soy nuggets etc
- Highly standardized ingredient quality
- Safe

Dal Analogue

- Dal Analogue production is based on Extrusion FoodTechnology

General Ingredients of Dal Analogue

- The protein content is derived from Defatted Soy flour – because of the **unique protein quality** of soy and the **highest protein density** and **low cost.**
- The carbohydrate content is based on **wheat flour/rice flour/corn flour.**
- Natural yellow/orange yellow colors – Turmeric (Curcumin), Riboflavin, Annatto, Beta carotene etc. Preferably a single ingredient is used to impart the desired color to the product

Composition of Dal Analogue Compared with Others Pulses

	Red Gram	**Green Gram**	**Dal Analogue**
Moisture	13.4	10.1	8.5
Energy	335	348	350
Protein	**22.3**	**24.5**	**30/32 (+35%)**
Fat	1.7	1.2	1.0
Carbohydrate	57.6	59.9	53

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TEST CERTIFICATE

Name& Address of the client	: American Soya bean Association
Request Reference	: NIN/FCD/2009/Dal Analogue
Name of the Product/Sample	: Dal Analogue
Batch number	: -
Manufacture date	: -
Expiry date	: -
Date of results release	: 09/03/2010

Sl. No	Parameters		Amino acid content	(g/100g of protein)
1	Moisture (g/ 100g.)	9.48	Aspartic acid	9.6
2	Protein (g/100g)	32.50	Threonine	3.5
3	Total Ash (g/100g)	4.09	Serine	4.7
4	Fat (g/100g)	0.54	Glutamic acid	21.1
5	**Total dietary fibre (g/100g)**	16.95	Proline	8.6
	Insoluble dietary fibre (g/100g)	14.06	Glycine	4.0
	Soluble dietary fibre (g/100g)	2.89	Alanine	4.0
6	Carbohydrates (g/100g)	36.44	Cystine	0.9
7	Energy (Kcal)	286	Valine	4.0
8	**Minerals(mg/100g)**		Methionine	1.2
	Calcium	230.84	Isoluecine	4.2
	Magnesium	246.32	Luecine	6.8
	Copper	1.18	Tyrosine	3.7
	Manganese	3.09	Phenylalanine	5.1
	Iron	8.2	Histidine	2.7
	Zinc	4.42	Lysine	5.5
	Phosphorus	424.88	Arginine	7.0
9	**Vitamins(mg/100g)**		Total Amino Acids	96.7
	Thiamine	0.22	Total Essential Amino Acids	34.9
	Niacin	2.48		
	Riboflavin	0.16		

Protein Quality

PDCAAS

Soy based Dal Analogue	**0.72**
Tur Dal	**0.59**
Quality enhancement in DA	**22%**

Dal Anlogue

- Wenger Manufacturing in US conceptualized, developed and promoted the concept and the first plant was set up in India by NDDB.

Alternate from Soy

- Made from defatted soy flour and wheat Flour and Turmeric powder
- Contains higher protein content (30%)
- Easy to cook
- Established technology
- Local raw materials
- Economical
- Healthier

India: Feeding and Welfare Programs

- India feeds around 250 million children and women under the School Meals Program and the Mother and Child programs (ICDS).
- The Opportunity for Soy based Dal Analogue would be **1.37 MMT** per annum.
- The volumes could expand further with the proposed extension of School Meal programs to children in the High Schools as well.

Soy Based Dal Analogue - Feeding and Welfare Programs

Program	Coverage (Million)	Soy based Dal Analogue (MT)
MDM	130	650,000
ICDS	120	720,000
TOTAL	250	1,370,000

India: Public Distribution Structure

- 100 million below poverty line families are covered under the Public Distribution Scheme
- India is embarking on a massive Food and Nutrition Security Plan very soon by an Act of Parliament. This would expand the coverage much further in numbers and content.
- Soy based Dal Analogue would be the best nutritional and economic alternative to expensive Dals.
- 30% coverage of the current program and delivering 5 kg of soy based Dal Analogue per month per food card would result in an opportunity of **1.8 MMT**.

India: Public Distribution

Total number of family cards currently covered – 100 Million Families

Opportunity for Soy based Dal Analogue per year -- 1,800,000 MT

India: Soy Based Dal Analogue - Retail Market

Branded and Unbranded Soy based Dal Analogue directly to Consumers

Soy based Dal Analogue Retail Market Opportunity -- 500,000MT

India: Soy Based Dal - Institutional and Food Service

- Corporate Kitchens
- Railway catering services
- Army and paramilitary establishments

Soy Dal Analogue Opportunity -- 500,000 MT

Move the Needle - Soy Based Dal Analogue Opportunity

- Soy is being increasingly recognized as the most potential resource to address the issues of gross under nutrition as well as to effectively bridge the ever increasing protein gap
- Generating new consumption opportunities through Soy based Dal Analogue can effectively open the doors for in country consumption of over 4.0 MMT of Soy based Dal Analogue and move the needle to over 2.0 MMT of SBM equivalent.

Wenger extrusion systems

	TX144/5 TPH	TX115/2.5TPH	TX85/0.5 TPH
Extruder system	1,250,000	1,000,000	$850,000
Automation	250,000	220,000	200,000
Tempering/drying	900.000	600,000	400,000
Balance of process	900,000	700,000	500,000
Total	3,300,000	2,520,000	1,950,000


WENGER
DANGER
KEEP DOOR CLOSED
WHEN EQUIPMENT IS RUNNING
WENGER


NP

Dal Analog - Production Video - Copy.wmv

Tasty & Healthy

IDAL

Thank You