TITLE:
Coffee husk mulch on soil erosion and runoff: experiences under rainfall simulation experiment.

General Comment:
The theme studied (efficacy of mulch on runoff and erosion) is not novel. The authors present data obtained from simulated rainfalls on trays with soil. The experimental design poses the following treatments: C treatment: soil without the addition of coffee husk (with and without crust), 2) S treatment: soil with coffee husk applied on surface (with or without crust) and 3) B treatment B: soil with coffee husks buried (with and without crust).

With the experimental design presented by the authors only is possible compare treatments C with S, and C with B, for analyzing the effect of the presence or absence of crust. S and B treatments cannot be compared and attribute the results to the way that the residue was applied (surface or buried), since the dose of coffee husks used in the buried treatment is more than double that in the treatment with surface residue. The report would benefit from rewritten, but eliminating comparisons between treatments S and B. The manuscript contains valuable and interesting data that deserve to be published after making a mayor correction.

Thanks you for your advices and contributions. We know that the mulch researches are not novel, because there is a lot of information about the use of mulch. However, coffee husk has not been studied like mulch and it is the novel aspect of this paper.

In other way, it is clear that doses are different, but when you design the experiment you had to choose between two options: equal doses or equal surface erosion percentage. For an orthogonal design you have to maintain constant one variable. Doses were not the same, but the soil surface cover percentage was the same. If we had decided to maintain the doses, then the soil cover had not been not equal. Which would you choose?
In our opinion and for erosion studies, the surface coverage percentage is more important because the soil surface had to show the same condition against the drop impact

In the literature review we had found experiments with both possibilities (these studies are cited in the text), and we decided that possibility. Another question is the differences that the results showed after the simulation. The differences have been described in the discussion.

Specific comments:

Below I have included several comments that might improve final version of this manuscript for publication:

Page 1130, lines 12-13: "...in studies about water and erosion soil variables." -- English review

We have reviewed the sentence:
"The use of simulated rainfall technique is common in erosion soil studies"

Page 1131, lines 14 -15: What physical and hydrological properties?. Do the authors refer to determinations of porosity and bulk density (e.g.) or other determinations?

Yes, we referred to those properties. It is possible that the order in the paragraph did not favor the understanding of this sentence. In that sense, we have changed it. First at all, we have defined the analytical parameters, and after that we have comment the sampled process.

"The analyzed parameters were: carbonate content ($CaCO_3$) by Bernard calcimeter method, electrical conductivity of saturated extract (EC_e), pH, organic matter (OM) by Walkley-Black method, field capacity (FC) and wilting point (WP) by pressure plate method, texture by Bouyoucos method and Sodium Absorption Ratio (SAR) by main cations and anions. Hydraulic conductivity was obtained by a constant charge permeameter method, whereas porosity was obtained by mercury porosimeter and aggregate stability by wet sieving. The soil samples were analyzed according to the Soil Survey Staff (2004) and they were collected in disturbed samples for textural and chemical analysis, and in core samples for physical and hydrological properties."

Page 1131, line 21:
It is not clear methodology for determining the stability of the aggregates.
What was the moisture content (pF = 1,for example)?.

This methodology is explained in the reference that we added in the paper: "Soil Survey Staff: Soil Survey Laboratory Methods Manual - Soil Survey Investigations Report No. 42. Version 4.0. Burt. R. U.S. Department of Agriculture, Natural Resources Conservation Service, 2004." Method 3F - Pag. 163.

In that sense, the wet sieving method is a common methodology for aggregate stability analysis in several research papers. By this reason, we think that it is not necessary to explain it, because if we explain with details that method, we should explain the set of methods (CaCO3, Organic Matter, etc.).

In reference to the moisture content, when you have to determine the aggregate stability by this way, the aggregate should be dry at the beginning.

Page 1132, line 9: "by" ‡ but

We have changed the sentence for a better understanding.

"Distilled water was sprayed on the soil surface to avoid the runoff generation."

Page 1132, line 11-12: Did you use different dose in S and B treatments? The results are not comparable. The aim should not be get same ground cover in S and B treatments, but that the residue dose used is the same.

This comment has been replied in the first paragraph of this document.

Page 1132, line 13: Why this depth? What kind of tillage attempts to simulate?

In the experimental design, we thought about the possibilities to use that residue in the future. In that sense, for avoiding the costs of material or application we decided to add near the surface. Five cm seemed as a good choice in concordance with our experimental conditions (trays). In reference to the tillage that we would want to reproduce, at the experimental period we did not think about that question because we did not know in which place the coffee husk could register the best results

Page 1132, lines 18-20: Which is the organic matter content of the residue? Authors do not give basic information on the waste that they apply.

The information about the characteristics of the residue is given in Pag. 1132 L1-L5.

"The husk used in this experiment was from the Angolan coffee region with maximum storage capacity 6.9% of moisture. The organic content was 2.5 %, bulk density values were between 0.32 – 0.35 g cm^{-3} and the diameter of husk between 0.5-2 cm."

Page 1132, lines 19-20: The objective should be to provide equal dose of residue, not equal surface protection.

This comment has been replied in the first paragraph of this document.

Page 1135, lines 3-4: Why do you say that agricultural lands are less variable than forest lands?

In the text, it was a mistake. However we have added some information to the paper and this sentence has been removed.

Page 1135, line 9: If the difference is not significant, authors can not claim that exists.

The outcome showed that it was significant ($p<0.01$). Therefore, treatment factor is statistically significant respect to infiltration rate. There was statistically differences among B and the other treatments (S and C). In contrary S and C did not show these differences.

Page 1135, line 12-13: Table 2 does not show these differences.

In table 2, you can show the differences between the levels inside the factors. There are differences between WC (48.19b) and WOC (65.94a) cases in reference to infiltration rate. In the table footnote you can see that values with different letter are significantly different.

Page 1135, lines 21-22: only there is differences if are statistically significants.

As you can see in table 2, there are not statistically significant differences, and it was the idea that we wanted to show. We have changed the text for a better understanding:

"The influence of the soil condition on soil infiltration rate also showed statistically significant differences. However, soil class factor did not show these statistical influences."

Page 1136, lines 21- 22: The B treatment had double doses waste that S treatment. Possibly, this has had a decisive influence on the results, rather than the situation of the residue (surface or burried).

This comment has been replied in the first paragraph of this document. And the differences have been explained in the discussion.

Page 1136, lines 26-27: Where are these values runoff?. Not listed on any table.

These data can be obtained of the figure 2c, because the data showed are the average values of the four soil data. However, we have added this datum to complete the paper.

Page 1137, lines 6-7: Where are the data to support this assertion?.

You can show that behavior in the figure 2 c and d. We wanted to express that I WC data and II WC data showed higher values of runoff than I WOC and II WOC. This behavior showed that the coffee husk could not avoid the crust effect.

We have improved the text:

"In crusted soils the action of burying the coffee husk did not get to maintain the runoff depth at the same levels of the non-crusted (figure 2a and 2c). In soils III and IV between B-WOC and B-WC there was a difference of 3 mm, in soil II of 8 mm and in soil I of 17 mm. The action of spreading the mulch on soil surface did not avoid the crust effect over runoff generation."

Page 1137, lines 8-11: Where are the data to support this assertion?.

We have removed this paragraph, because the idea was not well expressed and we have rewritten the idea. You can see in the previous point text a part of this new paragraph.

Page 1138, lines 8-9: English review. Where are the data to support this assertion?

The English has been reviewed. And the data that support that sentence was in figure 4. In reference to the general behavior of crusted treatments and non-crusted treatments in relation to sediment concentration the text have been improved.

Page 1138, line 17: The crust does not break with the rain.

It was a sentence that we read in the bibliography where we wanted to express the movement of soil due to the diffuse overland flow erosion. We have modified this sentence and remove it.

Page 1138, line 27: "straw wheat" ‡wheat straw.

We have changed this term.

Page 1139, lines 5-6: these treatments are not comparable, since they have been used very different doses of residue in each.

This comment has been replied in the first paragraph of this document.

Page 1139, line 15: "other soil covers" ‡others soil covers

We have changed this term.

Page 1139, line 15: "...aerial seeding" ---Aerial seeding?. Sow what?

Aerial seeding is a technique not a mulch, and when you read the text it seems a "type of mulch". We have modified the text and removed that word.

"The use of other soils covers like wheat straw or grass seeds (Groen and Woods, 2008), a combination of straw and pine needles or pine needles (Grismer and Hogan, 2005), [….]"

Page 1139, lines 15-16: “mulch cover and seeds”--What seeds?

The seeds are a combination 8 classes of grass seeds: 10% *(Festuca idahoensis),* 10% *(Agropyron spicantum)……* We did not add this information because you can look for that article and it was not important for our aims. However, we have added the “grass seeds” to the text.

“The use of other soils covers like wheat straw or grass seeds (Groen and Woods, 2008), a combination of straw and pine needles or pine needles (Grismer and Hogan, 2005), [….]”

Page 1139, line 19: The difference is due not only to the presence of crust.
Besides crusting, also influences the different doses applied of coffee husk.

This comment has been replied in the first paragraph of this document, and the differences have been explained in the discussion.

Page 1139, line 25: What wanted to say with soil lower quality?.

Soil quality is a measure of the condition of the soil that it is evaluated using inherent and dynamic soil properties like: Physical Properties (Aggregate Stability, Available Water Capacity, bulk Density, infiltration, soil crusting, structure and macropores, etc.,), Chemical Properties (pH, organic matter, etc.) and Biological properties (Soil respiration, earthworms).

Therefore in this case we want to say that coffee husk showed better outcomes when the soil presents worst conditions (aggregate stability, porosity, salinity, presence of crust). The experiments have shown that there was a marked improvement when the coffee husk was added. So the quality was higher after the experiment. In other analytical data that we measured (porosity, aggregate stability, etc.) this improvement was demonstrated. We have added a new table (table 3) with the results of these improvements.

Table 3. Soil physical properties after the experiment.

Soil Class	Treatment	Porosity (%)	Aggregate stability (%)
I	Superficial	51.75	5.73
	Buried	60.00	25.20
II	Superficial	48.50	5.73
	Buried	51.70	12.91
III	Superficial	46.00	6.43
	Buried	50.00	19.18
IV	Superficial	45.00	9.44
	Buried	47.65	14.88

Page 1140, lines 3-5: The clay fraction induces pore formation smaller than the silt fraction. However, is not more erodible. The reason is the low stability of the aggregates when the silt fraction is high.

We agree with you. Silt fraction is in an intermediate “situation”: i) Its aggregates are less stable than clay fraction and ii) The pore size is bigger than clay fraction. We do not find any different idea in our text. However this sentence has been included in the discussion about soil physical properties (porosity and aggregates) that we show you in the new table 3.