



Soy Goes to School

National Soybean Research Laboratory

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“ Education without children’s health is missing the heart of the matter” - C. Everett Koop M.D., Former Surgeon General of the United States

ISOY – *A Better School Lunch*

- School Meals
- Functional properties of soy and health
- Acceptable products
- Cost benefit
- 2009 New Schools & Subpopulations



International Partnerships



- Technical Support for WISHH
- Provide training in processing, nutrition education, and develop culturally-appropriate soy applications for human nutrition
- Support for sustainable solutions
- Support for microenterprise development

Protein Quality – Why Soy?

Product	PDCASS Score
Egg White	1.00
Milk (Casein)	1.00
Beef	0.92
Soybean	0.90 – 1.00
Pea	0.73
Kidney Bean	0.68
Chickpea	0.66
Oats	0.57
Peanut Meal	0.52
Lentils	0.52
Rice	0.47
Corn	0.42
Whole Wheat	0.40
Wheat Gluten	0.25

Comparable Protein Contents

Commodity	Protein Per 100 grams	Kcal Per 100 grams
Textured Soy Protein	60.5	334
Defatted Soy Flour	53.0	329
Lentils	28.1	338
Peas	24.6	341
Wheat-Soy Blend	21.5	355
Soy Bulgur	18.2	340
Corn-Soy Blend	17.2	376
Wheat Flour	10.3	364
Corn Meal	8.5	366
Rice	7.1	365

Soy as a Functional Ingredient

- Fairly “taste neutral”
- Absorbs flavors
- Emulsifies
- Increases whiteness
- Improves texture
- Retains moisture
- Absorbs fat
- Improves shelf-life



School Lunch - India

- **Goal: improve diets of 1,000,000 school age children – currently reaching *over 900,000***
 - Incorporate soy into the school meal
 - Soy Flour & TSP into existing meals
 - Cost neutral or decreased costs
 - Partnerships with schools, NGOs and governments
- Collaboration with The Akshaya Patra Foundation (TAPF)



AKSHAYA PATRA NUTRITION ANALYSIS

SAMBHAR

Serv. Size (gm)	Class	WITHOUT SOY				WITH SOY				
		Calories	Protein, gm	Carb., gm	Fat, gm	Calories	Protein, gm	% Change	Carb., gm	Fat, gm
227		132	7.28	24.44	1.13	127	9.80	35%	21.92	1.18
100		58	3.21	10.76	0.55	56	4.32	35%	9.65	0.52
256	High Sch.	148	8.22	27.55	1.41	143	11.06	35%	24.7	1.33
192	Middle Sch.	111	6.16	20.66	1.06	108	8.29	35%	18.53	1
171	Prim. Sch.	99	5.49	18.40	0.94	96	7.39	35%	16.5	0.89
128	Nursery	74	4.11	13.77	0.70	72	5.53	35%	12.35	0.67

VEGETABLE PULAV

Serv. Size (gm)	Class	WITHOUT SOY				WITH SOY				
		Calories	Protein, gm	Carb., gm	Fat, gm	Calories	Protein, gm	% Change	Carb., gm	Fat, gm
227		162	1.78	5.86	14.89	99	2.99	68%	4.38	3.56
100		72	0.78	2.58	6.56	44	1.43	83%	1.93	6.59
144	High Sch.	104	1.12	3.71	9.44	64	2.06	84%	2.78	9.49
108	Middle Sch.	78	0.84	2.79	7.08	48	1.54	83%	2.08	7.12
98	Prim. Sch.	71	0.76	2.53	6.43	43	1.40	84%	1.89	6.23
72	Nursery	52	0.56	1.86	4.72	32	1.03	84%	1.39	4.74

BESIBELE BATH

Serv. Size (gm)	Class	WITHOUT SOY				WITH SOY				
		Calories	Protein, gm	Carb., gm	Fat, gm	Calories	Protein, gm	% Change	Carb., gm	Fat, gm
227		173	7.56	21.89	6.35	182	9.48	25%	23.04	6.38
100		74	3.22	9.33	2.70	81	4.18	30%	10.15	2.81
151	High Sch.	112	4.86	14.09	4.07	122	6.31	30%	15.33	4.24
113	Middle Sch.	84	3.64	10.54	3.05	92	4.72	30%	11.47	3.18
101	Prim. Sch.	75	3.25	9.42	2.72	82	4.22	30%	10.25	2.84
76	Nursery	56	2.45	7.09	2.05	62	3.18	30%	7.71	2.14

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TAPF Recipes

Sambhar	Quantity
Hing	40 g
Byadagi Chili	500 g
Curry Leaves	750 g
Moong dal	40 kg
Sambar Powder	15 kg
Thur Dal	40 kg
Pulses	25 kg
Turmeric	150 g
Refined Oil	7 kg
Salt Crystal	17.25 kg
Jaggery	6 kg
Tamarind	7 kg
Coriander Leaves	5.5 kg
Mustard	1 kg
Tomato	30 kg
Vegetables	225 kg
Water	1200 Liters
Defatted Soy flour	20 kg

Yield

65 Vessels

Vegetable Pulav	Quantity
Green Peas	7 kg
Tasting Powder	100 g
Lemon Salt	25 g
Turmeric Powder	100 g
Refined Oil	14 kg
Salt Crystal	5.7 kg
FCI Rice	90 kg
Coriander Leaves	3.75 kg
Green Chili	2 kg
Ginger	2 kg
Tomato	10 kg
Beans	4 kg
Carrots	4 kg
Pudina	1.32 kg
Water	300 Liters
Soy TSP	20 kg
Spice Mix	
Yield	16 Vessels

School Lunch – Latin America

- **Haiti** – TSP added to school meals
- **Honduras**
 - Adding soy flour to tortillas and making spiced TSP “meat” mixture
 - Soy Cow & new school feeding projects



School Lunch - Tajikistan

- Tandoori Naan enhanced with 12% soy flour



School Lunch - Senegal & Kenya

Senegal – TSP & Soy Protein Isolate in School Lunches

Kenya - *Masai Mara*

– Enhanced CSB Porridge

Primary School (300+ students)

Remote Location, No Cooking Facilities, Limited Water Access

Pre-School (50+ students)

Slightly Less Remote Location, Pilot for Developing Hot School Lunch



Incorporating Soy



- Start with end point of protein needs and then look how best to add to the menus
- Assessment of when & how to add soy products
- Acceptability improves using culturally appropriate recipes
- Importance of training & education of staff

Questions?



National Soybean Research Laboratory

Research, Outreach and Education supporting soybean production and nutrition