



BIO-COAL BOOKLET

A Viable Solution for Achieving Clean Energy Goals

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Gomti Nagar, Lucknow,
Uttar Pradesh, 226010



भारत 2023 INDIA

वसुधैव कुटुम्बकम्

ONE EARTH • ONE FAMILY • ONE FUTURE

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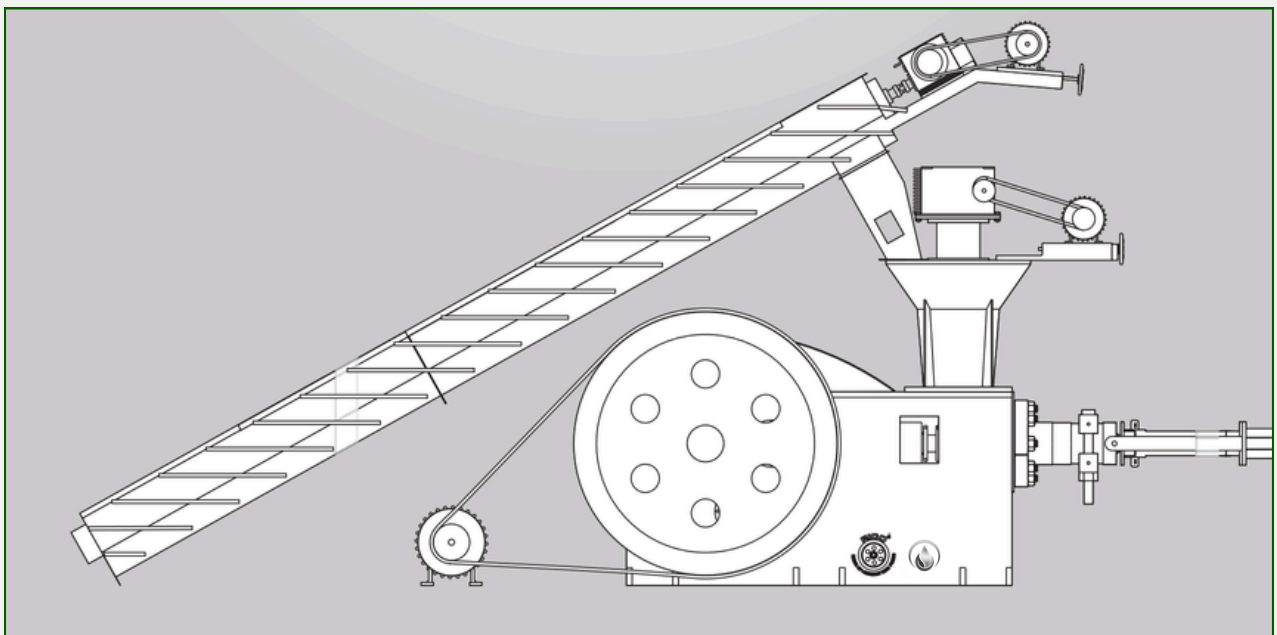


एक कदम स्वच्छता की ओर



INDRAPRASTH
OIL

LEADING THE WAY IN BRIQUETTING PLANT INNOVATION



Greetings!

We, the team of Indraprasth Oil, are thrilled to welcome you and share our vision for a sustainable future. At Indraprasth Oil, **we are not just building a company, we are building a movement.** A movement towards cleaner air, a healthier planet, and a secure energy future for generations to come.

The world is facing unprecedented environmental challenges, and the time to act is now. We believe that innovative solutions and a collective commitment can pave the way for a brighter tomorrow.

That's where you come in.

Whether you're a customer choosing cleaner fuel options, a client partnering with us in this endeavor, or simply someone who shares our vision for a greener planet, you are a vital part of the solution.

Together, we can make a difference.

By embracing sustainable energy solutions like biofuels and clean energy generation, we can create a ripple effect of positive change. Imagine a future where our cities breathe clean air, our dependence on fossil fuels diminishes, and our planet thrives.

Indraprasth Oil is here to be your partner in this journey.

We are dedicated to providing innovative, eco-friendly solutions that not only power your vehicles but also power a more sustainable future.

We invite you to join us on this exciting adventure.

Let's be the generation that leaves a legacy of a healthy planet and a secure energy future for all.

Thank you for being a part of the change.

Sincerely,

The Team of Indraprasth Oil





COMPANY PROFILE

Indraprasth Oil, a fresh and innovative company founded in May 2022, is based in Lucknow, Uttar Pradesh. Our team, led by Kunwar Vishwas Singh, Divyanshu Katiyar, Manish Singh, Sunil Singh, Dr. Chandan Singh and Sarita Singh, is driven by a powerful vision to revolutionize the energy sector with sustainable fuel solutions.

At Indraprasth Oil, we are dedicated to providing eco-friendly alternatives to traditional fuels. Our mission is to champion the transition towards clean energy sources like Biodiesel, CNG, Ethanol, and Bio-Coal. We are committed to minimizing environmental impact and contributing to a healthier planet for all.

Our commitment to sustainability goes beyond just the products we offer. We are dedicated to developing and deploying cutting-edge technologies that ensure efficient biofuel production and clean energy generation. We prioritize responsible resource utilization and implement sustainable practices throughout our operations. Furthermore, we foster a culture of environmental awareness and social responsibility within our company.

Our vision extends far beyond the horizon. We aspire to become a leading producer of biofuels and a prominent force in India's clean energy sector. We are committed to expanding our reach by establishing a comprehensive network of biofuel pump stations across the country. Our ultimate goal is to contribute to India's energy independence while creating a positive impact on the environment and society as a whole.



VISION, MISSION & VALUES



Vision

Our vision for the company is not just limited to providing clean energy, but also expanding these efforts into other areas such as researching new ways to create more sustainable fuel sources and reducing our carbon footprint overall. We believe that by investing in research, development, and innovation we can make a lasting change in the world's use of natural resources while minimizing their environmental impacts .



Mission

The mission of Indraprasth Oil is to provide clean, renewable energy sources. We are devoted to lessening our negative effects on the environment while offering dependable and affordable solutions to the global oil crisis. In all facets of our business, we seek to be economically competitive, socially responsible, and environmentally friendly in all aspects of our operations.



Values

We are on a mission to revolutionize the energy landscape. We champion sustainable fuel solutions like biodiesel, CNG, ethanol, and bio-coal, paving the way for a cleaner and more secure energy future.



MANUFACTURING EXCELLENCE

- At Indraprasth, we prioritize unwavering quality. Our state-of-the-art machinery (CNC, VMC, VTL, Boring) combined with a world-class Quality Control Department ensures every product meets the highest standards.
- Our dedicated Research & Development team relentlessly pursues innovation, leveraging experience and creativity to develop cutting-edge solutions.
- Every stage of production is meticulously monitored by CCTV cameras, overseen directly by the Production Director. This ensures complete transparency and accountability throughout the manufacturing process.
- Every component undergoes rigorous inspection and testing before being used or stored, guaranteeing the integrity of our final products.
- Our technical head meticulously analyzes departmental performance through comprehensive reports, guaranteeing both precision and excellence in every area.
- A key differentiator at Indraprasth Oil: our advanced computerized technology and machinery enable seamless interchangeability of parts, eliminating dimensional and fitting issues.

We have following latest & advanced technological machines like:

- | | |
|---------------------------|---------------------------|
| • CNC | • Boring Machine |
| • Shaping Machine | • Auto Drill Machine |
| • VMC | • Lathe Machine |
| • Planning Machine | • Hydraulic Press Machine |
| • VTL Machine | • Slotting Machine |
| • Profile Cutting Machine | • Rectifier |



STRENGTH

Quality and Efficiency

- We adhere to the highest standards, following both ISO 9001 norms and European CE standards for our machinery.
- **In-House Manufacturing:** To ensure quality control, we manufacture a significant portion (85-90%) of our parts on-site.
- **Advanced Technology:** We leverage technology extensively, with 70% of our manufacturing process being computerized. Our measurement instruments (micrometers, verniers, etc.) are calibrated to ISO standards for precise results.
- **Rigorous Part Testing:** Every component undergoes laboratory testing to guarantee quality. We use only high-grade materials and subject parts to various processes (e.g., hardness testing, chrome plating) to enhance durability.
- **Computerized Design:** Parts are designed using sophisticated computer-aided design (CAD) software, ensuring consistent and interchangeable components.
- **Efficient Parts Management:** Our computerized spare parts department allows for prompt order fulfillment, with parts typically dispatched within 2 hours during working hours. Our commitment to client satisfaction means we strive to fulfill all part requests.
- **Precision Manufacturing:** Advanced CNC and VMC machines guarantee high precision and accuracy throughout the manufacturing process.
- **Secure Shipping:** Parts are shipped securely in corrugated boxes for added protection.



KNOWLEDGE CENTRE

Introduction (What is Bio-fuel?)

Biofuels are fuels derived from organic matter, like plants, algae, or animal waste. They're a renewable alternative to fossil fuels and can be produced in a relatively short timeframe compared to the geologic timescales needed for fossil fuel formation. Biofuels come in various forms, including liquid biofuels like bioethanol and biodiesel, and solid biofuels like bio-coal briquettes.

What is Bio-Coal Briquettes?

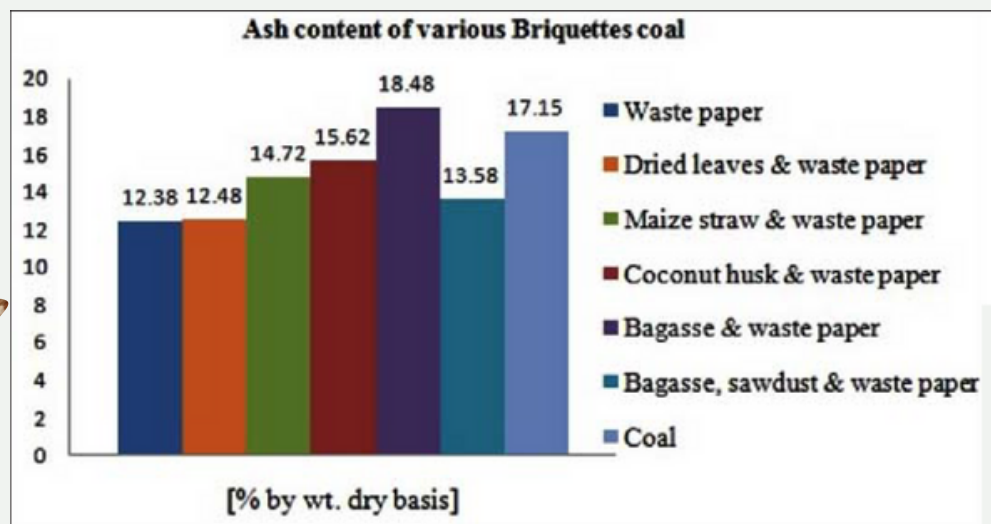
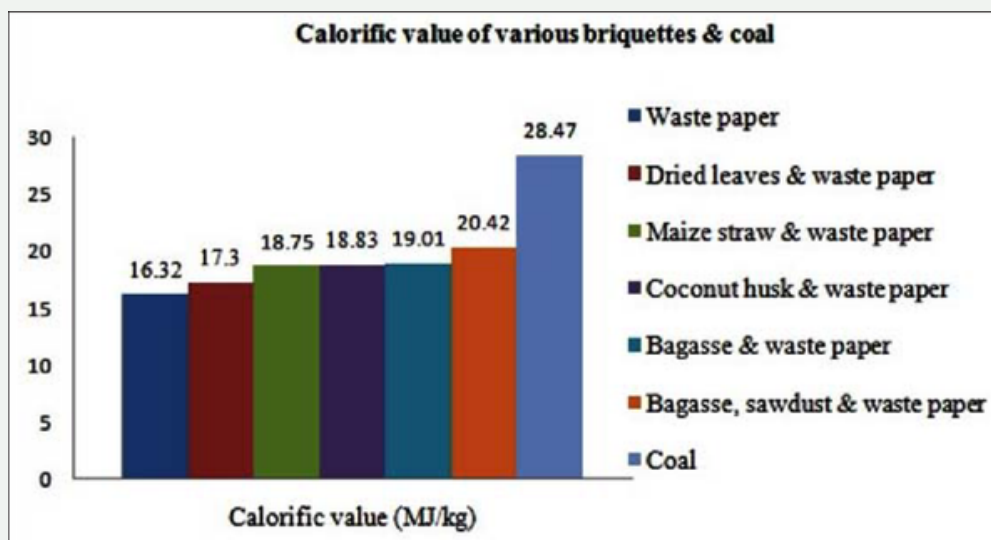
Bio-coal briquettes are a type of solid fuel made from compressed organic materials like sawdust, rice husk, or agricultural waste. These renewable resources are compacted into dense briquette shapes through a high-pressure process, typically without binders or chemicals. This densification increases burning efficiency compared to loose biomass and makes them easier to transport and store. Bio-coal briquettes offer a more sustainable alternative to traditional coal, emitting fewer greenhouse gasses when burned.

Calorific Value Chart of Raw Materials

TYPE OF MATERIAL	ASH (%)	HEAT OF COMBUSTION KCAL
Arhar Stalk	1.98	4000
Babool Stalk	0.90	4707
Baggasse	1.80	4300
Briquettes of Bark	3.4	4487
Chips	3.0	4800
Bamboo Dust	8.0	4160
Barks Wood	4.4	1270
Bark and Winder	4.8	4459
Castor Seed Shells	8.0	3862
Clean Chopped Straw	5.3	4403
Coffee Waste	2.0	4371
Coconut	3.5	5200
Wheat Straw	8.0	4100
Wood Chips	1.2	4785
Tabacco Waste	31.5	2910
Tea Waste	3.8	4237
Sugercane	10	3996
Sunflower Stalk	4.3	4300
Cotton Stalk/Chips	3.0	4252
Cow Dung	14.89	3240
Forestry Waste	7.0	3000
Groundnut Shells	2.80	4661
Jute Waste	3.0	4428
Maize Stalk	2.10	3800
Soya Been Husk	4.1	4170



TYPE OF MATERIAL	ASH (%)	HEAT OF COMBUSTION KCAL
Straw and Coal Dusk	6.1	4826
Shells from Oil kevels	2.0	4985
Saw Dusk	0.7	4654
Saw Dusk + Cow Dung	8.2	3898
Straw+ Coal Dusk + Rape Seed	3.8	4100
Rice Straw	19.2	3500
Rice Husk	19.2	3200
Papyrus	5.6	3965
Paper	1.5	4801
Press Mud (Maili)	14.25	3600
Paddy Straw	15.5	3469
Palm Husk	4.9	3900
Peat	29	3180
Pine Needles	1.86	4000
Mustard Straw	3.4	4200
Mustard Shell	3.7	4300



Finished Product (Briquettes)



BENEFITS OF BRIQUETTES VS OTHER FUELS

FEATURE	BIO-COAL BRIQUETTES	OTHER FUELS
Source	Renewable	Non-Renewable
Efficiency	Higher	Lower
Emissions	Lower	Higher
Storage Space	Less Required	More Required
Transportation	Easier	More Difficult

WHY BRIQUETTES?

- **Renewable:** Made from sustainable biomass.
- **Efficient:** Denser form burns hotter, using less fuel.
- **Lower Emissions:** Cleaner burning with fewer pollutants.
- **Reduced Storage:** Compact size needs less storage space.
- **Easy Transport:** Denser form simplifies transportation.
- **Cost-effective:** Competitive price compared to some fuels. (in some regions)
- **Stable Supply:** Consistent availability from renewable sources.
- **Waste Utilization:** Turns agricultural waste into valuable fuel.
- **Greenhouse Gas Reduction:** Lowers CO₂ emissions compared to coal.
- **Locally Sourced:** Potential for regional biomass sourcing.
- **Energy Security:** Reduces dependence on imported fossil fuels.
- **Rural Development:** Creates jobs in bio-coal production areas.
- **Versatile Use:** Suitable for various heating applications.
- **Controlled Burning:** Predictable burning characteristics.

MANUFACTURING PROCESS OF BRIQUETTES?

Feedstock Preparation:

- Various agricultural and forestry waste materials (sawdust, nut shells, etc.) under 25mm (Jumbo-90) or 10mm (Super-70) are fed into the machine using a screw conveyor.
- Materials exceeding 10-12% moisture content might require drying (sunlight or dryer) to ensure optimal burning.

Briquette Formation:

- The conveyor delivers the material to a press where it's compressed through a die, forming cylindrical briquettes.
- The compression process generates heat, softening the natural lignin present in the biomass. This lignin acts as a binder, eliminating the need for chemicals or adhesives.

Cooling and Packaging:

- The formed briquettes are cooled on a conveyor belt before being transferred for storage.
- Cooled briquettes may be broken into smaller pieces and then bagged or stored in bulk for delivery.



BRIQUETTING MACHINE

The Indraprasth Oil Briquetting Machine is utilized for creating high-quality Biomass Briquettes from agricultural and forest waste, completely devoid of binders or adhesives. This plant employs Binderless Technology, compacting the raw material using a high-pressure mechanical punch. Indraprasth provides Briquetting Machines in various sizes, ranging from 40 MM to 100 MM, to accommodate diverse production capacities.

(The optimal moisture content in raw material for briquetting is between 8-12%.)



Model	Production	Power Requirements
100	Up-to: 2,500 KG/HR	91 / 116 HP
90	Up-to: 2,000 KG/HR	88.5 HP
70	Up-to: 1,300 KG/HR	59 HP
60	Up-to: 1,000 KG/HR	47 HP
40	Up-to: 250 KG/HR	23 HP




DUALFEED COMBO MACHINE

The Indraprasth Oil DualFeed™ Combo Briquette cum Pellet Machine serves the dual purpose of producing both Biomass Briquettes and Biomass Pellets using the same equipment. Forest and agricultural waste are utilized for both types of fuel without the need for binders or adhesives. Pellets, which are cylindrical and smaller in size compared to briquettes, can also be generated.

(The ideal moisture content in the raw material for briquetting/pelleting should fall within the range of 8-12%.)



Model	Production	Power Requirements
DualFeed™ 100	Up-to: 2,800 KG/HR (Briquettes)	118 HP
DualFeed™ 90	Up-to: 1,400 KG/HR (Pellets) Up-to: 2,300 KG/HR (Briquettes)	93 HP
 DualFeed™ 70	Up-to: 800 KG/HR (Pellets) Up-to: 1,400 KG/HR (Briquettes)	61 HP



SAWDUST MACHINE

The Indraprasth Oil Sawdust Machine is utilized to transform wood logs, with diameters of up to 12 inches, into sawdust or powder (4-8 mm) without the need for hammering or grinding processes. This machine is engineered to process various types of wood log materials, including hardwood, softwood, wet or dry tree trunks, and logs, efficiently converting them into sawdust in a single operation. It simplifies the disposal of large quantities of wooden waste. To ensure optimal performance, all ESM models come fully equipped with the Indraprasth Automatic Control System.



Model	Log Size	Production	Power Requirement
ESM 150	Up-to: 12"	Up-to: 5,000 KG/HR	159 HP
ESM 100	Up-to: 10"	Up-to: 3,000 KG/HR	106 HP
ESM 75	Up-to: 8"	Up-to: 2,000 KG/HR	79.5 HP
ESM 50	Up-to: 6"	Up-to: 1,000 KG/HR	53 HP



CHIPPER GRINDER

The Indraprasth Oil Chipper Grinder is employed to slice and dice agricultural and forest waste raw materials into smaller sizes, making them easily transportable for utilization as biomass for heat generation or other applications. The output size of the raw material can be moderately adjusted by altering the perforated screen of the machine. Starting from the CG 40 model, all variants come equipped with the Indraprasth Automatic Control System to guarantee the seamless operation of the machine.

(The moisture content in raw material for processing in the chipper grinder should not exceed 25%.)



Model	Production	Power Requirement
CG 150	Up-to: 10,000 KG/HR	165 HP
CG 120	Up-to: 5,000 KG/HR	129 HP
CG 75	Up-to: 3,000 KG/HR	83 HP
CG 60	Up-to: 2,000 KG/HR	65 HP
CG 40	Up-to: 1,000 KG/HR	43 HP
CG 10	Up-to: 500 KG/HR	13 HP



HAMMER MILL

The Indraprasth Oil Hammer Mill serves to pulverize chipped raw materials into smaller sizes. This high-performance machine finely grinds a wide range of biomass materials into powder form (3-15 mm) through repeated hammer blows. The finely ground biomass can be utilized directly as a heating source or as raw material for Pellet Mills, Briquetting Machines, and similar applications. All models starting from HM 40 come fully equipped with the Indraprasth Oil Automatic Control System.

(Note: The moisture content in raw materials processed in the Hammer Mill should not exceed 12%.)

Model	Production	Power Requirement
HM 120	Up-to: 7,000 KG/HR	199.5 HP
HM 100	Up-to: 5,000 KG/HR	151 HP
HM 60	Up-to: 3,000 KG/HR	84 HP
HM 50	Up-to: 2,000 KG/HR	65 HP
HM 40	Up-to: 1,300 KG/HR	52.5 HP
HM 20	Up-to: 600 KG/HR	28 HP
HM 10	Up-to: 250 KG/HR	15 HP



ROTARY DRUM DRYER

The Indraprasth Oil Rotary Drum Dryer eliminates moisture from raw materials by exposing them directly to heat produced by the furnace. With the ability to handle raw materials with moisture content of up to 50%, it boasts the highest drying capacity among other dryers. Moreover, it can efficiently process materials with significant variations in size and composition, as it is less affected by particle size compared to alternative dryers.



Model	Capacity	Power Requirement
RDD 50	Up-to: 5,000 KG/HR	74 HP
RDD 30	Up-to: 3,000 KG/HR	69 HP
RDD 20	Up-to: 2,000 KG/HR	42 HP



ECONOMIC FEASIBILITY & PROFITABILITY

The rising cost of fossil fuels like coal, diesel, and LPG has significantly increased energy expenses in recent years. Bio-coal briquettes offer a compelling alternative due to their:

- **Renewable Source:** Made from sustainable biomass, briquettes are an eco-friendly fuel source.
- **Waste-to-Wealth Potential:** They transform readily available agricultural and forestry waste into a profitable fuel source. This creates additional income streams for farmers after harvest.
- **High Demand & Growth:** The briquette market boasts excellent growth potential due to increasing industrial demand and its suitability for various applications.
- **Favorable Business Environment:** Briquette production benefits from:
 1. Easy transportation
 2. High job creation potential
 3. Low startup costs
 4. Relaxed government regulations
 5. Tax incentives
 6. Reduced reliance on foreign energy sources
- **Eco-Friendly & Sustainable:** Bio-coal briquettes are a natural fuel with minimal environmental impact.
- **Growing Market & Global Opportunity:** With increasing plant installations in India and the abundance of biomass waste in many countries, the briquette industry presents a lucrative global business opportunity.

BRIQUETTE MARKET & END USER OF BRIQUETTE

Briquettes are a valuable fuel solution for a wide range of industries, including:

- | | |
|---------------------------------------|---|
| • Brick manufacturing | • Refractory production |
| • Hot air generation (dryers & ovens) | • Solvent extraction plants |
| • Textile mills | • Laminate manufacturing |
| • Ceramics production | • Milk processing facilities |
| • Bakeries | • Chemical plants |
| • Paper mills | • Dyeing houses |
| • Leather processing | • Industrial processes requiring thermal applications |
| • Gasification systems | • Food processing |
| • Spinning mills | • Vegetable processing |
| • Rubber industry | • Biomass power plants |

Their high demand stems from their versatility and efficiency as a fuel source across numerous industrial sectors.



INCENTIVE BY GOVERNMENT

Recognizing the environmental and economic benefits of bio-briquettes, the Indian government offers significant incentives to promote their production:

- **Tax Breaks:** New biomass briquette manufacturers enjoy complete income tax exemption for the first five years. Additionally, 80% depreciation on plant and machinery is allowed in the first year.
- **Duty Exemptions:** Solid bio-briquettes are exempt from excise duty, and several states offer sales tax exemptions as well.
- **Priority Sector Benefits:** The energy sector is a national priority, and bio-briquette projects qualify for benefits typically reserved for small-scale industries and priority sectors, considering the project cost.

Additional Incentives:

- **Subsidies:** Entrepreneurs can explore potential subsidies from District Industries Centres (DICs) and the Khadi & Village Industries Commission (KVIC). Contact your local offices for details.
- **Financing Options:** Banks and non-banking financial companies offer loans to support bio-briquette plant establishment.

Overall, the Indian government actively encourages investment in biomass briquette production through a range of attractive incentives and financial support options.

COMPARISON BETWEEN PISTON TYPE, EXTRUDER TYPR & PELLETE TYPE

FEATURE	PISTON TYPE	EXTRUDER TYPE	PELLETE TYPE
Mechanism	Uses a piston to compress biomass into molds	Uses a screw to push and compress biomass through a die	Uses rollers to compress and form biomass into pellets
Shape	Typically briquettes in various shapes (depending on mold)	Cylindrical briquettes	Cylindrical pellets (smaller diameter than briquettes)
Production Rate	Moderate	High	Highest
Suitable Feedstock	Wide range of biomass materials (including wet materials)	Denser and drier biomass materials	Drier and finely ground biomass materials
Energy Consumption	High	Moderate	Low
Maintenance	More complex due to moving parts	Moderate	Relatively simple
Cost	Generally higher initial cost	Moderate initial cost	Lower initial cost
Applications	Industrial applications, domestic heating	Industrial applications, animal feed	Animal feed, domestic heating (pellet stoves)



WHY CHOSE INDRAPRASTH OIL?

As a leading global manufacturer of advanced Biomass Solutions, Indraprasth Oil has acquired extensive expertise and experience in constructing Biomass Solution Plants. This enables us to design and deliver efficient plants that facilitate our clients' transition to cleaner energy sources and foster growth.

At Indraprasth Oil, our foremost priorities include timely deliveries, top-notch quality, and minimal downtime. Moreover, we offer comprehensive support by ensuring low maintenance costs and readily available spare parts, backed by an exceptional after-sales service team.

Indraprasth Oil is more than just a fuel company – we're a team passionate about building a greener future. Here are some interesting facts that might surprise you:

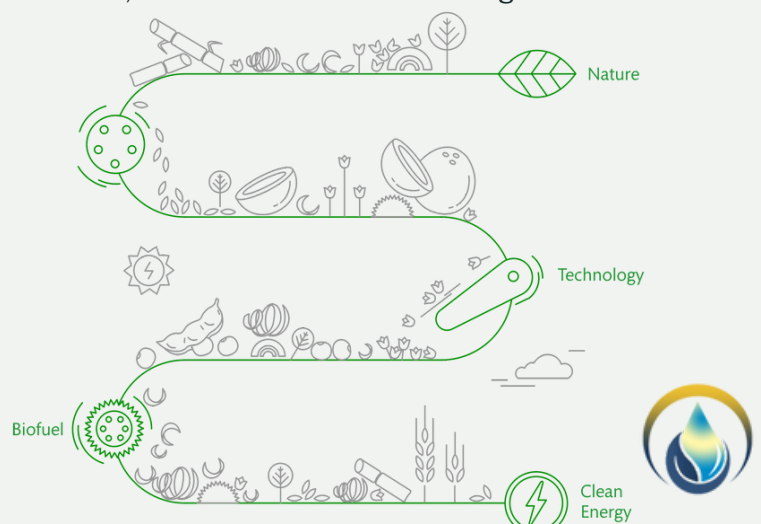
We're New & Innovative: Established in 2022, we're a young company at the forefront of clean energy solutions, constantly exploring and developing cutting-edge technologies.

We Reduce Your Carbon Footprint: By choosing Indraprasth Oil fuels, you're actively contributing to a cleaner environment. Our biofuels and clean energy sources significantly reduce greenhouse gas emissions compared to traditional options.

We Promote Sustainability: Sustainability is at the heart of everything we do. We prioritize responsible resource management and environmentally conscious practices throughout our operations.

Building a Greener Network: We're committed to expanding our reach and establishing a comprehensive network of biofuel pump stations across the country. This makes choosing clean energy options more convenient and accessible for everyone.

Be Part of the Change: When you choose Indraprasth Oil, you're not just a customer, you're a changemaker. Join us in leading the transition to a cleaner, more sustainable future for generations to come.



SUCCESS

In just a few decades, Indraprasth Oil has transformed from a local enterprise into a global leader in biomass solutions. Beginning with the manufacture of briquette machines, we've expanded our portfolio to include cutting-edge Biomass Solution Plants. Our expertise lies in crafting efficient plants that facilitate the transition to cleaner energy sources, driving sustainable growth for our clients worldwide. With a focus on timely deliveries, top-quality products, and unparalleled after-sales support, we ensure customer satisfaction at every step. Our flagship product, the Indraprasth Oil Hammer Mill, finely grinds biomass materials for various applications, equipped with our innovative Automatic Control System. Our success story is a testament to our commitment to excellence and our dedication to shaping a greener, more sustainable future.



We help you



Boost Your
Productivity



Strengthen
Energy



Enhance Economy
Performance



Attain Sustainable
Growth

Over time, Indraprasth Oil has seen significant global growth in its business operations. Initially focusing on producing briquette machines, we have evolved to specialize in crafting Complete Biomass Solutions utilizing advanced automatic computer-operated machinery with precise machining capabilities. We are proud to empower businesses, facilitating performance enhancement and supporting their transition to sustainable fuel utilization.



We welcome inquiries from Potential Investors. Please reach out to us for more information.

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