

The manuscript “Metagenomic and physicochemical analyses reveal microbial community and functional differences between three different grades of Hongxin low-temperature Daqu” presents a thorough study where metagenomics and physicochemical analysis were used to compare three grades of Hongxin daqu.

The results concerning the microbial population, the metagenomic functional characteristics and the physicochemical analysis highly improves the knowledge on their interactions and composition in different grade daqu samples.

The manuscript is generally well written, although mainly lines 385-390 and 417-420 need improvement. There are some names in the figures and figure captions that have low quality and need improvement.

Other comments that need revision are:

Line 21-23 – This sentence is somehow contradictory, additionally it is not presented in the paper the differences in temperature and humidity.

2.1 Sample collection – this section should be more complete in order to fully identify the origin of the samples that are being analysed.

2.2 Please provide full description of the methods used for the determination of saccharification power, liquefaction power, fermentation power, esterification power, and alcoholic power.

Line 132 – Please indicate the name of the manufacturer of “Buffer ATL / PVP-65”.

Lines 176 – Replace “was above 1 % ( Figure.2a ), which were Bacillota” by “above 1 % ( Figure.2a ), corresponded to Bacillota”

Line 184 – Correct “Figureure”

Line 187 – Do you mean *Lactiplantibacillus plantarum*?

Lines 187 and 190 – “*Aspergillus oryzae*” is repeated in both lines with different percentages. Please correct.

Line 189 – Do you mean *Levilactobacillus brevis*?

Line 198 – There is lacking the observation concerning the relative abundance of phylum, genus and species between samples. Although the significance of the results is not presented in figures 2a, 2b and 2c, similar profiles are generally observed within the same grades of HX, which are mostly different among grades. One can at least observe a trend. Please complete with that observation.

Line 201 – It should be clarified that this value is valid when considering the samples from each grade together, as when they are considered individually (figure 2e) the common species are only 1447.

Line 207 – The percentages presented must be clarified. In fact, from figure 2d, if you consider only the number of species in each HX grade, the percentages are as follows:

- HXT – Total = 4159; unique = 355; 8,5%
- HXF – Total = 4088; unique = 432; 10,6%
- HS – Total = 3505; unique = 642; 18,3%

Lines 208-209 – Modify the sentence according with the eventual modifications of line 207.

Figure 2. e) - Why are there only 8 groups and not 9, corresponding to the 9 samples analysed?

Figure 3. - The microbial names at figure 3f and 3g are not readable

Figure 4. - The captions of figure 4a, 4c, 4d are not readable.

Line 325 – Liquefaction power of HXS was lower than the other HX. Alcoholic power is the one that is also higher. Please correct.

Line 326 – HXS presented lower values for the remaining indicators analysed. Please correct.

Lines 348-350 – How the correspondence between HXT and group 1, HXF and group 2, HXS and group 3 was established?

Line 425 – Add “respectively” at the end of the phrase.

Lines 515-517 – Did you establish a correspondence between the Daqu grade and its location in the fermentation chamber to make such a statement? Did you measured its temperature and moisture?

Line 523 – If the previous question are negative, you should add “probable causes” as the cause of the differences in the microbial population and activities are only hypothetical.