Mission: Bring new value added natural products of MN and USA to industrial manufacturing and commercialization
American Nature is a Well of Natural Products
American Industry is a Well of Natural Wastes
Otzi the iceman
Was an ancient, frozen soul
With a copper ax and some blue tatoos
And some snowshoes shaped like bowls

It must have been quite a surprise
When the hikers Otzi found
They screamed until their cheeks were red
And kept running around

Otzi the iceman
Had long since passed away
So they all said "Run and tell everyone
We'll be on the news today!"

Down in the village
All the experts made a plan
"We'll send a chopper to that ledge
And bring down the iceman!"

They rushed him down
The streets of town
In, past the museum shop
And since that day in '91, our learning's
never stopped

Otzi the iceman's
Stuff is now on display
And the folks walk by and you hear them
sigh
"Oh, those far-off ancient days."
Piptoporus betulinis

Lariciformes officinalis
Next Generation BB Processing

- Harvested Birch Tree
  - Debarking
    - Outer Bark
    - Shredding
    - Pelletization
  - Inner Bark
OBB DEPOLYMERIZATION / EXTRACTION PROCESS
OBB Extract Balance

- Betulin (1) 72.4%
- Betulinic acid (2) 5.4%
- Betulinic aldehyde (3) 1.3%
- Lupeol (4) 5.9%
- Oleanolic acid (5) 0.3%
- Oleanolic acid 3-Ac (6) 1.6%
- Betulin 3-caffeate (7) 6.2%
- Other (minor) 6.9%

Diagram showing the distribution of components in the OBB extract.
OBB DEPOLYMERIZATION / EXTRACTION PROCESSING

Suberic fatty acids

Betulin 19% Yield
Lupeol 1.5% Yield
Betulinic acid 1.5%

Basic Depolymerization
NaOH + i-PrOH

Birch Bark Depolymerised

55% 20% 25%
Triterpenes Suberinic Acids Polyphenolic matrix
What could be manufactured from 1000 kg of outer Birch Bark from *Betula Paparifera* by new processing

TRITERPENES

- Lupeol: 15 kg
- Betulinic Acid: 15 kg
- Betulin: 190 kg

SUBERINIC ACIDS

- Epoxyacid: 110 kg
- 9,10,18-trihydroxyoctadecanoic acid: 120 kg
- 22-Hydroxydocasanoic acid fraction: 120 kg
- Mixture of Suberinic Acids: 170 kg

Polyphenolic polymers

- Polyphenolic polymers: 200 kg

TOTAL AMOUNT: 940 kg 94% yield of products
What could be manufactured from inner birch bark

- Birch bark tannin - 30%
- Anthocyanidine - 15%
- Enterosorbents – 40%
Natural products for commercialization from birch bark

Outer bark

1. Betulin - 18%
2. Lupeol - 3%
3. Betulinic acid - 1.5%
4. Suberinic acids salts - 55%
5. Suberinic acids - 55%
6. 22-hydroxydocosanoic acid - 10%
7. Depolymerised Suberin - 20%

Inner bark

1. Tannin - 30%
2. Anthocyanidin Dyes - 15%
3. Enterosorbents - 40%
Use of products

- Triterpenoids
  - anticancer, antiobesity, anticholesterol, anti-HIV, antibacterial, antiherpes, antifungal, immune stimulation, antiproliferative, antiinflammatory, skin-care, hair-care, tooth paste, antiaging
- Suberinic omega-hydroxyfatty acids
  - skin-care, antiaging, hair-care, biodegradable plastics polyesters (samples), individual chemicals for drug design, dietary supplements anticholesterol, antiobesity
- Suberinic omega-acids salts – special washing materials, shampoos, hair care
Anti-cancer, Anti-malaria, Anti-HIV, Anti-herpes, Anti-bacterial, Anti-fungal, Anti-inflammatory TRITERPENES

LUPEOL

BETULIN

BETULINIC ACID

URSOLIC ACID

OLEANOLIC ACID
USA-Canada Cooperation

USA, Mn

Canada, NL

USA, Mm

Central Newfoundland Birch Products Inc.

Canada Ottawa, ON

Semintha Nutraceuticals Ltd.
• Betula Extractives is developing extraction and processing facilities utilizing NRRI licensed processes
• Betula markets these compounds to the nutraceutical, cosmeceutical, and pharmaceutical industries
• They are developing a combined research program with universities, institutions, and companies to accelerate product development, applications, and commercialization
NL Local Initiatives

Farm the forest and harvest white birch materials

- Sap
- Chaga fungus
- Mushroom

- Transformed raw materials into commodities being used in Natural Health Products
Semintha Nutraceuticals seeks to be a leader in the formulation and commercialization of added-value health products

- nutraceuticals
- nutricosmetics
- cosmeceuticals
- functional beverages

containing birch tree and other natural biomass (berries) bioactives - that have been validated through science and clinical trials, and that have received regulatory approvals.

A 21st century vision for natural resources
THANKS FOR YOUR ATTENTION