

Warm Degradation Studies of Artocarpus Heterophyllus Leaf Powder

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Abstract: Biomass briquettes supplant non-renewable energy sources, for example, coal or oil and have adaptable importance's in new nations. These briquettes are a sustainable power source and breaking point the carbon discharge to the climate. We use Artocarpus Heterophyllus departs (AHL), a sort of waste gathered from the Jack organic product tree for the most part from town side. So as to make choice, the properties of the material taken and the expense of the folio expansion assume a significant job. Right now waste (CD) and Saw Dust (SD) with water are taken as cover material considering their accessibility and cost adequacy. Five examples were set up by adding the fasteners to different weight rates. The briquettes are acquired at high weight and they experience mechanical and warm treatment. Warm and mechanical examinations of the fuel were performed using standard techniques including pressure bomb calorimetry, thermogravimetric investigation (TGA/DTA) and Scanning electron microscopy individually.

Keywords: Artocarpus Heterophyllus leaves; Briquette; cow dung; Saw dust; calorimetry.

I. INTRODUCTION

Vitality improvement is explicitly associated with flourishing and flourishing over the globe. Dealing with the creating interest for imperativeness in a safe and biologically careful manner is a key test. A sensible vitality supply, both in the long-and the present time and place, is required for progressing both money related headway and people's close to home fulfilment, and furthermore guaranteeing nature. The issues related with the usage of the petroleum product, solicitation and supply opening, reliably growing costs, an a dangerous atmospheric deviation and other biological issues made the world to think for exchange wellsprings of vitality like sun oriented, wind, ocean and biomass which are the fundamental indigenous practical vitality sources capable of Substituting enormous amount of strong, fluid and vaporous non-renewable energy source [1]. Biomass vitality has immediately transformed into a key bit of the overall practical vitality mix and record for a routinely creating idea of electric capability included the world over. Bioenergy structures offer significant possible results for diminishing ozone harming substance emanations due to their gigantic potential to supersede petroleum products in vitality age. Biomass diminishes releases and improves carbon sequestration since short-rotate items or woodlands set up on gave up agrarian land gather carbon in the dirt. Biomass is the third greatest basic vitality resource on earth, after coal and oil. Biomass vitality is produced using any similarity to wood, crops, cultivating rubbish, sustenance waste, and assembling waste. Biomass briquettes, for the most part made of green waste and other characteristic materials, are conventionally used for power age, warmth, and cooking fuel. These stuffed blends contain distinctive normal materials, including rice husk, bagasse, ground nutshells, metropolitan strong waste, and cultivating waste. The development of the briquettes changes by an area due to the availability of natural materials. The natural materials are collected and pressed into briquette with the ultimate objective to devour longer and make transportation of the product simpler. These briquettes are out and out not quite the same as charcoal since they don't have gigantic considerations of carbonaceous substances and included materials. Appeared differently in relation to petroleum derivatives, the briquettes make low net total studio gas emanations of the way that the materials used are starting at now a bit of the carbon cycle [1, 5]. Briquetting [1, 3] is densification methodology of biomass to convey reliably estimated strong bits of raised thickness, which can be beneficially used as fuel. Briquettes can be made from the free biomass until the thickness of 1200 kg/m³ [7]. Lin P [8] thought about the consuming characteristics of different biomass fills, inspected the basic effect factors on ignition (fuel qualities, shapes and sizes, and air dispersion, etc.). Wang L [9] investigated on the coking issue in biomass consuming technique, and discussed a combination of measures to decrease the debris. The reliably assessed littler biofuel exhibits better stream limit in bio-reactors for giving indications of progress execution of vitality actualizes. In the present examination we report the Thermal, mechanical investigation and infinitesimal picture investigation of fuel arranged.

II. MATERIALS AND METHODS

Artocarpus heterophyllus departs (AHL) powder, a waste item from the jackfruit tree leaf, is a significant wellspring of vitality for biomass densification. AHL were gathered generally from the town zone, transparently from rural regions. The gathered leaves were substitute, weathered, elliptic-elongated to praise with the smaller end at the base,

entire or now and again 3-lobed, 7 to 15 cm protracted, and the top and base together pointed. Female heads are pressed by spathaceous, deciduous, stipular sheaths, 5 to 8 cm long with two sepals and the spike is 5 to 15cm protracted. Cover less Briquetting is constantly picked in light of the fact that it is low complicity and more affordable. The expansion of folio by and large relies on the attachment between the particles. Right now, request to upgrade the powers of union between the particles, cow compost and saw dust were utilized as restricting material. Bovine excrement and sawdust a cover material utilized for briquette is a modest and effectively accessible bio mass material [7]. Nature of briquette of various biomass will vary with various proportion [10]. Right now, various proportions of briquetting biomass of AHL powder saw residue and dairy animals excrement were utilized. The homogeneous powder of AHL was set up by remembering that the example has adequately fine molecule size appropriation, dampness substance and folio activity.

III.RESULT AND DISCUSSION

A. Thermal Analysis

Examination was executed in a differential thermo gravimetric analyzer, TGA-6/DTG of Perkin Elmer, with which the example weight reduction and pace of weight reduction as elements of time or temperature were adjusted ceaselessly, underneath unique conditions, in the shifts from 30–800oC. The preliminaries were done at climatic weight, underneath nitrogen condition, among a stream pace of 20 ml/min, at various direct warming rates. The response time, the adjust example of gravity, and temperature were aligned by the analyzer. Five examples were set up with test 1 containing unadulterated AHL powder with no fastener, test 2 containing 90 % AHL powder and staying 5 % CD and 5 % SD. Test 3 records for 80 % AHL with staying 10 % CD, 10 % SD. Test 4 contains 10 % SD and test 5 has 10 % CD. Every example must be assessed under the fundamentally the same as conditions, together with temperature range, climate, and warming rate, to choose the most part repeatable and definite outcomes. TG plots for every example were gained as the yields for warm transformation [11]. Table 1 gives TGA results. Wu HX [12] made research on the pyrolysis execution, and moreover their mix, calling attention to the different bio-mass at early on unusual releasing temperature and the principle most extraordinary apex temperature of co-pyrolysis extending with more lignite in blend by TGA. Figure 1 shows the TG bend of unadulterated AHL powder (Sample 1).

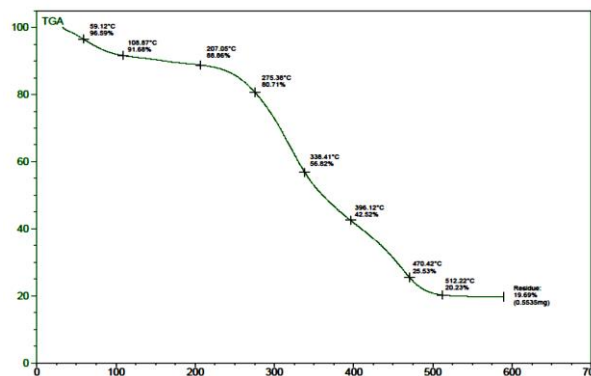


Fig 1. shows the TG curve of pure AHL powder

The qualities of the TGA examination of the rest of the examples are displayed in Figures 2(b-e) with capacity of various rates. The profile of TG twist is practically identical for each considered briquette. The similar investigation of the watched weight reduction and their temperature go is recorded in Table 1. It might be seen that the extension of different sorts of rate impacts hardly the advancement of weight reduction. By taking a gander at the TG twists for each trialed material, three phase weight misfortunes can be legitimized [13, 14]. The principal arrange weight reduction is fundamentally because of the vanishing of water. The following phase of weight reduction came about because of the oxidation of ignitable parts present in briquettes which thus gives a thought regarding the decay of leaf powder. Extra misfortune in weight might be reason by the start of coke. The weight reduction happened in the subsequent stage is huge sum when contrasted with the other two phases. It unmistakably shows that the vast majority of the stage change happened in the specific temperature ranges. Above 500oC, the weight reduction was less significant. Right now, corruption of cellulose and lignin occurs. The 90% of leaf powder delineated the base weight reduction (75 %) at 800oC. The most extreme weight reduction 95 % was investigated for the 70% of leaf powder, which was a direct result of the enormous substance of unpredictable issue and dampness in explicit examples. For a most extreme dampness level, briquettes ought to be set up for a period of around 24 hours. They should not to be dried in light of the

fact that this would cut down their mechanical quality. The best results were practiced for a mix with a 90% of leaf powder for a best warm soundness. The warm conduct for the example exhibits potential for the use of biomass waste as fuel as briquettes in the start procedure.

The TGA bend of above Figures2(a-d) indicated the nonattendance of water particles, as weight reduction was seen at 275.38oC and the comparing weight reduction is 19.29%. Thus the weight reduction of 512.22oC is 79.77%.

Table 1 Characteristics of TGA Curve

S. No.	Sample code	Stage	Weight loss	Temperature range
1.	AHL	I step	8%	30 °C – 100 °C
		II step	19%	100 °C -275 °C
		III step	80 %	275 °C - 510°C
2.	90% AHL - 5% CD-5% SD	I step	3 %	30 °C – 100 °C
		II step	72 %	250 °C – 500 °C
		III step	75 %	Above 500 °C
3.	80%AHL -10% CD-10% SD	I step	3 %	30 °C – 100 °C
		II step	83%	250 °C – 500 °C
		III step	85%	Above 500 °C
4.	AHL - 10 % CD	I step	3 %	30 °C – 100 °C
		II step	92 %	220 °C – 500 °C
		III step	95 %	Above 500 °C
5.	AHL - 10 % SD	I step	3 %	30 °C – 100 °C
		II step	82%	250 °C – 490 °C
		III step	86%	Above 500 °C

DTA bends from Figures2(a-d) shows the briquettes test of various joining pieces show that all are exothermic in nature. Table 2 shows the related warm occasions watched for different briquette tests. Unclear course from found in the DTA twists for all of the examples exhibited similar lead and only assortment in the height of the exothermic peak in both DTA. The exothermic zeniths identify with the periods of warm corruption of divisions of hemicellulose, cellulose and lignin dynamically [15]. The most extreme vitality release was experiential for all examples in the essential event with apex most noteworthy at around 330°C. The briquettes exhibited a below average endothermic event when differentiated and the wastes since they have cut down proportions of dampness. It might be in like manner support to the TGA results. As the temperature was extended, the start of the biomass proceeded through the stages for parchedness and drying, brisk pyrolysis and consuming of volatiles, and the burnout of waiting carbon. After 600°C, the procedure got steady for the all examples.

Table 2 Characteristics of DTA Curve

S. No.	Sample code	Peak	DTA (uV)	Centered at
1.	90% AHL - 5% CD-5% SD	I	350	320 °C
		II	50	450 °C
2.	80% AHL -10% CD-10% SD	I	320	340 °C
		II	50	40 °C
3.	AHL - 10 % CD	I	3 %	30 °C – 100 °C
		II	80 %	220 °C – 500 °C
4.	AHL - 10 % SD	I	100	340 °C
		II	270	410 °C

B. SEM Analysis of AHL powder samples

Surface morphology was analyzed from SEM pictures by utilizing Scanning Electron magnifying lens (Model-Philips XL 30). Figure 4 (an e) shows the surface morphology investigation of the various powders. The SEM pictures of un-doped and doped AHL are appeared in Figure 4 (an e). An unadulterated AHL test plainly shows the non-homogenous morphology having a molecule with sporadic shape. By the consolidation of CD and SD into the unadulterated AHL show that the bi-model circulation. Anyway the little size fusing particles inserted onto the AHL molecule limit. Despite the fact that, the SD particles are develop in the tight plate like shape and CD particles are look like in a thickly pressed stone like structure. In the two particles.

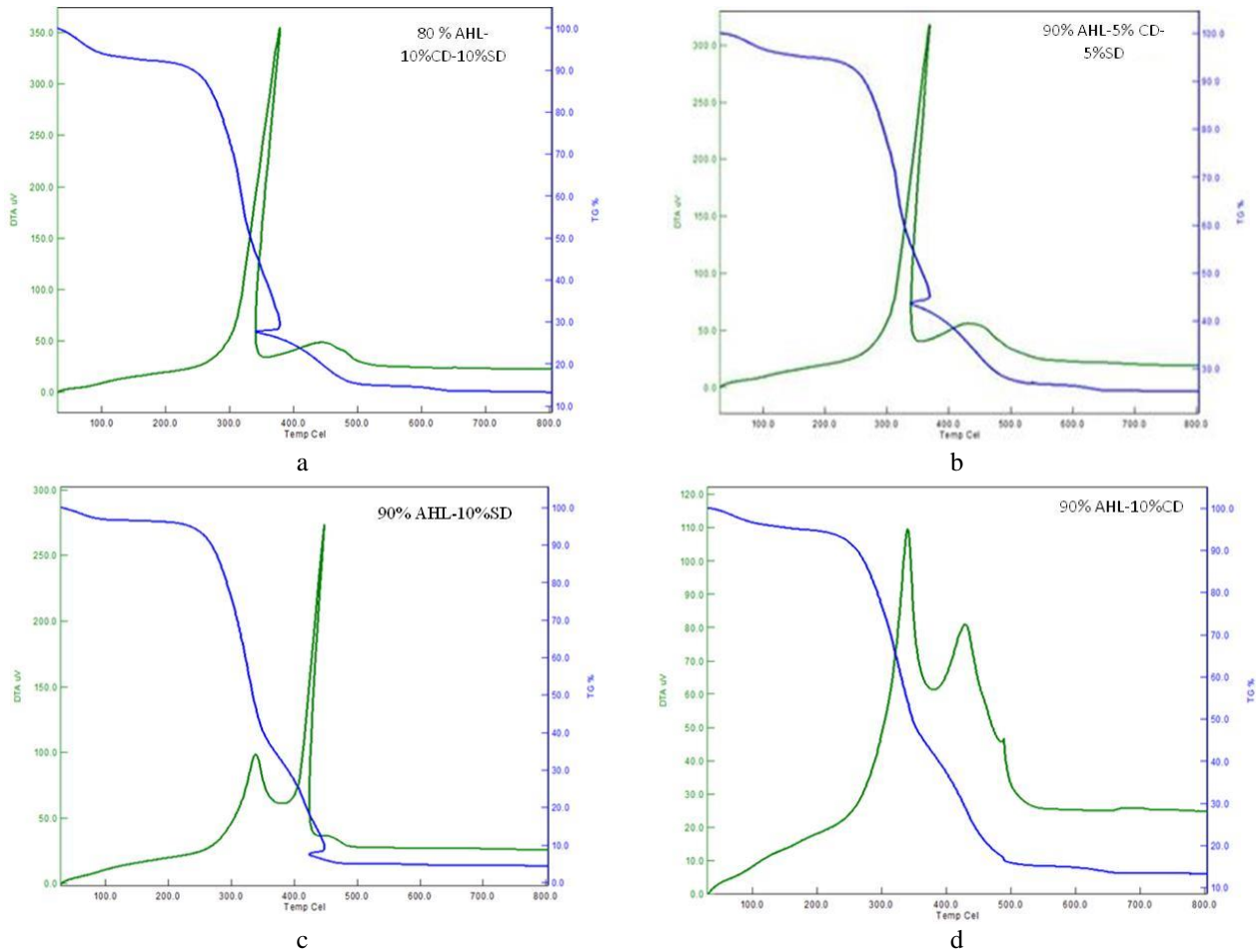
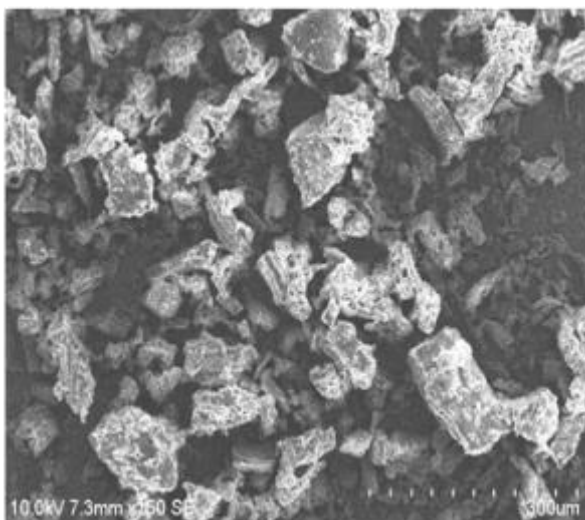
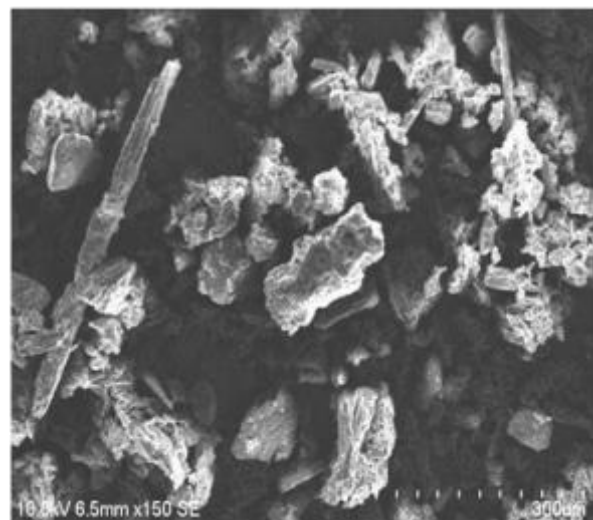


Fig.2 TGA Analysis of different samples

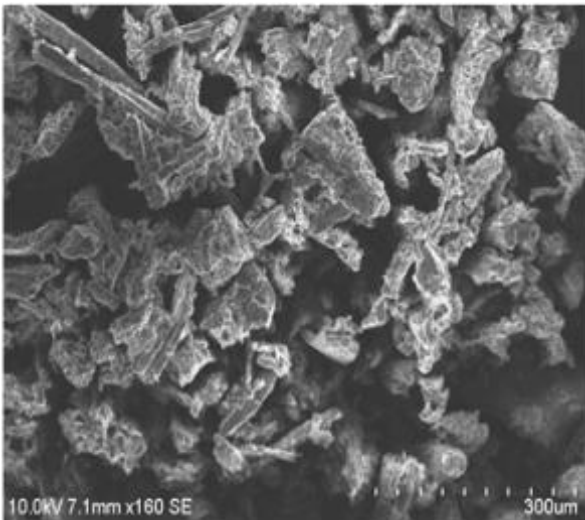
are not consistently conveyed in the whole example. At this example, the CD and SD particles installed in the AHL morphology is effectively imagined and along these lines affirms the arrangement of two stage material in a solitary framework. The joining proportion chooses the major and minor particles in the surface morphology.



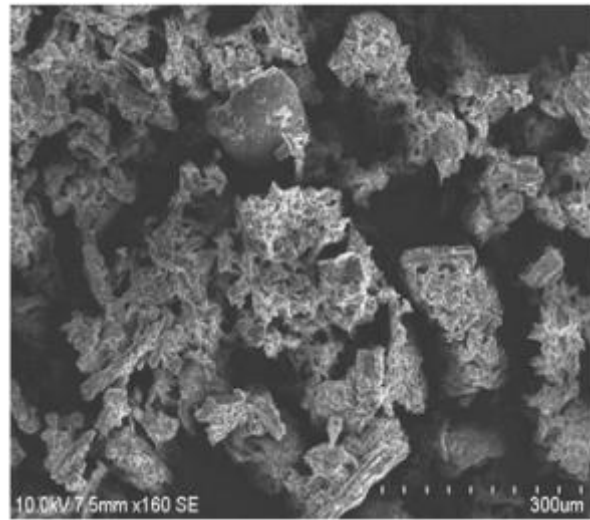
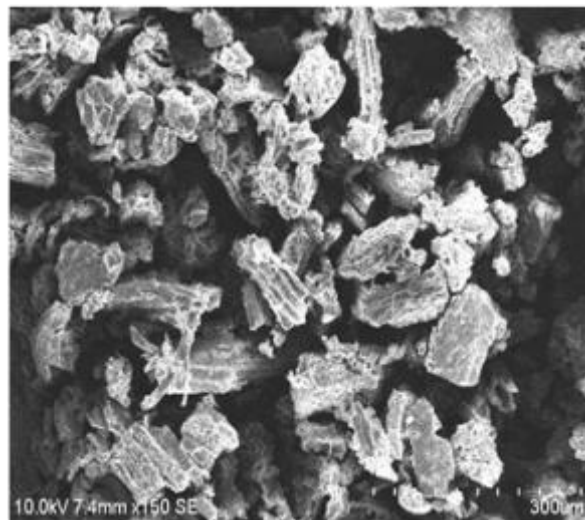
AHL powder



90% of AHL + SD 5% + CD 5%



80% of AHL + SD 10 % + CD 10 %

90% of AHL + CD
10 %

90% of AHL + SD 10 %

Fig.3 SEM images of the samples

IV. CONCLUSION

Artocarpusheterophyllus deports powder, a waste item from the jackfruit tree leaf, is a significant wellspring of vitality for biomass densification. Thermo Gravimetric Analysis has been performed for five chosen biomass tests which can be utilized as briquetting crude material. The TGA bend of the unadulterated example indicated the nonattendance of water particles, as weight reduction was seen at 275.38oC and the relating weight reduction is 19.29%. So also the weight reduction at 512.22oC is 79.77%. The SEM picture of unadulterated AHL powder test plainly shows the non-homogenous morphology having a molecule with sporadic shape.

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BIOGRAPHY



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