

Response to Executive Editor Comments

The abstract needs to be improved to more clearly summarise the key results and explain the significance of the work. This is described more clearly in the conclusion section (L200-207). I would suggest using some of the conclusion statements to improve the abstract.

Response: Part of conclusion as suggested by the Editor are added to improve the abstract.

L11 “Microbial community composition varied remarkably from other deserts and from one place to another” should be re-written as “The composition of the microbial community varied greatly among the sites sampled”.

Response: The sentence is rephrased as suggested.

L20 The final sentence in the abstract should be deleted and replaced with a sentence which explains the significance of the findings.

Response: The sentence is deleted.

L48-57 In methods section 2.1 more descriptive detail needs to be provided on the 3 sampling locations, including moving some of the information which appears in section 3 such as elevation. Reviewer 3 requested this change but it has not been done. This needs to include descriptions of the land use / ecosystems / topography in these areas, the vegetation at each of the sampling locations needs to be described, and given that only soil pH and no other soil properties were analysed a general description of the nutrient status of these soils should be included.

Response: We have included the data like land use/ ecosystem /topography. Unfortunately, data on nutrient status was not collected.

Line 50 – is it correct that 3 cores were taken at each site and combined into a single composite sample for analysis. In the response to reviewer 3's comment, the authors responded that “samples were collected in triplicate”. So were they analysed as 3 separate samples per location or as 1 composite sample, this needs clarifying in the text.

Response: Yes, three cores were taken from each site and were combined into a single sample. So one composite sample composed of three subsample was analysed from each site.

Line 52 – what was the diameter of the soil core

Response: The diameter was 1.9 cm and the information is added to the revised manuscript.

Line 50-53 – It is not clear how rhizosphere soil samples were collected. Rhizosphere soil is defined as soil particles in a narrow zone around the roots. I do not think you sampled rhizosphere soil attached to roots, you sampled soil from 2 areas in Muzhmiyah, one with vegetation and one without. If that is correct then the description of this needs to be amended to precisely explain what was done and how far apart these sets of samples were taken from each other.

Also why was a rhizosphere and non-rhizosphere sample collected from Muzahmiyah and not the other sites. Were samples collected at the other 2 locations were in areas of vegetation or not?

Response: Yes, the soil sample was collected from the Rhizosphere of *Haloxylon persicum* a commonly found vegetation in the region. At the Place of sampling in Hafral Batin no vegetation was there. While sample from Abha was collected where there was no vegetation at the time of sampling. The idea was to compare the desert soil with almost no vegetation with the soil which is known for agriculture.

What plant species or plant community was present where the rhizosphere soil sample was taken, and what distance was the non-rhizosphere soil from a plant root.

L54 – how were soils processed when they arrived at the lab, were they sieved prior to analysis?

Response: The information is added to the revised manuscript.

L55 – how was pH measured. It is not enough to just say we used a pH meter, what volume or mass of soil and liquid and in what medium water or calcium chloride solution). Were no other soil properties measured, for example soil moisture, total C or nutrients. In the response to reviewer the authors suggest they could include

Response: The information is added to the revised manuscript. However total C or nutrient content was not measured.

L197 – the word “Bacterial” needs deleting

Response: Deleted.

L200 – reword as “Understanding the composition of desert microbial communities”

Response: Corrected as suggested

Reviewer 2 suggested a paper by Eida et al 2018 should be considered for inclusion but the authors responded this it was not directly related to this paper. I would disagree, the paper reports analysis of microbial community structure in desert soils of Saudi Arabia comparing

rhizosphere and non-rhizosphere soils so given the lack of data on soil microbes in desert soils I would suggest this paper should be referenced and discussed.

Response: Reference is added to the reference list and in the discussion.

Table 1. The soil type of each sampling site listed in table 1 needs to have the correct soil classification rather than the more general description of the soil type currently provided.

Response: Corrections made.