



HOUSE OF REPRESENTATIVES

2 STATE HOUSE STATION
AUGUSTA, MAINE 04333-0002

(207) 287-1400

TTY: (207) 287-4469

Beth A. O'Connor

92 Sullivan Street

Berwick, ME 03901

Residence: (207) 698-7899

Cell Phone: (207) 289-9047

Beth.OConnor@legislature.maine.gov

Testimony In Support Of:

LD 824 – “An Act Regarding Ethanol Motor Fuel”

Joint Standing Committee on Environment and Natural Resources

March 26, 2015

Good afternoon Senator Saviello, Representative Welsh and esteemed members of the Joint Standing Committee on Environment and Natural Resources. Thank you for taking my testimony in support of LD 602 and LD 824 in the efforts to kiss corn ethanol in our fuel good-bye.

It is my intent to show that corn ethanol in our fuel is one of the most colossal mistakes that has ever darkened our doors.

I am reminded of the song my kids listened to in 1990's by Kermit the Frog, It Ain't Easy Being Green ... selling corn ethanol as a fuel additive indeed makes being green impossible, never mind not easy. The only thing "green" about the ethanol Renewable Fuel Standard (RFS) is the billions of dollars it takes from taxpayers and consumers and funnels to politicians, who pass the cash to corporate giants, who then return some of it as campaign contributions, to get the politicians reelected and the beat goes on. Talk about a vicious circle.

Corn-based ethanol requires 2,500 to 29,000 gallons of fresh water per million Btu's of energy. This is a pretty scary statistic as we witness places like California in one of the most serious droughts in history, but the cronies keep insisting we reach the goals of the RFS and that federal law requires that the ethanol mandate must keep rising: from 9 billion gallons of ethanol in 2008 to 14 billion now and 36 billion gallons by 2022.

Now ask yourself, where does all that water go and what's in it? Much of it is nitrogen fertilizers that get washed off the land into waterways that drain into the Gulf of Mexico, where they cause giant summertime algae blooms. When the algae die, their decomposition consumes oxygen in the water creating enormous low and zero-oxygen regions that suffocate marine life that cannot swim away.

The RFS in all its Tom foolery would lead you to believe that gas would cost more if it was not blended with ethanol ... this is rubbish. The facts show that ethanol is 30% less efficient which results in we the consumers shelling out more money for fewer miles driven. I can't even begin to estimate the economic loss caused by damage to our lawn mowers, snow mobiles, four wheelers and every other vehicle. Ethanol collects water, gunks up fuel lines, corrodes engine parts and to boot it must be delivered in stainless steel tankers that are filled with diesel fuel.

Then we have perhaps the biggest problem of all and I have said this multiple times in the past 5 years. MAN WHO BURNS HIS FOOD GOES HUNGRY! U.S. corn prices went higher than an

elephant's fanny from \$1.96 per average bushel in 2005 to as much as \$7.50 in autumn 2012 and \$6.68 in June 2013, before dropping in 2014 due to record yields and lower demand for corn and ethanol. Since the inception of this boondoggle the cost for feed for chicken, turkey, and pig farmers has risen by \$100 billion. That is billion with a capitol B. The guaranteed income to grow corn is an incentive for farmers to convert land that would otherwise be used for wheat and rye or used as conservation or pasture land and again requires huge amounts of irrigation, fertilizers, pesticides and lots of gasoline and diesel fuel.

We have been told corn ethanol produces cleaner air quality. I beg to differ. In fact the only thing it has done is substitute one set of pollutants for others and in the early stages of examining this the standards imposed from the clean air act of 1990 have not been met, nor have the goals proposed in the RFS been met ... think hard about that statement ...maybe they were never intended to be met, or maybe no one thought about the ramifications from really bad policy. Never mind Shades of Gray ... there could be a best seller called Shades of Green.

The combustion of ethanol creates increased acetaldehyde in the air we all breathe. Vehicle and factory exhaust can create a chronic exposure source to those who live near heavily trafficked areas or who spend hours commuting on highways. Acetaldehyde contributes to smog formation when it reacts with other volatile substances in the air. Open car windows increase exposure, as does breathing in acetaldehyde-containing fumes near gas pumps. Auto exhaust research has shown that low dose chronic exposure to acetaldehyde may still be sufficient to gradually damage proteins, enzymes and other cellular structures in the brain and other organs.

Furthermore, acetaldehyde can cause a depletion of vitamin B1, where even mild, chronic B1 deficiency can produce brain-related symptoms such as emotional instability, confusion, depression, fatigue, irritability, headaches, sensitivity to noise, insomnia, decreased short-term memory, brain-fog and a feeling of impending doom.

I have attached a map showing you the Corn Belt and you will see Iowa is the epicenter ... also the home of the first primary election. Iowa has over 183 gas stations that sell ethanol free fuel. I included the locations and phone numbers. Nationwide over ten thousand locations sell ethanol free fuel. Maine has six locations, all are located at airports or marinas. That is probably because we can't be having Airplanes crashing to the ground or boats stranded at sea when the engines start sputtering out.

I have also included a series of slides pointing out ethanol related health issues.

The bottom line here is corn ethanol as a renewable energy source is a science and engineering joke, not common sense energy policy, never mind wise environmental, economic or health policy.

Thank you for your service and dedication to the beautiful State of Maine.



Effects of Ethanol on Body Structures

Psychology 470

Introduction to Chemical Addictions

Steven E. Meier, Ph.D.

Listen to the audio lecture while viewing these slides

1

Psyc 470 – Introduction to Chemical Addictions

Mouth

- Trace amounts absorbed here
- Causes
 - Irritation
 - lesions
 - ulcers
 - oral cancer

2

Psyc 470 – Introduction to Chemical Addictions

Esophagus

- Is a tube surrounded by muscles and blood vessels
- Has a mucosal lining
- Causes
 - Damage to mucosal lining
 - Esophageal ulcers
 - Esophageal Cancer
 - Esophageal Varices

3

Psyc 470 – Introduction to Chemical Addictions

Stomach

- 15-20% absorbed here
- Stimulates production of HCL
- Irritates and damages mucosal lining
- Changes the electrical properties of the stomach lining
- Gastritis
- Ulcers
- Achlorhydria

4

Psyc 470 – Introduction to Chemical Addictions

Pyloric Valve

- Spasms in the presence of large amounts of ethanol

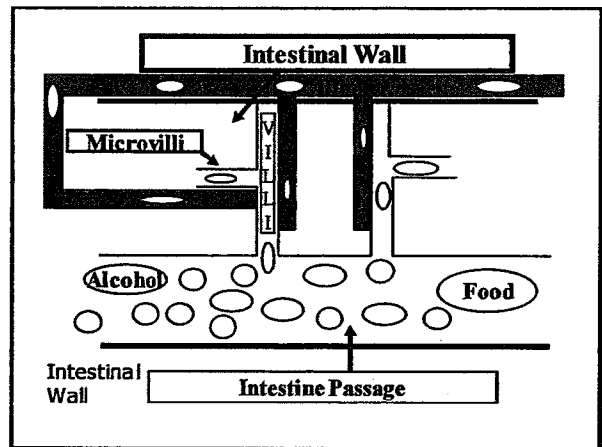
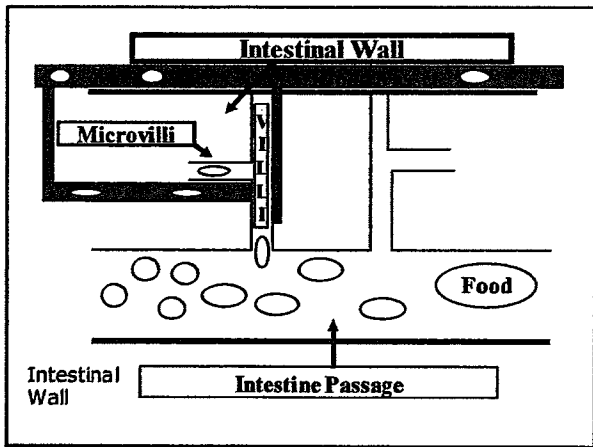
5

Psyc 470 – Introduction to Chemical Addictions

Small Intestine

- Majority of Ethanol absorbed here
- Damages Mucosal Cells, Villi, and Microvilli
- Decreases absorption of nutrients and vitamins
- Increases Triglyceral and Cholesterol production

6

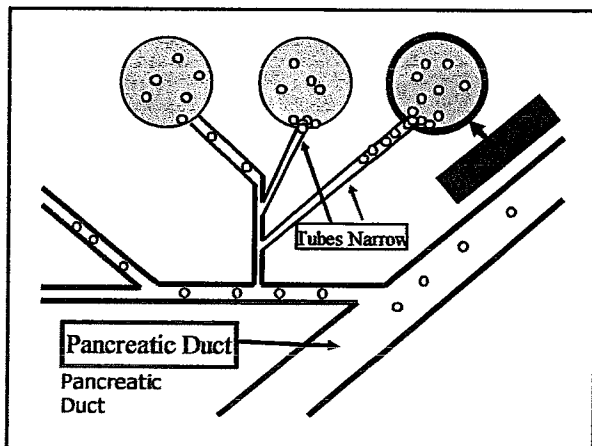
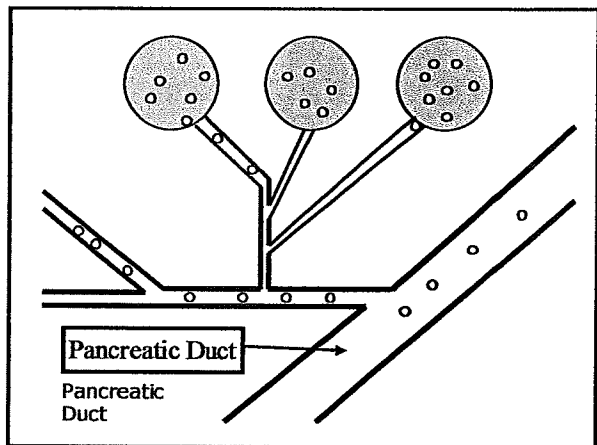


Psyc 470 - Introduction to Chemical Addictions

Pancreas

- Increased concentration of Pancreatic enzymes
- Decreased volume of enzyme secretion
- Pancreatitis
- Decreased insulin production
 - Secondary Diabetes

9



Psyc 470 - Introduction to Chemical Addictions

Gall Bladder

- Decreased amounts of Bile

12

Large Intestine

- Decreased water and vitamin absorption
- Diarrhea

13

Effects on Blood Cells

14

RBC

- Decreased Production
- Anemia

15

WBC

- Decreased production
- Decreased response time
- Get more infections
- Increased risk for STD's/HIV

16

Platelets

- Decreased production
- Decreased clotting time
 - More bumps and bruises

17

Nervous System

18

Neurons

- Alters neuronal membrane (lipid bilayer)
- Decreases amounts of Na that enters the axon
- Decreased height of the action potential
- Alters Ca influx - Decreases the amount of NT that is released
- Decreases transmission speed
- Increases tolerance
- Demyelination

19

More

- Inhibits the function of NMDA – subtype of Glutamate Receptor
 - Decreases the responsiveness of NMDA receptors to glutamate
- Binds on BZ subunit of GABA receptor
 - Inhibits other neurons by increasing Cl into post synaptic element
- May impact Serotonin receptors (5HT₂, 5HT₃) located in Dopamine Post Synaptic Elements in Nucleus Accumbens

20

Brain Structures

21

Brain Structures

- Alters newer evolutionary structures first, then older structures
- Damages Frontal, Temporal lobes, hippocampus, etc
- Decreases the numbers of dendrites and axons
- Increases Ventricle Size
- Decreases blood flow

22

Related Brain Damage

- Blackouts
- Sleep Changes
- Wernicke-Korsakoff's Syndrome
- Other Psychological and Psychiatric problems

23

Wernicke-Korsakoffs Syndrome

- Due to a lack of B vitamins
- Results from damage to cortex peripheral nerve cells
- Key symptom is confabulation
 - Get holes in memory so you fill them in.
- Usually STM is the most affected
- Poor Prognosis

24

Visual System

- Decreased accommodation time
- Decreases tracking ability
- Double vision
- Decreased recovery time

25

Endocrine Effects

- Inhibits Vasopressin release
- Decreases thyroid hormones, progesterone, testosterone, Luteinizing hormone, and others

26

Males

- Damages or kills Leydig Cells
- Increases feminine characteristics
- Decreased sexual drive, reproductive failure, impotence

27

Females

- Early Menopause
- Premenstrual discomfort
- Increased menstrual Flows
- Infertility

28

Muscle Tissue

29

Skeletal Muscle

- Disrupts internal structure of the muscle
- Cramps, pain, weakness = Alcoholic Myopathy

30

Cardiac

- Increased Weight of the heart
- Dilation of heart chambers
- Scar tissue
- Cardiomyopathy

31

Removal of Ethanol

32

Methods

- Trace amounts through respiration and sweat.
- Some through fecal material
- Most is metabolized by the liver via two systems

33

Alcohol Dehydrogenase System (ADH)

- | Substance | Degrading Enzyme |
|--------------------------------------|------------------------|
| • Ethanol | Alcohol Dehydrogenase |
| • Acetaldehyde | Aldehyde Dehydrogenase |
| • Acetic Acid | |
| • CO ₂ + H ₂ O | |
| • Respiration | |
| • Urination | |

34

Psyc 470 – Introduction to Chemical Addictions

Microsomal Ethanol Oxidase System (MEOS)

- | Substance | Degrading Enzyme |
|--------------------------------------|------------------------|
| • Ethanol | MEOS |
| • Acetaldehyde | Aldehyde Dehydrogenase |
| • Acetic Acid | |
| • CO ₂ + H ₂ O | |
| • Respiration | |
| • Urination | |

35

Ethanol Effects on the Liver

- Fatty Liver
- Cirrhosis
- Portal Hypertension
- Decreased vitamin production
- Decreased hormones and other products important for body functioning

36

Other Issues

37

Genetic Differences

- Decreased ADH metabolic rates for Europeans
- Increased ALDH metabolic rate for Europeans

38

Biological Effects on Children

- Increased numbers of spontaneous abortions
- Fetal Alcohol Syndrome (FAS)
- Endocrine Changes
- BAC

39

Drugs

- Additive effects
- Benzodiazepines
- Synergistic effects
- Barbiturates
- Decreased effectiveness
- Antibiotics

40

Conclusions

- Most damaging drug there is
- Influences every system
- Causes major social/economic problems
- Highly correlated with aggression

41