Improved Extraction of Lipids from Biomass

Description:

Replacing fossil fuels with sustainable, renewable fuels is a topic of major research, interest, and investment of late. A promising replacement for petro-diesel fuel (which could in turn replace gasoline in many applications) is bio-diesel fuel made from algae, fungus, or plant material. Of these sources, algae shows the greatest potential, but is restrained by the difficulty of extracting the lipids from the cells. Current methods are energy or solvent intensive, and make algae nonviable economically. They include organic solvent extraction, vacuum distillation, and maceration, all of which present ecological problems during production and disposal of waste, and can actually degrade the oil during the recovery process.

This technology advances the field by providing a method of extracting lipids from algae, fungus, or plant cells. It is more environmentally friendly, less expensive, and more effective at removing lipids from biomass than current technologies. The process may utilize many different fluids, including reusable and safe fluids such as carbon dioxide or water. The fluid begins as a highly pressurized liquid, penetrating the cellular structure of the biomass, and then is suddenly de-pressurized, causing the fluid to flash violently and break apart the cells, releasing the lipid. The fluid may then be captured and reused.

Applications:
- Extracting oil from algal or fungal sources for use in dietary supplements
- Producing biodiesel from renewable resources (algae or fungus)
- Producing lubricants or other traditionally petroleum-based products

Benefits:
- Potentially makes biodiesel economically viable
- As a dietary supplement, algal and fungal oils provide better nutrients than currently used fish oil
- Algae oil has no fishy smell or taste associated with fish oil supplements
- Can utilize safe, reusable fluids for extraction instead of the currently used solvents

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