

# CSIR-IIP Technology for Room Temperature Biodiesel

The increase in fossil fuel import has necessitated the search for alternate indigenous fuels as a substitute to Petrol and Diesel. Biodiesel obtained from non-edible oils has emerged as a viable option. CSIR-IIP's room-temperature biodiesel technology allows the production of biodiesel with minimum capital and operating expenditures. This technology uses ambient conditions i.e., 5-40°C temperature and atmospheric pressure with minimal mechanical stirring.

## Salient Features

- Only room-temperature biodiesel process in the world.
- Easily deployable and sustainable process for Used cooking oil (UCO) and Tree borne oil (TBO)
- Glycerin separates easily on standing; biodiesel, purified by distillation, complies with BIS:15607 specifications.
- Simple small-scale make-and-use operation possible by unskilled users with elementary safety training.
- Enables "Drop and drive" rural community model
- First unit operational at Chhattisgarh Biofuel Development Authority (CBDA) Raipur, Chhattisgarh (India).
- Life cycle assessment (LCA) of CSIR-IIP's RT biodiesel processes showed ~80% less emissions in comparison with conventional processes.
- A process patent has been granted in India

## Societal Impact

- Aligned with national missions & National Biofuel Policy. Empowerment of rural and tribal populations.
- Renewable fuels will boost afforestation and soil conservation.
- Livelihood improvement of rural and tribal populations by use of non-edible oil for biodiesel production by deployment of this technology.
- Use of renewable Bio-diesel as fuel will reduce carbon footprint
- Localized supply of Biodiesel for tractors and agriculture equipment of rural population

Properties	Methods	BIS 15607 : 2022	Distilled Biodiesel
Density@ 15°C (g/cc)	ASTM D-4052	0.860 - 0.900	0.886
Kin. Viscosity @40°C (cST)	ASTM D-445/ ISO3104	3.50 - 5.00	4.13
Flash Point (°C), Min	ASTM D-93/ ISO2719	101	165.4
Ester Content (% mass), Min	EN14103	96.5	99.4
CFPP (°C), Max	EN16329/ D6371	+18 (Summer) +6 (Winter)	+8
Acid Value (mg KOH/g) , Max	ASTM D-974/ EN14104	0.50	0.38
Sulphur (ppm), Max	ASTM D-5433	10	3

## Status of Commercialization:

- The RT Biodiesel unit of 200L/Day capacity has been running since 2019 **at CBDA, Raipur**.
- CSIR-IIP and the **Biodiesel Association of India** have a MoU.
- CSIR-IIP has teamed up with NGOs for the collection of UCO for Biodiesel production in Dehradun and nearby regions.
- The biodiesel industry and several private entrepreneurs are collaborating to commercialize RT Biodiesel technology, both for energy saving in existing biodiesel plants and Capex and Opex savings in the new plants.

## Economics

Plant capacity, TPD	0.72 (Four 200L batches/day)	3.6 (Four 1000L batches/day)	7.2 (Four 200L batches/day)
Payback period, Years	~1.0	~0.5	~0.4

सीएसआईआर-आईआईपी देहरादून एसडीसी फाऊंडेशन एंड डिया आईएमटी के संयुक्त तत्वाधान में जागतिकता कार्यशाला  
"भुक्तुं ज्ञानं धनं भवति न च धनं अस्ति अज्ञानं तन्मयी धनं" (अज्ञानं धनं न आनन्ददायी धनम्)



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