“Overview of Low Trans Alternatives for the North American Food Industry”

Oils & Fats Synergy in Food and Fuel Applications
APOC Meeting
9/13/2007

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Outline

- Trans – Commercial Perspective
- Viable Options / Future Options – U.S.
- Nutritional Aspects

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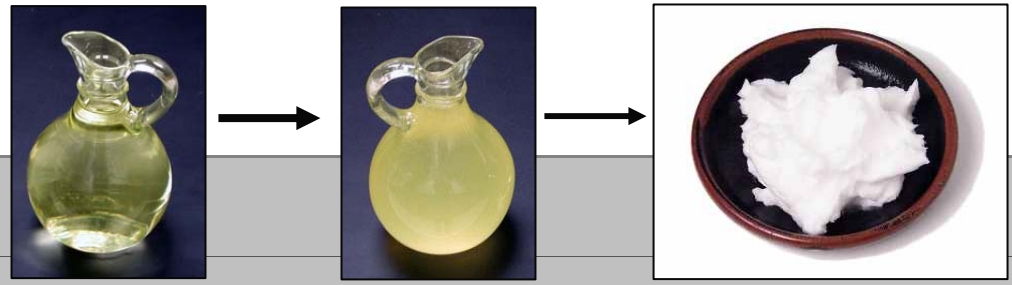
Partial Hydrogenation

Iodine Value	% Trans	% Saturates
130	1.5	14
105	14	17
70	40	23
40	34	54
20	20	80
2	0	100



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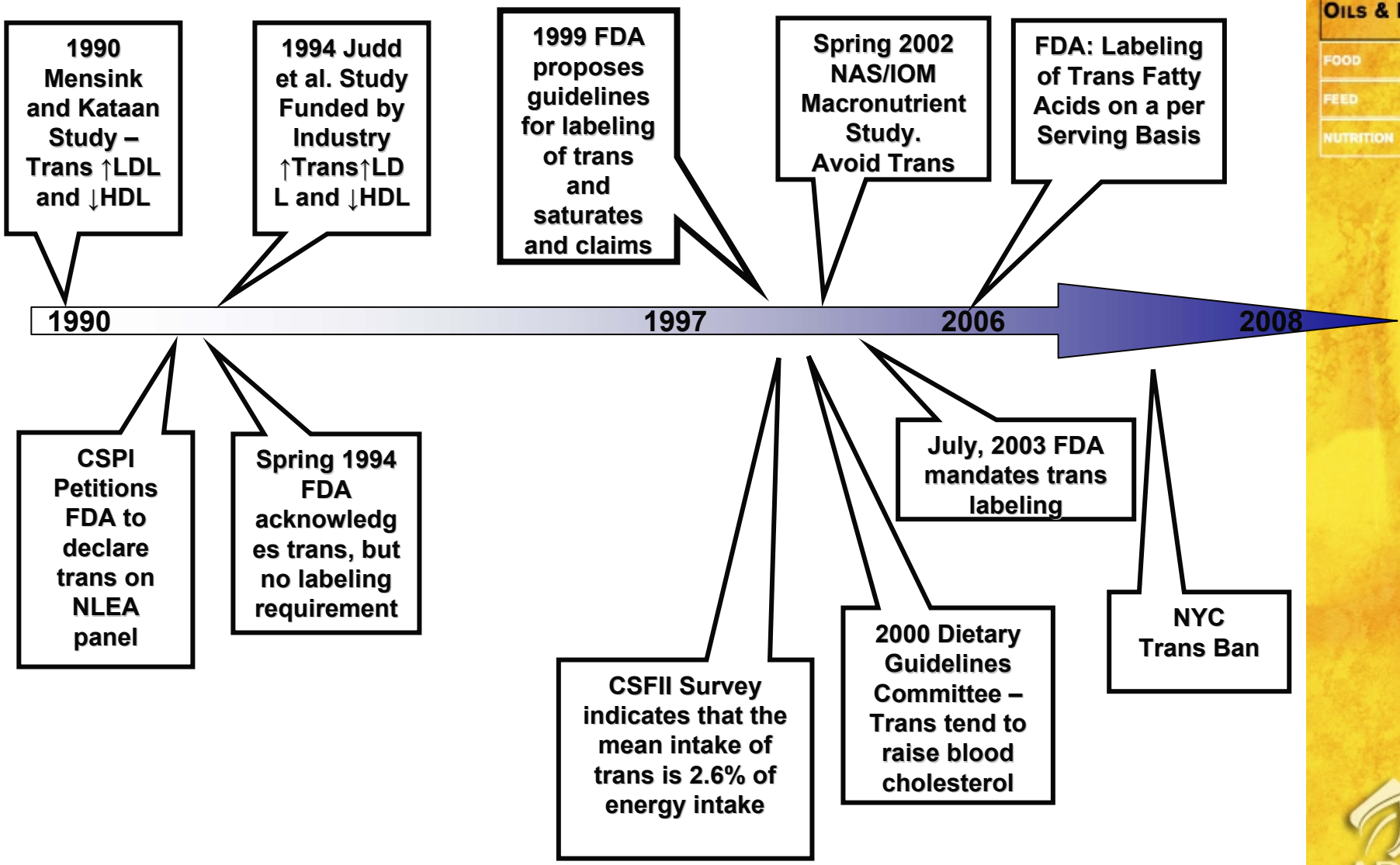
Timeline of Activities



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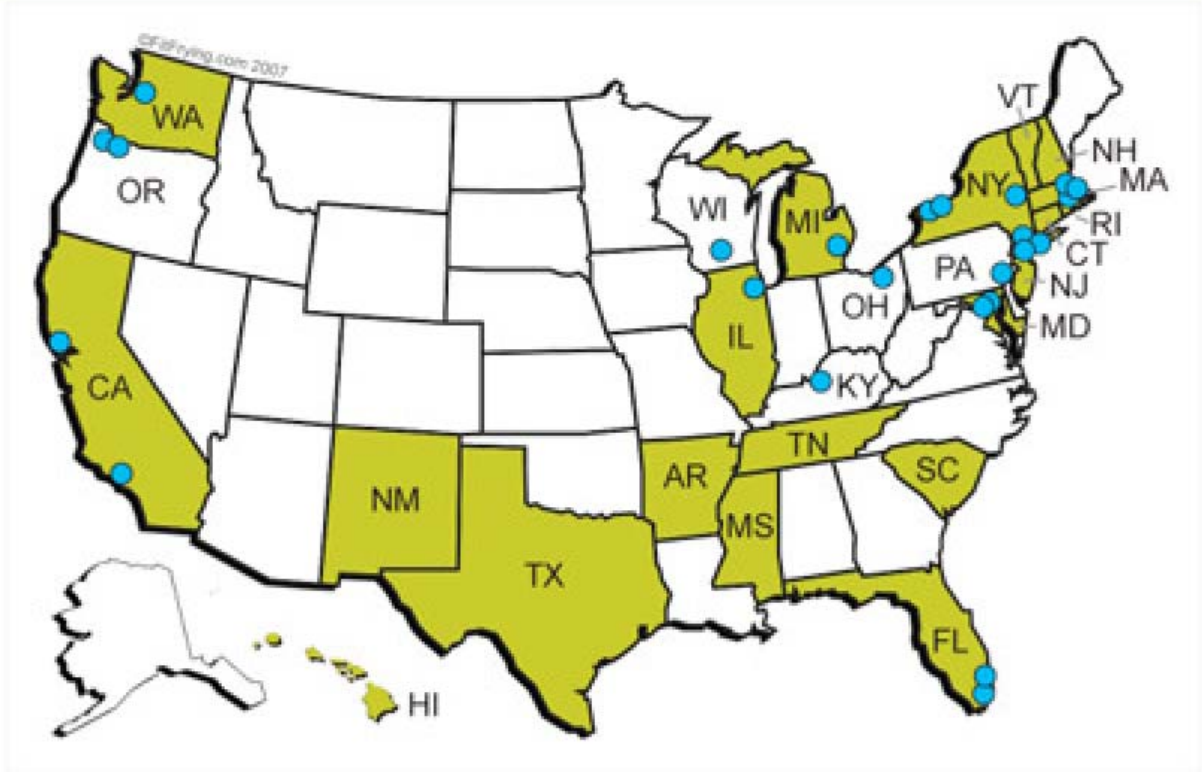
States / Cities / Municipalities Considering Trans Bans

Trans Fat Transition Map



Source: Frymaster

U.S. Update

- Trans less than 0.5g / serving = 0 g.
- No % DV required.
- Conjugated Linoleic Acid not included.
- Average American is said to obtains 2.6% of energy from trans fatty acids.
- NAS/IOM report - avoid consumptions of trans.
- ADA 2007 advise is not to have saturates of the low trans alternative exceed combined sats/trans of the PHVO.
- AHA – consume less than 1% of calories from trans.

Mandatory

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Nutrition Facts

Serving Size 1 cup (228g)
Servings Per Container 2

Amount Per Serving	
Calories 260	Calories from Fat 120
	% Daily Value*
Total Fat 13g	**20%**
Saturated Fat 5g	**25%**
Trans Fat 2g	
Cholesterol 30mg	**10%**
Sodium 660mg	**28%**
Total Carbohydrate 31g	**10%**
Dietary Fiber 0g	**0%**
Sugars 5g	
Protein 5g	

Vitamin A 4% • Vitamin C 2%
Calcium 15% • Iron 4%

* Percent Daily Values are based on a 2,000 calorie diet. Your Daily Values may be higher or lower depending on your calorie needs:

	Calories:	2,000	2,500
Total Fat	Less than	65g	80g
Sat Fat	Less than	20g	25g
Cholesterol	Less than	300mg	300mg
Sodium	Less than	2,400mg	2,400mg
Total Carbohydrate		300g	375g
Dietary Fiber		25g	30g

Calories per gram:
Fat 9 • Carbohydrate 4 • Protein 4

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Health Canada

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Health Canada Santé Canada

TRANSforming the Food Supply

Report of the Trans Fat Task Force
Submitted to the Minister of Health
June 2006

The Task Force recommends that:

For all vegetable oils and soft, spreadable (tub-type) margarines sold to consumers or for use as an ingredient in the preparation of foods on site by retailers or food service establishments, the total trans fat content be limited by regulation to 2% of total fat content.

For all other foods purchased by a retail or food service establishment for sale to consumers or for use as an ingredient in the preparation of foods on site, the total trans fat content be limited by regulation to 5% of total fat content. This limit does not apply to food products for which the fat originates exclusively from ruminant meat or dairy products.

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Low Trans Options –Solid Fats

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- **Interesterification:** effective for producing low trans solid / semi solid fat solutions. The process of using enzymes is becoming more attractive. Both soy based and palm based alternatives are meeting the demand for low trans alternatives.

- **Offshore Fats / Oils:** palm, palm olein, palm stearine, coconut, palm kernel. All of these can use used alone or as part of a blend in the production of low trans lipid systems.

- **Blending for Solid Fats:** blends of vegetable oils with palm, palm fractions, fully hydrogenated vegetable oil and mono or diglycerides are suitable for certain applications.

- **Alternative Hydrogenation Conditions**: the modification of the partial hydrogenation process is being utilized within practical means.

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Product Development Issues

"Low Trans Solid Shortening"

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- ***Oxidative stability*** **issues, shelf life concerns.**
- ***Cube integrity*****, wicking, staining, concern of stacking of cubes and pallets.**
- ***Creaming issues*** **– low trans blends tend to be soft and may be over mixed, over developed dough.**
- ***Stickiness of dough's*** **– low trans blends typically have ↑PUFA's which can delay crystallization as well as depress SFC curves.**
- ***Plasticity*** **– high production bakeries require plasticity for extrusion into dough. Low trans fats on soft side cause dough's to swim, low trans fats on the firms side are hard to extrude and cause rips in the dough.**
- ***Oiling out*** **– depending on the formulation low trans alternatives a prone to oiling out at increasing temperatures (proofing process, sheeting, extrusion, in cube).**

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Low Trans Options –Liquids

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- **Offshore Fats / Oils:** palm olein is suitable for frying or as a component of a blend for use in frying or as a spray oil.

- **Naturally Stable Oils:** corn oil and cottonseed oil are considered gold standards for snack food frying and are very useful for food service frying.

- **Trait Enhanced Oils:** the industry continues to develop varieties of soybeans, canola and sunflower that have greater inherent stability.

- **Blending for Liquids (frying / spray oils):** blends of traditional vegetable oils with naturally stable oils or palm products are suitable for many low solids applications.

- **Alternative Hydrogenation Conditions:** the modification of the partial hydrogenation process is being utilized within practical means as a component of a blend.

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Product Development Issues

"Low Trans Frying Mediums"

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- ***Oxidative stability*** **of vegetable oils (off flavor, ↓ food:oil ratio polymerization, degradation products?).**
- ***Flavor*** **characteristics of vegetable oils.**
- ***Oily perception*** **(mouth feel, cheese powder, leaching in package).** ***Mouth feel*** **of donut frying medium.**
- **Glaze / Sugar** ***adherence*** **in donut frying application.**
- **Increase** ***crumbing*** **or** ***dusting*** **in fryer.**
- **Increase in** ***packaging cost*** **(cubed shortening vs. jug in box)**
- ***Availability*** **of oxidatively stable liquid frying mediums.**

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Nutritional Aspects

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- Many low trans options have less total combined saturates and trans compared to the partially hydrogenated vegetable oils that are being replaced.
- Many low trans options have higher levels of linoleic acid and linolenic acid compared to the partially hydrogenated vegetable oils that are being replaced.
- Food processors are now discussing the possibility of lowering saturates as next steps in the development of low trans alternatives.
- It is a fine line to balance out functionality and nutritional aspects of lipids for certain applications

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Discussion

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- Traditional means of thinking are being challenged with low trans product development. No one size fits all!!
- Trans fatty acids (PHSBO) are very functional, it is very challenging to obtain similar functionality in low trans fats and oils, though viable low trans options have been developed.
- Partially and fully hydrogenated vegetable oils are viable components of low trans solutions / *don't attack the process.*
- Palm and palm fractions are being seeing an increase in demand as low trans solutions.
- Some degree of saturation is needed to provide solids for various functional purposes.
- Many low trans options that are currently being utilized have much higher levels of PUFA's compared to the partially hydrogenated vegetable oils they are replacing.

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