**Reviewers Comment**

Reviewer #1

* The authors present a potentiometric paper-based sensor patterned in common A4 paper for Zika virus. While interesting, the manuscript still lacks fundamental information such as morphological characterization which could be useful to support the affirmations for Zika Virus immobilization.

Thank you for the valuable suggestion. To support the Zika immobilization on paper, AFM scan images (Fig 5(a)) have been provided in the text.

* Also, some preliminary cross-reactivity tests with, for example, Dengue virus are desirable to evaluate the feasibility of the devices. The presented information seems very early, focusing mainly on the effects of Zika addition over Voc which is only the underlying principle of detection. I recommend work on additional experiments to present proper data for sensitivity, selectivity, reproducibility in order to improve the manuscript and then resubmit again.

Please see lines 215-229.

Reviewer#2

This work focuses on the application of an aptamer-based potentiometric paper sensor for the detection of the whole Zika virus. Although the concept sounds interesting and have a considerable potential for developing new sensing strategies, there are some confusing parts in the manuscript and some important flaws in the study design.

Moreover, the scientific content of the paper poorly meets the academic standards and I highly recommend the completion with the sensitivity, selectivity and reproducibility studies, as stated by the authors at the end of the manuscript. Without a strong revision of the manuscript I do not agree with its publication in this journal.

As in this version, I recommend rejection for numerous technical and scientific reasons:

* The introduction itself doesn’t provide sufficient information to sustain the necessity of the study. Hence, there only a few examples of paper-based sensors reported from the literature and no other sensors for Zika virus or any commercially available kits for Zika detection. Based on what is written now, it is hard to tell what is new, what is the novelty.

Thank you for the valuable comments. The reported techniques are mentioned in the Introduction section lines 37-44.

* Line 18: What did the authors mean by simulant Urine? And where are the results presented based on these experiments?

The simulant Urine (Surine) have been obtained from Sigma Aldrich and is a negative urine control used for testing. Please see lines 222-229.

* The manuscript configuration doesn't follow the requested template. Materials and methods section is poorly written and contains several figures of which reference is only made at the end of the manuscript. I would suggest a more detailed explanation in the experimental part: chemicals, preparation of the paper-based sensor, how many types of soaked papers were used, the AFM measurement procedure, etc.; as one to be able to reproduce the study.

Thank you for the suggestion. The manuscript has been reformatted according to the template. We also edited to make it more readable. The AFM measurements were performed by simply scanning over a portion of the paper sensor. Please see the yellow highlighted sentences in lines 114-125 throughout the manuscript to see all the changes.

* Line 62: IUPAC name should be introduced when first appeared.

Thank you for the suggestion. The IUPAC name have been added in the text at line 70-71.

* Line 63: How was this calculated? Please provide the aptamer structure. Discussion is needed.

The aptamer number was calculated by using the Avogadro’s number. The aptamer structure has been discussed in the text at Line 71-74.

* Line 66-69. Figures should appear in the order when they get mentioned in the manuscript, check out Fig. 1 and Fig. 2, and their discussions.

Thank you for valuable feedback. The figures have been repositioned in the text.

* Line 70: Figure 3 - Can you please explain why does the Voc (V) increase before the Zika sample addition (t=5-7 minutes)?

The sensor response was susceptible to the air current on the sensor, static electric field generated in the lab environment and us moving around. The paper sensor was placed in a petri dish covered in copper tape and had to be closed in order to keep the sensor environment hydrated. In order to apply the Zika, the cover had to be removed which caused the static charge from our hand to the sensor response. These are explained in lines 215-222 and in 139-140.

* Lines 110-129: Discussion needs beefing up.

Thank you. We added more discussions.

* Line 122: Please revise and modify accordingly whether the paper devices were of 2 mm/10 mm or 3 mm/10 mm as stated in the abstract.

The paper was cut in 2mm by 10 mm. Thank you for pointing out the error.

Lines 158-164: There is no discussion based on the negatively charged aptamer (DNA strands). Doesn't it influence the overall Voc? What about the Zika - aptamer complex configuration? The influence of the ionic strength of the buffer is not sufficiently discussed.

The aptamer although negatively charged is applied throughout the paper and causes it to balance the net charge distribution. The Zika-aptamer conjugate have been discussed in the text at line 180-183.

* Lines 169-182:  Parameters of the measurement should be included for the readers to reproduce the results.

We explained the parameters and the procedure more in detail.

* Lines 190-193: The conclusion doesn’t sufficiently sustain the necessity to develop such a sensor. It strongly needs beefing up. Grammar. There are various grammar issues.

The conclusion is modified according to the suggestion.