

Review Form 1.6

Journal Name:	Journal of Materials Science Research and Reviews
Manuscript Number:	Ms_JMSRR_88968
Title of the Manuscript:	Investigation Of The Mechanical And Combustion Characteristics Of Cocoa Pod And Coconut Husk Composite Briquette
Type of the Article	Original Research Article

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This journal's peer review policy states that **NO** manuscript should be rejected only on the basis of '**lack of Novelty**', provided the manuscript is scientifically robust and technically sound. To know the complete guideline for Peer Review process, reviewers are requested to visit this link:

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PART 1: Review Comments

	Reviewer's comment	Author's comment (if agreed with reviewer, correct the manuscript and highlight that part in the manuscript. It is mandatory that authors should write his/her feedback here)																																				
<p>Compulsory REVISION comments</p>	<p>General comments.</p> <p>I found this article very confusing. It examined the use of the shell of cocoa pods (CCP) and the husk (coir) of coconut (CNH) to make char briquettes as an alternative to fuelwood and wood charcoal. As these are waste products, they are free to collect and use. But no information is given about production costs and whether the briquettes would be competitive with fuelwood and charcoal</p> <p>These products were collected, sun dried and charred in a furnace. The charred products were then combined together in various mixes, bound together with 50% corn starch and then made into briquettes. The various combinations were then tested for amongst other things: Density (Table1); Moisture content (Table 3); Ash content (Table 4); and Energy value (Table 5). All these tables were inconsistent with the values given for 100% CCP and 100% CNH.</p> <p>The article gave the moisture content (m.c.) of fresh CCP (28% wet basis), but did not give the m.c. of CNH. It then said it sun-dried both products down to 5%, which is hard to believe. Were there products tested for m.c? The 5% value is inconsistent with Table 3 unless the starch binder has a higher m.c.? Also, banana peel paste and water are used to make a paste, but I assume that this is only for testing?</p> <p>What the paper should have given are the following:-</p> <ol style="list-style-type: none"> 1. Energy value and moisture content of fresh CCP & CNH 2. Energy value and moisture content of sun-dried CCP & CNH 3. Energy value and moisture content of charred CCP & CNH 4. Energy value and moisture content corn starch (16 MJ/kg)? 5. Cost of corn starch. (US\$ 0.28 to 0.30 kg. Cedi 1.61 kg.) 6. Cost of collecting and drying CCP & CNH 7. Cost of charring CCP & CNH 8. Cost of briquetting CCP & CNH 9. Estimated selling price of CCP & CNH briquettes 10. Selling price and energy content of fuelwood and charcoal. <p>Turning to the various tables and their inconsistency, I list the following.</p> <p>Table 1. Density of Briquettes: kg/m3</p> <table border="1" data-bbox="982 1465 1896 1734"> <thead> <tr> <th>CNH%</th> <th>CCP%</th> <th>As calculated</th> <th>Table 1 results</th> </tr> </thead> <tbody> <tr> <td>100</td> <td>0</td> <td>383</td> <td>383</td> </tr> <tr> <td>80</td> <td>20</td> <td>411</td> <td>522</td> </tr> <tr> <td>60</td> <td>40</td> <td>439</td> <td>611</td> </tr> <tr> <td>50</td> <td>50</td> <td>451</td> <td>389</td> </tr> <tr> <td>40</td> <td>60</td> <td>467</td> <td>536</td> </tr> <tr> <td>20</td> <td>80</td> <td>495</td> <td>589</td> </tr> <tr> <td>0</td> <td>100</td> <td>523</td> <td>523</td> </tr> <tr> <td>Mean</td> <td></td> <td>454</td> <td>508</td> </tr> </tbody> </table> <p>If the values for CNH and CCP are correct, then the calculated values for the stated composition of the briquettes must lie between the 100% values for CNH and CCP. However, three of the stated values in the paper are greater than the 100% value for CCP? How can this be? It is not logical!</p>	CNH%	CCP%	As calculated	Table 1 results	100	0	383	383	80	20	411	522	60	40	439	611	50	50	451	389	40	60	467	536	20	80	495	589	0	100	523	523	Mean		454	508	
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Table 3. Moisture content of Briquettes: % moisture (wet basis).

CNH%	CCP%	As calculated	Table 3 results
100	0	8.97	8.97
80	20	9.30	7.96
60	40	9.80	9.26
50	50	10.06	8.77
40	60	10.32	8.47
20	80	10.82	9.63
0	100	11.33	11.33
Mean		10.06	9.20

The moisture content of the char either from CNH or CCP should be about 5%, similar to wood charcoal. Why the high values? Is it because of the addition of 50% corn starch? Even so, these figures seem high, especially as the raw material was sun-dried. Air-dry wood has a moisture content of about 15%.

Table 4. Ash content of Briquettes: % of weight.

CNH%	CCP%	As calculated	Table 4 results
100	0	10.27	10.27
80	20	9.13	4.67
60	40	7.97	5.33
50	50	7.40	7.00
40	60	6.83	5.73
20	80	5.65	4.83
0	100	4.53	4.53
Mean		7.40	6.05

Again, the ash content varies considerably from the calculated values. How can this be explained? What is the ash content of starch?

Table 5. Energy value of Briquettes: MJ/kg.

CNH%	CCP%	As calculated	Table 5 results
100	0	17.73	17.73
80	20	17.96	16.31
60	40	18.19	17.80
50	50	18.30	17.02
40	60	18.42	16.53
20	80	18.66	16.58
0	100	18.88	18.88
Mean		18.30	17.26

The energy values given in Table 5 are lower than the calculated values. Why is this so? The energy value of starch is about 16 MJ/kg. So, with 50% starch, this will contribute about 8 MJ/kg, which means that the char contributes between 19.46 and 21.76 MJ/kg. This should be compared to wood charcoal which has about 28 MJ/kg at 5% moisture content. Thus, 1.3 to 1.4 kg of these briquettes are equivalent to 1 kg of wood charcoal. Incidentally, air dry wood had an energy value of about 15.5 MJ/kg.

Regarding the concentration of starch to the mix. In Kenya only about 5% starch is added to wood charcoal dust as a binder. 50% starch as a binder seems excessive. It will also add about 0,8 Cedi per kg. to the cost of the briquette.

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	There are other uses for char from CNH and CCP. These are good soil enhancers and will facilitate the increased capture of soil carbon. Also, coir used to make matts and to stuff mattresses etc.	
Minor REVISION comments		
Optional/General comments		

PART 2:

	Reviewer's comment	Author's comment (if agreed with reviewer, correct the manuscript and highlight that part in the manuscript. It is mandatory that authors should write his/her feedback here)
Are there ethical issues in this manuscript?	<i>(If yes, Kindly please write down the ethical issues here in details)</i>	

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