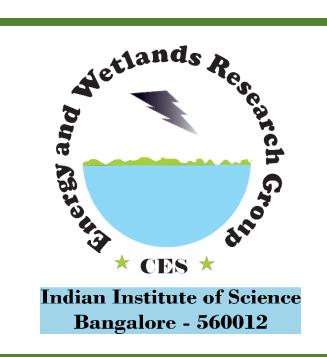


Diatom's Lipids – Scope for Biodiesel

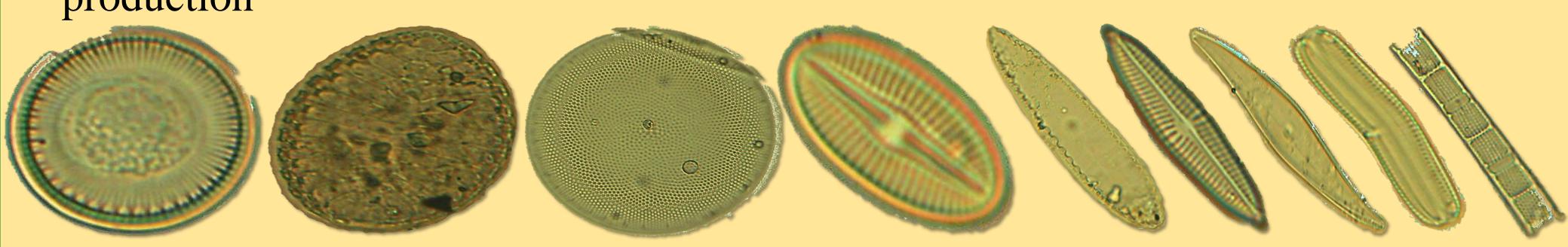
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DIATOMS

- Diatoms are a major group of microalgae that belongs to the class "Bacillariophyceae"
- They are distinguished by their ornate cell structure made of hydrated silica and are known as "Algae in Glass houses"
- Diatoms majorly store their energy in the form of lipids or as chrysolaminarin a complex polysaccharide
- The diatoms are considered to be a potential source of lipids for biodiesel production



Diatom	Lipid content (% dry wt)
Nitzschia sp.	45–47
Nitzschia dissipata	28–46
Navicula pellucosa	27–45
Isochrysis sp.	25–33
Thalassiosira weissflogii	22–24
Phaeodactylum tricornutum	20–30
Cylindrotheca sp.	16–37
Skeletonema costatum	16–35
Thalassiosira pseudonana	16–26

Biodiesel Production Schematics

Diatom Screening and Isolation





Diatom Culturing

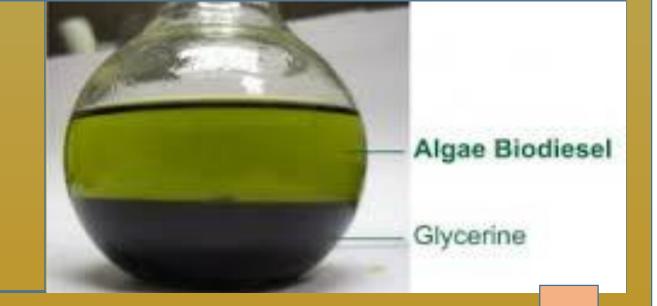
Nutrient Optimisation and Cultivation





Biomass harvest & Pretreatment

Lipid Extraction & Transesterification



Biodiesel Harvest



ENVIS

Transesterification

Catalytic

Non Catalytic

Homogenous

Supercritical Alcohol

Heterogeneous

Supercritical CO₂

Homogeneous acid catalyst

- •HC1
- $-H_2SO_4$
- ■RSO₃H (Sulfonic acid)
- Boron trifluoride
- $-H_3PO_4$

Homogeneous base catalyst

- NaOMe, KOMe
- NaOH, KOH

Homogeneous
Enzyme/Biocatalyst
(free/mobilized) Lipase

Heterogeneous base catalyst

- Single component metal oxides
- Zeolites
- Supported alkali metal
- Clay minerals
- Non oxides
- H₃PO₄

Heterogeneous acid catalyst

- Ion exchange resins
- Sulfonated solids
- Metal oxides
- Supported
 heteropolyacids H₃PO₄

Heterogeneous solid immobilized
Enzyme/Biocatalyst
Solid acid catalyst
+Lipase