



Cure Organic Farm Newsletter

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Spinach- The Natural Power Food

If leafy greens like spinach help to give our bodies the energy it needs, what about giving energy to other things? For the first time, MIT researchers have incorporated a plant's ability to convert sunlight to energy into a solid-state electronic "spinach sandwich" device that may one day power laptops and cell phones. At the heart of the device is a protein complex dubbed Photosystem I (PSI). Derived from spinach chloroplasts, PSI is 10 to 20 nanometers wide. Around 100,000 of them would fit on the head of a pin. Plants' ability to generate energy has been optimized by evolution, so a spinach plant is extremely efficient, churning out a lot of energy relative to its size and weight. But combining biological and non-biological materials in one device has stymied researchers in the past. Biological materials need water and salt to survive--both are deadly for

electronics. So far, scientists and engineers' efforts to harness the photosynthetic properties of green plants have been successful with naturally soft organic materials in liquid solutions. But if organic solar cells are to be practical for commercial devices, they need to be integrated with solid-state electronics. The researchers ground up ordinary spinach and purified it with a centrifuge to isolate a protein deep within the cell. The resulting dark green pellets that smell like cut grass were purified still further and coaxed into a water-soluble state. One of the challenges was to keep the proteins in the same configuration as they appear naturally in the organism. Here's where peptides come in. The 80,000-plus kinds of proteins in our body, when in fragments called peptides, transform themselves like tiny LEGOs into millions of substances. With some tweaking researchers

have been able to use these peptides to keep protein complexes functional on a dry, cold, hard surface. Much more conducive for generating and storing electricity.

Using transparent glass, coated with a conductive material. A thin layer of gold helps the chemical reaction that assembles the spinach chlorophyll Photosystem I complexes. The researchers then evaporate a soft organic semiconductor that prevents electrical shorts and protects the protein complexes from the layer of metal that completes the sandwich. The researchers shone laser light on the device to create optical excitation, then measured the resulting current. They estimated that they converted around 12 percent to charge.

At this point we may not be able to power our homes on spinach alone, but they are working on it! For you techie nerds out there check out web.mit.edu/newsoffice/2004/spinach-0915.html for the full story.

2008 CSA Shares

Next week we will have 2008 CSA shares available for renewing members. Share sizes and cost will remain the same as this year.
Small-\$300
Medium-\$400
Large-\$600
Fruit shares-\$150

The CSA will run for 20 weeks from June 4th through Oct. 15th. Pick-up will be each Wednesday from 4-7 pm at either the farm or the Boulder Farmers Market.

We look forward to sharing another season with you!



In your share this week:

- Spinach*
- Winter Squash*
- Baby Fennel*
- Bok Choy*
- Leeks*
- Potatoes*
- Carrots*
- Onions*

Winter Share continues for 2 more weeks. December 12 will be the last pick-up.



Coming Next Week

- Carrots
- Winter Squash
- Baby Fennel
- Potatoes
- Head Lettuce
- And much more!**

Recipes

Savory Spinach Pancakes

1/2 pound fresh spinach leaves, finely chopped
4 eggs + 1/4 C milk
1/4 C flour
salt and pepper to taste
some recipes call for a little butter or oil in the batter, others didn't; try it either way and you'll probably be fine
Optional additions: bit of nutmeg, grated parmesan, feta cheese, minced onion, diced tomato, diced cooked bacon...

Combine ingredients into a batter (if too thick add a little more milk; too thin, a little more flour) and cook on a hot buttered griddle until nicely browned. Serve topped with an optional dollop of sour cream!

Scalloped Potatoes with Gouda & Fennel

from *Bon Appetite Magazine*, Oct 91
serves 6

1 C ea. of whipping cream, half & half
1 med. fennel bulb, trimmed, halved and thinly sliced
1 tsp. fennel seeds, crushed
2 lbs. potatoes (peeled if you like)
2 C firmly packed shredded Gouda (approx 8 oz.)

Preheat oven to 400 degrees. Generously butter 8x8-inch glass baking dish. Combine cream, half & half, fresh fennel & fennel seeds in heavy large skillet. Thinly slice potatoes & add to skillet. Bring mixture to boil over high heat, stirring frequently to separate vegetable slices. Boil 5

min. Season generously w/ salt & pepper. Transfer half of potato mixture to prepared baking dish. Sprinkle half of Gouda over that. Top with remaining potato mixture & firmly press down. Sprinkle remaining Gouda over top. Cover dish tightly with foil. Bake until potatoes are tender, about 40 min. Uncover & bake until top is golden brown, about 10 min. longer. Let stand 10 min. before serving.



Carrot, Fennel & Orange Soup

from *Gourmet Magazine*, Apr 96
Makes about 8 cups

1 med. fennel bulb, sliced (save fronds)
2 tbsp. unsalted butter
4 C sliced carrots (appx. 1 1/2 lbs)
1 garlic clove, sliced thin
6 C water
1 tsp. salt, or to taste
1/3 C fresh orange juice
1/4 C sour cream

In a 3 qt. heavy saucepan, cook fennel slices over med. heat, stirring, until soft & beginning to turn golden. Add carrots & garlic, stir &

cook 1 min. Add water & salt, simmer, covered, 20 min. until carrots are tender. Puree mixture in a blender (in batches) w/ OJ & sour cream until smooth. Salt & pepper to taste. Transfer back to pan and reheat (do not boil). Serve garnished with fennel fronds.

Winter Squash and Fennel

Serves 8
Butternut squash, approx. 2.5 lbs., peeled, halved lengthwise, seeded and chopped
2 granny smith apples (I'll use whatever's in the box), peeled, cored and chopped
2 fennel bulbs, halved lengthwise

2 tbsp. chopped fennel fronds (optional)
1/2 C dried cranberries
1/4 C olive oil
1 1/2 tsp. salt
1/2 tsp. pepper

Adjust the oven rack to the upper middle position and preheat oven to 400 degrees. Toss all ingredients in large bowl until well coated. Arrange mixture on baking sheet and roast until veggies are tender and lightly browned (about an hour).

Words to Live By

The turnip farmer
Points the way
With a turnip

-Issa

