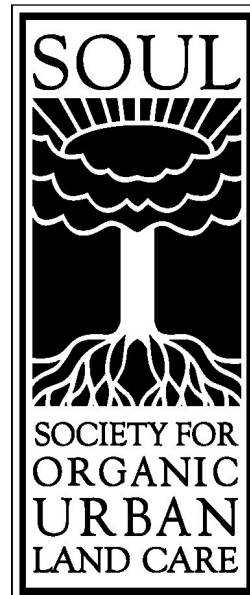


Organic Land Care *with*



"You never change things by fighting the existing reality.
To change something,
build a new model that makes the existing model obsolete."

Buckminster Fuller

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Our Mission:

"To support our communities in their transition to organic practices".

This newsletter is distributed free of charge to all SOUL members. Please feel free to share this publication.

SOUL

New Address:
P.O. Box 8548
Victoria BC V8W 1L4
Ph: 250-386-7685
info@organiclandcare.org
www.organiclandcare.org

Editor:

Christina Nikolic
info@stewardshipnld.com

To find an organic land care professional in your area please visit the SOUL website at:
www.organiclandcare.org

March, 2007

Hello out there,

The internet is becoming our second reference library – as long as we know what to look for, and how to tell truly useful information apart from “greenwash”!

If you have time at all to read before the busy spring season gets into full swing, check out the following highly recommended “web sites of the month”:

Soil and Health Library - FANTASTIC stuff:

<http://www.soilandhealth.org/>

Acres USA for REALLY good and unusual books:

<http://www.acresusa.com/>

The Soil Biology Primer - REQUIRED reading:

http://soils.usda.gov/sqi/concepts/soil_biology/biology.html

Please note:

SOUL has a new mailing address, effective immediately:
P.O. Box 8548 Victoria BC V8W 1L4

Yeasts Targeted for High Ethanol Production

Metabolic engineering of yeasts for high ethanol biofuel production may generate toxic metabolites and pose unique threats to agriculture. *By Prof. Joe Cummins*

Fermentation of plant materials to make ethanol has been greatly promoted as a means of producing sustainable biofuel. Production of ethanol during fermentation has been limited by the inability of yeast to grow at high ethanol levels, and a great deal of effort is being devoted to creating yeast strains that tolerate high ethanol levels, so they can continue fermentation to produce higher concentrations of alcohol. This has the major advantage of saving on energy involved in distilling and refining the ethanol.

Yeast genetic manipulation is far more precise than can be achieved in crop plants, and the genes in yeast have been precisely altered by mutations [...] to make the yeast tolerate high levels of ethanol and glucose.

Although genes can be altered precisely to avoid collateral genetic damage, changing a metabolic network will still result in unexpected metabolic effects. The reason is that because genes are connected in a complex functional network, one gene cannot be altered without affecting many others. Twelve years ago, Japanese scientists reported that a transgenic yeast engineered for increased rate of fermentation with multiple copies of one of its own genes ended up accumulating the metabolite methylglyoxal at toxic, mutagenic levels. As the yeast is not intended for making very strong beer for consumption but ethanol biofuel, toxin production may seem less of a problem, provided the yeast strain can be completely contained, which is well nigh impossible.

GM yeast is likely to contaminate or cross with native yeasts. If unexpected toxins are produced because of metabolic network alterations, then we are in real trouble. Bakers yeast is not a pathogen, but may become one as the result of contamination. And toxic ethanol yeast in the human gut would be hardly desirable.

What if this yeast escapes into the general environment and contaminate the soil as it might well do? Some years ago, a GM bacterium, *Klebsiella planticola*, engineered to produce ethanol from wood wastes was found to inhibit the growth of wheat plants in every microcosm tested. A GM yeast engineered to produce high concentrations of ethanol released into the soil may spell catastrophe for agriculture and food production.

Manipulating metabolic networks is a brand new field and clearly here to stay. Organic farmers and the organic industry will soon be faced with difficult decisions about organic foods. Can genes and networks manipulated by precisely engineered DNA changes be considered organic? We will have to decide soon, before the bureaucrats decide for us. [...]

The main concern about the manipulation of metabolic network regulators is that the genes have multiple effects and changing the activity of one gene inevitably alters that of many others. Consequently, it may lead to production of unpredicted toxins (see above). [...] Not much thought seems to have been given to the consequences of releasing such modified yeast to the environment. *Sacchromyces cerevisiae* [brewer's yeast] has not been pathogenic in plants or animals but modified yeast may create novel pathogens, or simply prevent crop plants from growing (see above).

Mutations and genetic modifications of *S. cerevisiae* are being promoted to boost ethanol production from fermentation of crop and forest waste products. However, critical evaluation of the human and environmental consequences of releasing the novel organisms has not been forthcoming. Furthermore, it has been shown recently that ethanol from cellulose biomass is neither sustainable nor environmentally benign. ISIS Press Release 12/01/07
— Source: Sustainable Agriculture Network Discussion Forum



"The problem for even the best-intentioned environmental activism is that it imagines that it can confront a problem external to itself. Confront the bulldozers. Confront the chainsaws. Confront Monsanto. Fight the power. What the environmental movement is not very good at is acknowledging that something in the very fabric of our daily life is deeply anti-nature as well as anti-human. It inhabits not just bad-guy CEOs at Monsanto and Weyerhaeuser but nearly every working American, environmentalists included."

Curtis White, Orion