Operation Manual

1 Introduction

'OSCCit assistant' is a convenient way of analyzing spectra obtained from the OSCCit spectrometer. It lets the user analyze images taken from a phone's camera and determine the concentration of an unknown sample and the spectrum of a given light source.

2 Modes of Operation

The app has two modes of operation as detailed below:

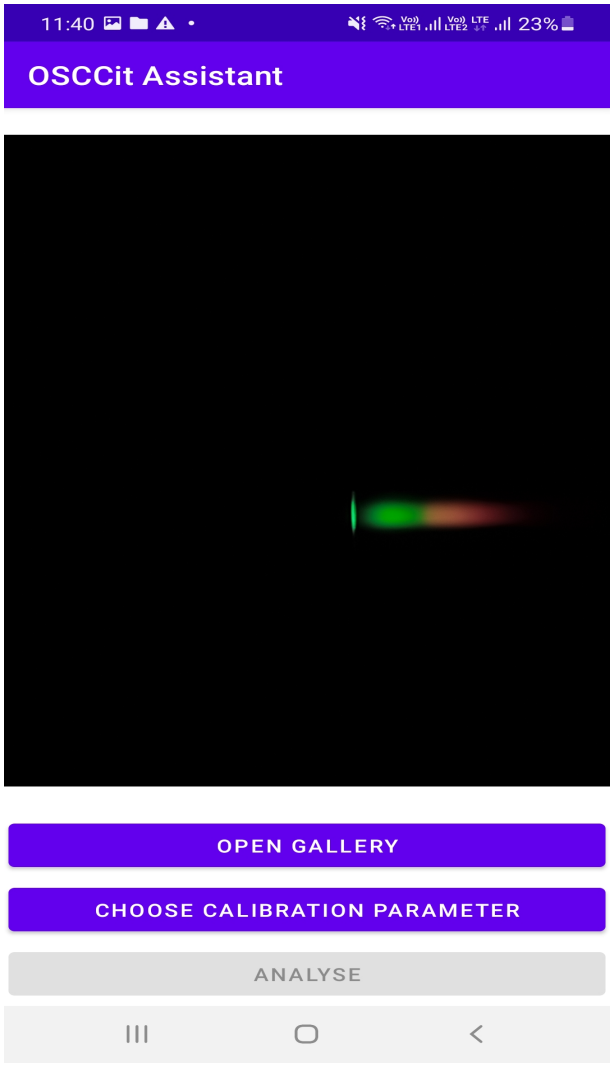
2.1 Spectrum Intensity Analyzer

It allows the user to obtain the intensity-wavelength spectra of a given sample. The steps required to use the app are as follows:

1. Take the spectrum image of the CFL bulb from your smartphone's camera(in pro mode) using the spectrometer.
2. Take the image of the sample from your phone's camera(in pro mode) using the spectrometer.
3. Open the 'OSCCit assistant' app on your android device.

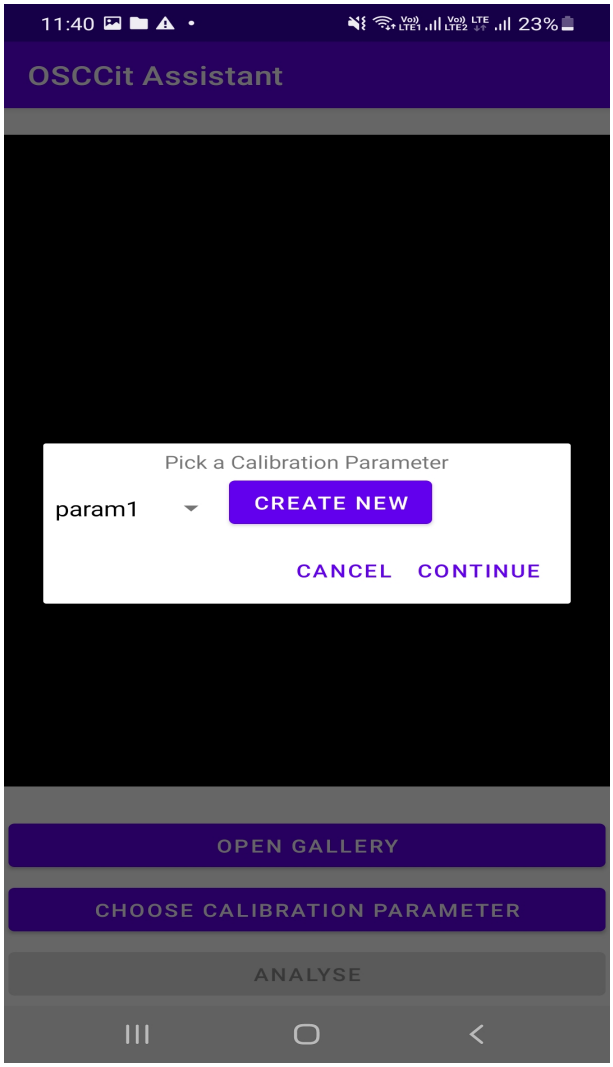
4. Click on ‘Spectrum Intensity Analyzer’

5. A new 'activity' will appear. Press 'Open Gallery' button. The app will ask for storage permissions if you are operating it for the first time. Providing the permission is essential.



6. Choose the spectrum image of the sample from your gallery. The image will be loaded on the screen. We will obtain the spectrum of this image at the end.

7. The 'Choose Calibration Parameter' button will be enabled. Click on it.



8. A dialog box will appear. You can choose a calibration parameter you may have created earlier(provided the camera setting are the same. For each session, a new one needs to be created).

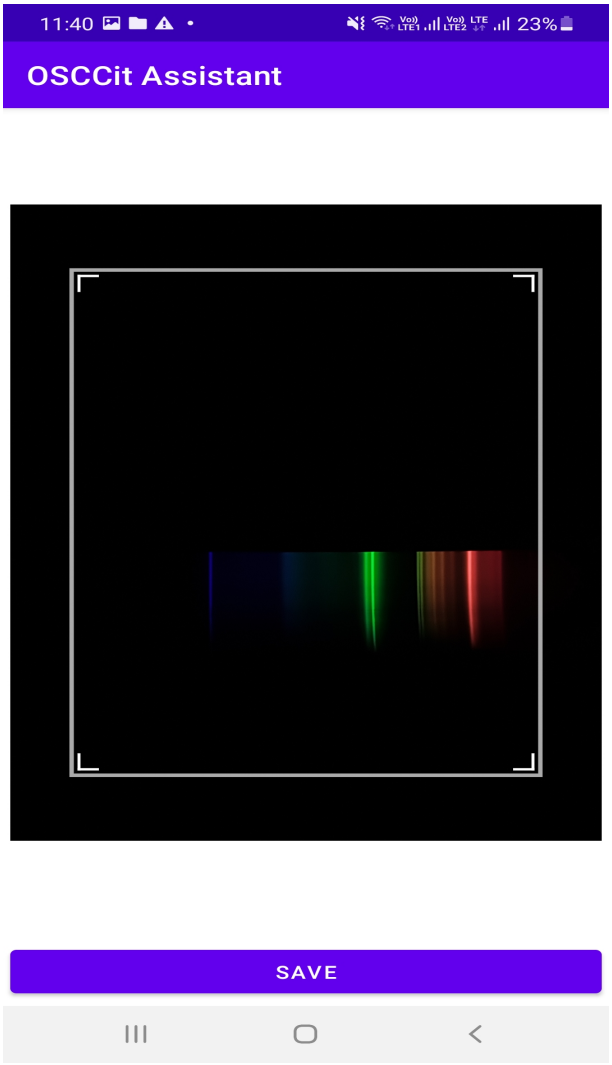
   The calibration parameters are taken from the CFL bulb spectrum image. Peaks from this are used for calibration.

   If you are using the app for the first time or you haven't stored any calibration parameters, you will have to create a new one. The steps for creating the same are detailed below. In case you already have one,

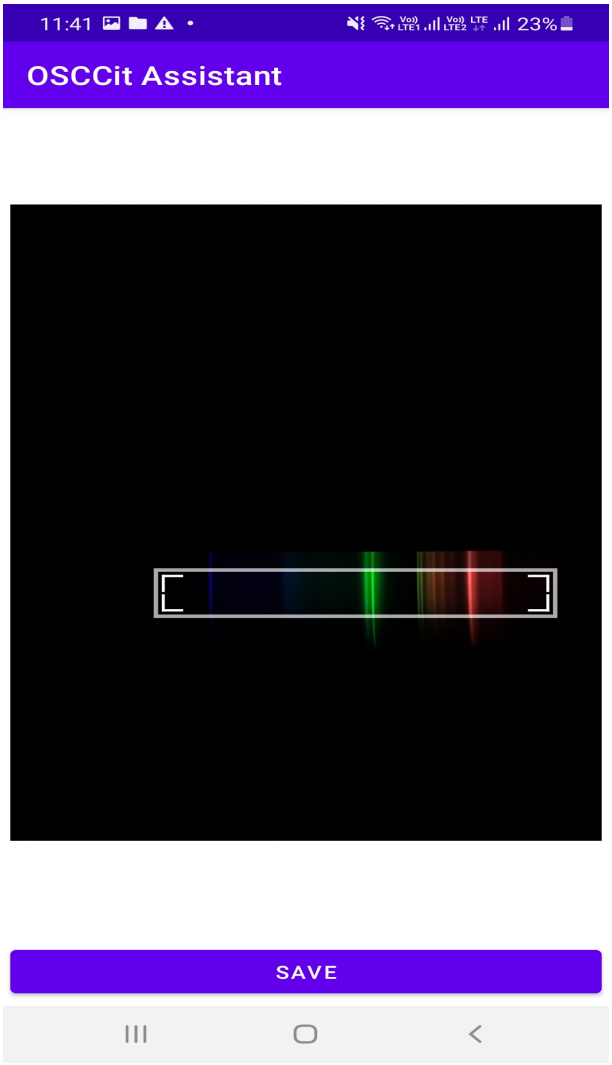
you can skip these-

8.1 Click on ‘Create New’ button inside the dialog box.

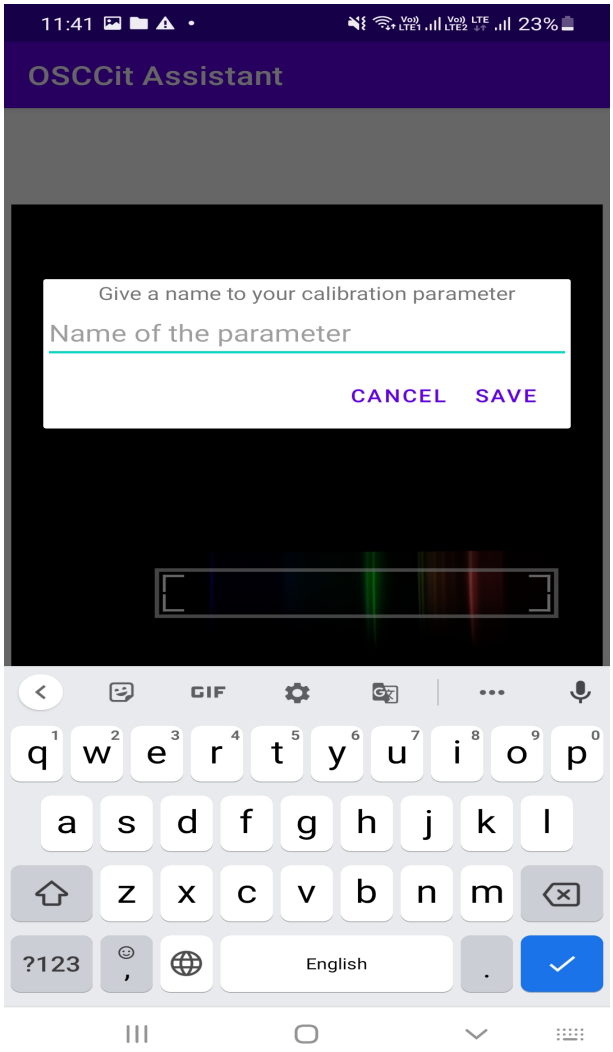
8.2 Click on the button at the bottom right corner.

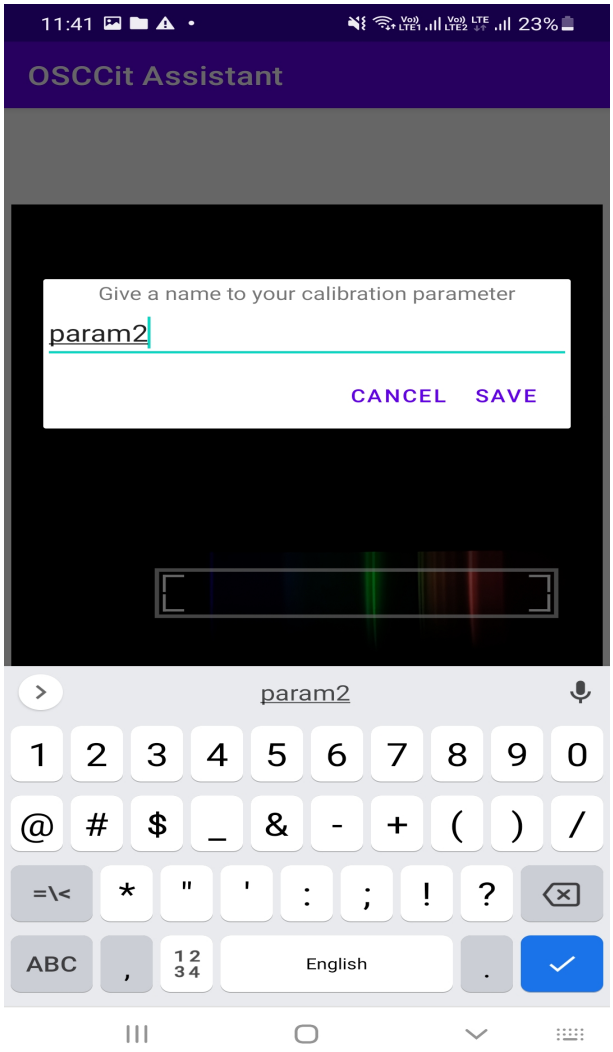


8.3 Choose the calibration image of the CFL bulb.



8.4 Select the relevant area and press ‘Save’.


11:41
23%
OSCCit Assistant
Give a name to your calibration parameter
Name of the parameter
CANCEL
SAVE
GIF
English



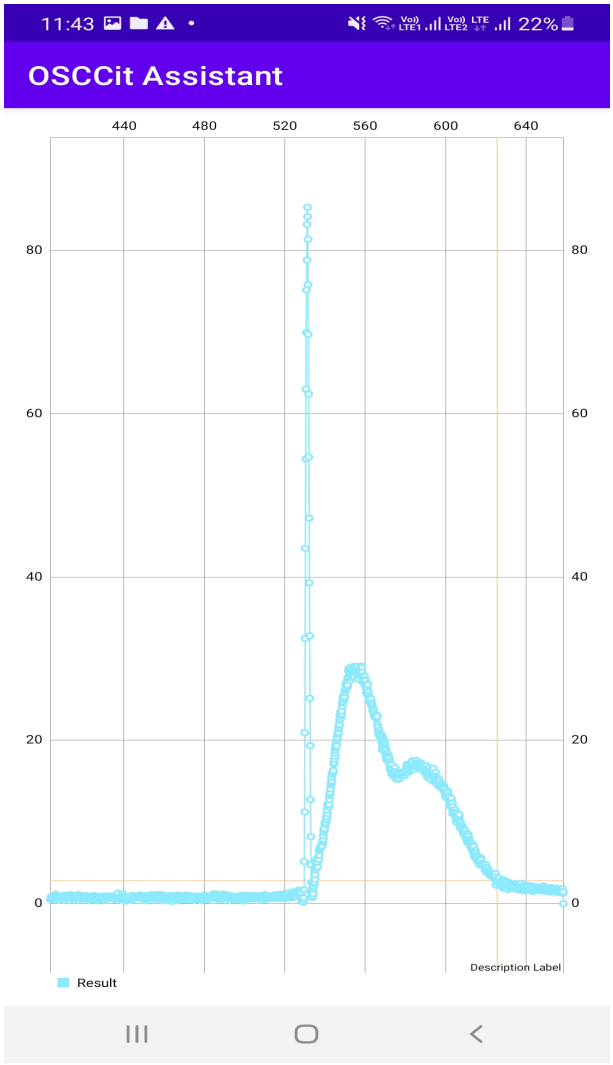
8.5 A dialog box will appear. Give the calibration parameter a name and press save.

8.6 You will be taken back to the activity displaying the sample image. The calibration parameters have not been applied on the image yet.

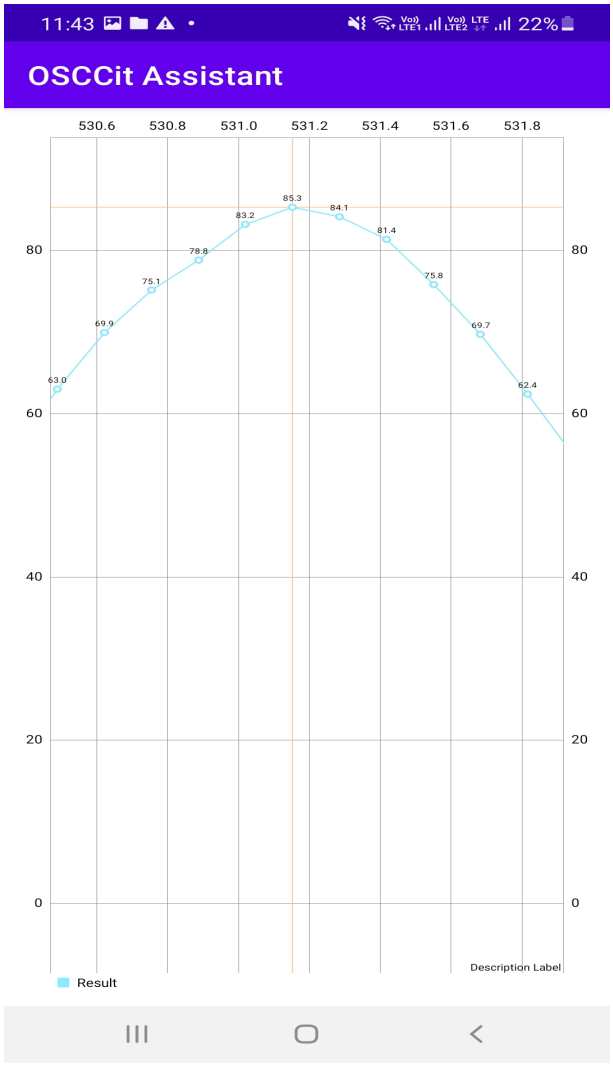
8.7 You need to click on the 'Choose Calibration Parameter' button again. Then follow the steps detailed below.

9. After choosing the calibration parameter, press 'Continue'.

10. Click on ‘Analyse’



11. The intensity-wavelength spectra would appear on the screen.



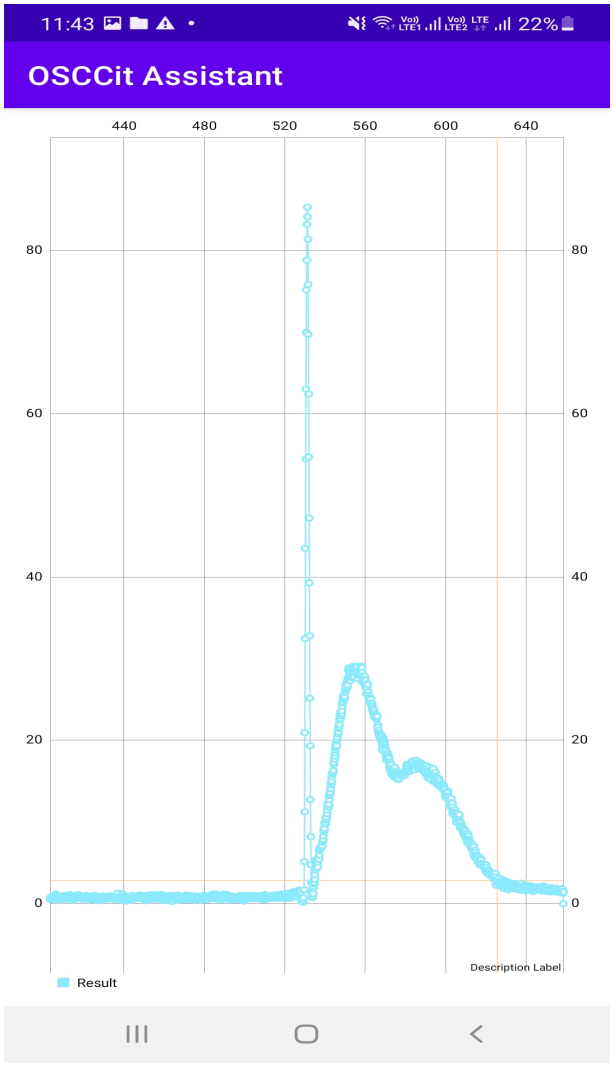
12. You can zoom in and zoom out with your fingers to see the intensity of a particular wavelength.

Precautions-

1. The spectra should have blue wavelengths on the left and red on the right.

2. The position of the phone camera should be fixed while taking the calibration and the sample image.

Results:



This is the emission spectra of CY3-dye at $531nm$ excitation. Zooming in reveals that the excitation peak lies at $531nm$ while the rest is fluorescence emission.

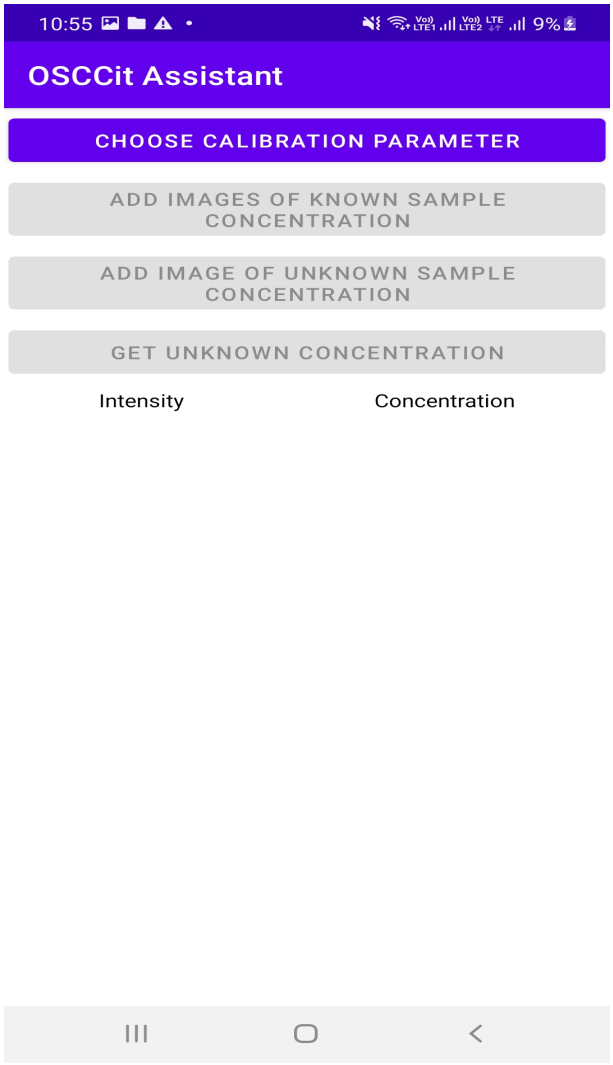
2.2 Sample Concentration Analyzer

It lets the user obtain the concentration of an unknown sample using samples for which the intensity and concentration are specified. The steps required to use this feature are as follows:

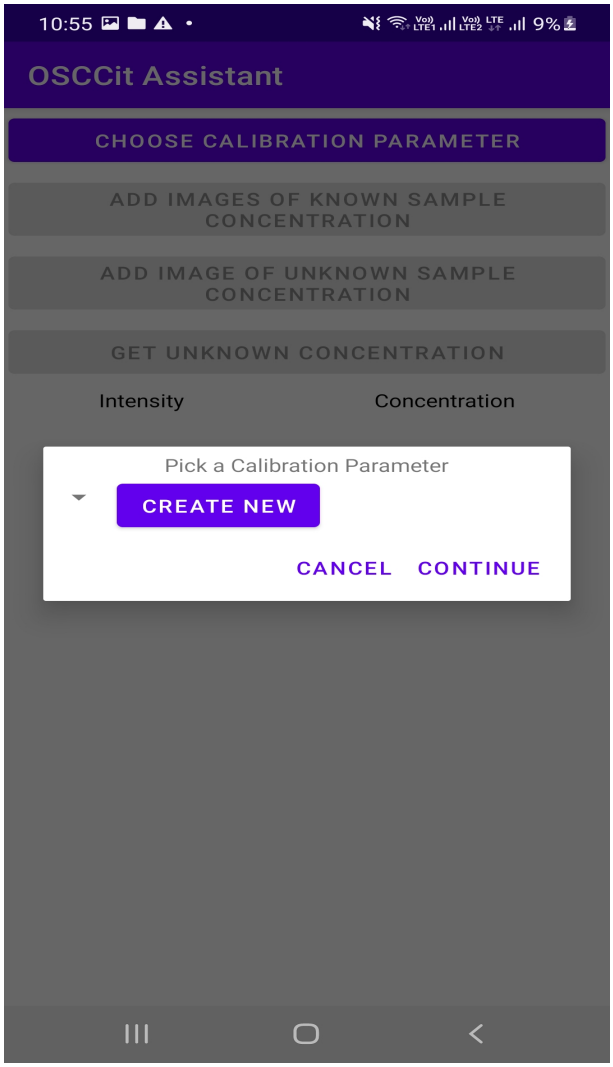
1. Take the images of several(more than 3) samples of known concentration using the spectrometer and your phone's camera(in pro mode).

2. Open the 'OSCCit assistant' app on your android device.

3. Click on ‘Sample Concentration Analyzer’.

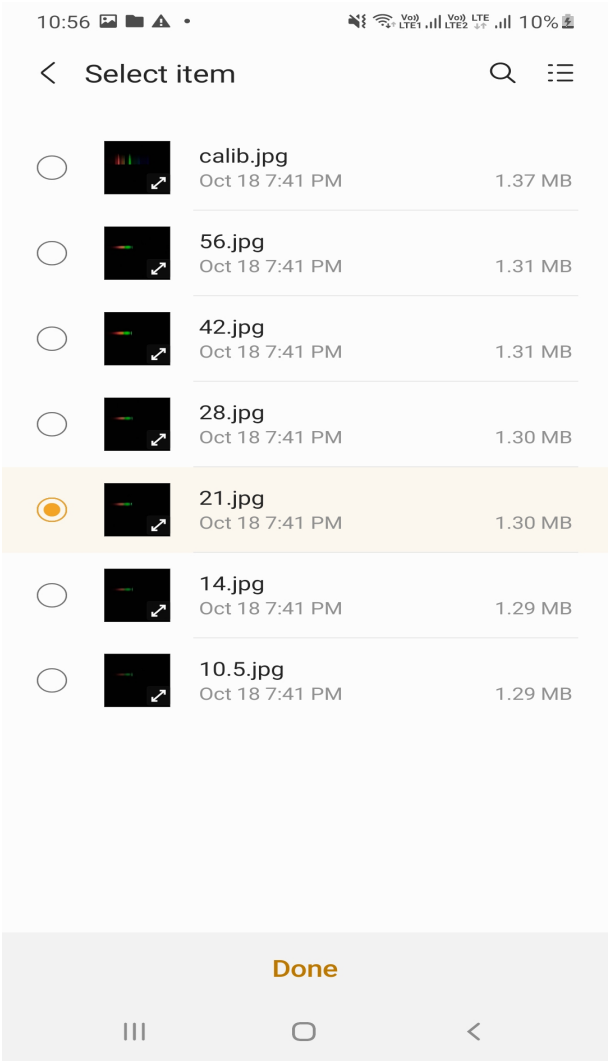


4. Click on ‘Choose Calibration Parameter’ button. You can choose a calibration parameter from the dropdown. If you don’t have a calibration parameter stored on your device, follow the steps given below:

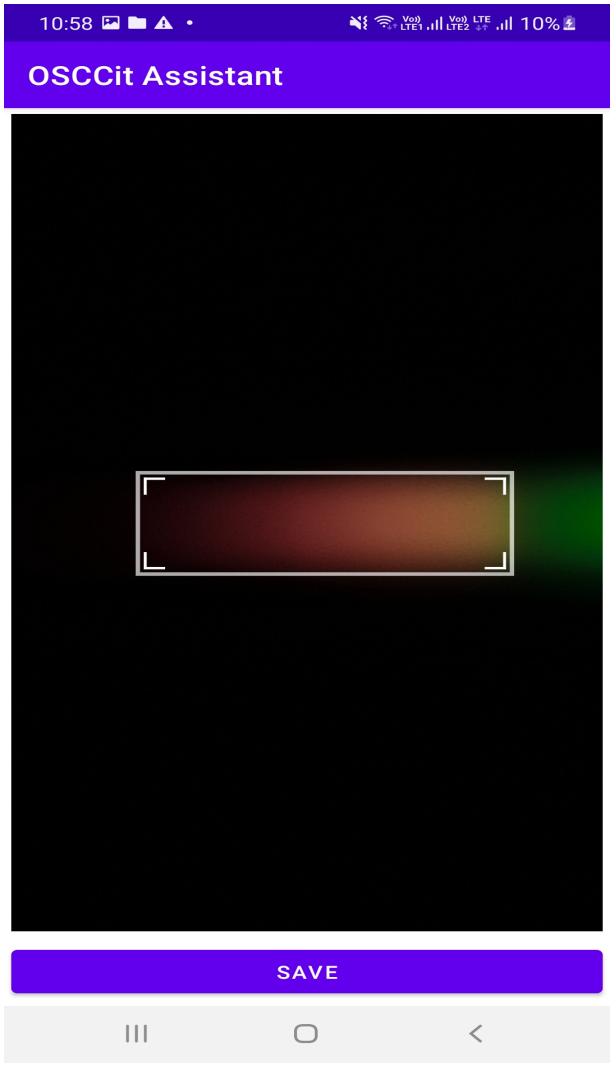


4.1 Click on 'Create New' button.

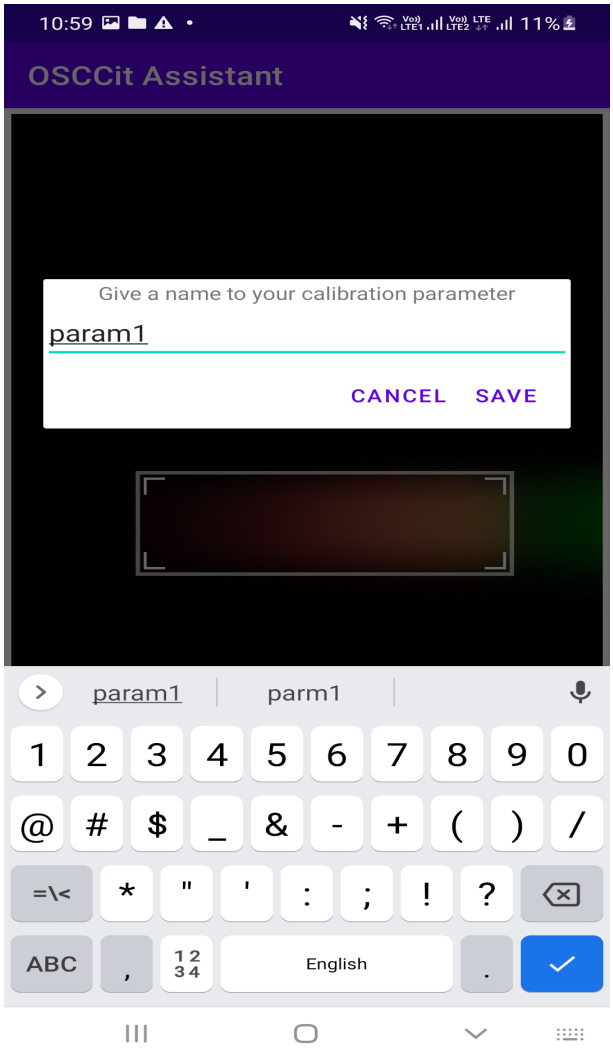
4.2 Click on the button on bottom right corner of the screen. If the phone asks for storage permissions, grant the same. Providing the permission is essential.



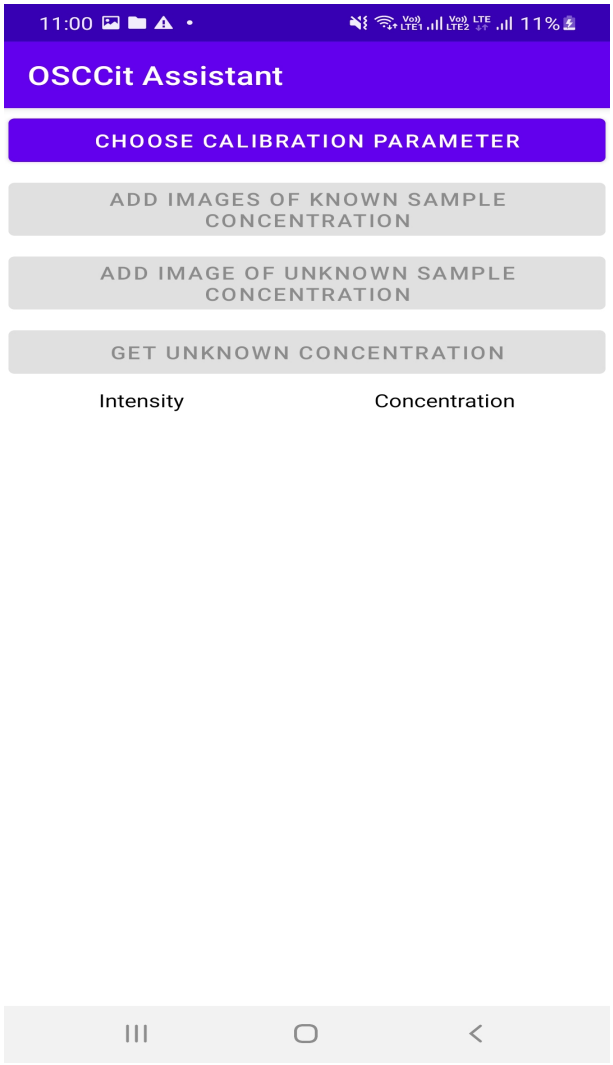
4.3 Choose one of the images you have clicked.



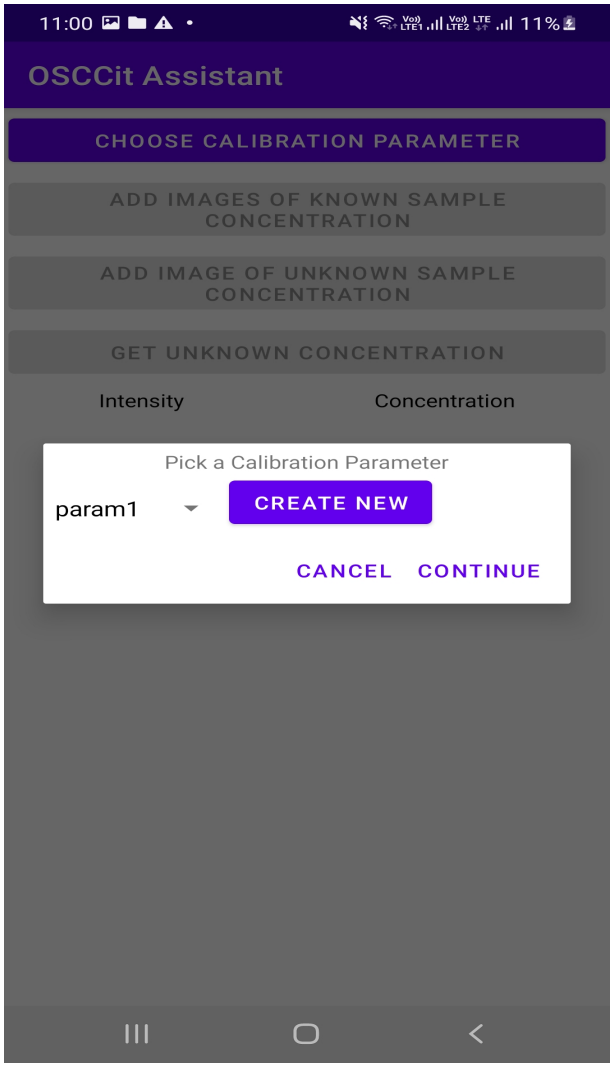
4.4 Select the relevant area in the image and and click on ‘Save’. This area will be used to calculate emission intensity.



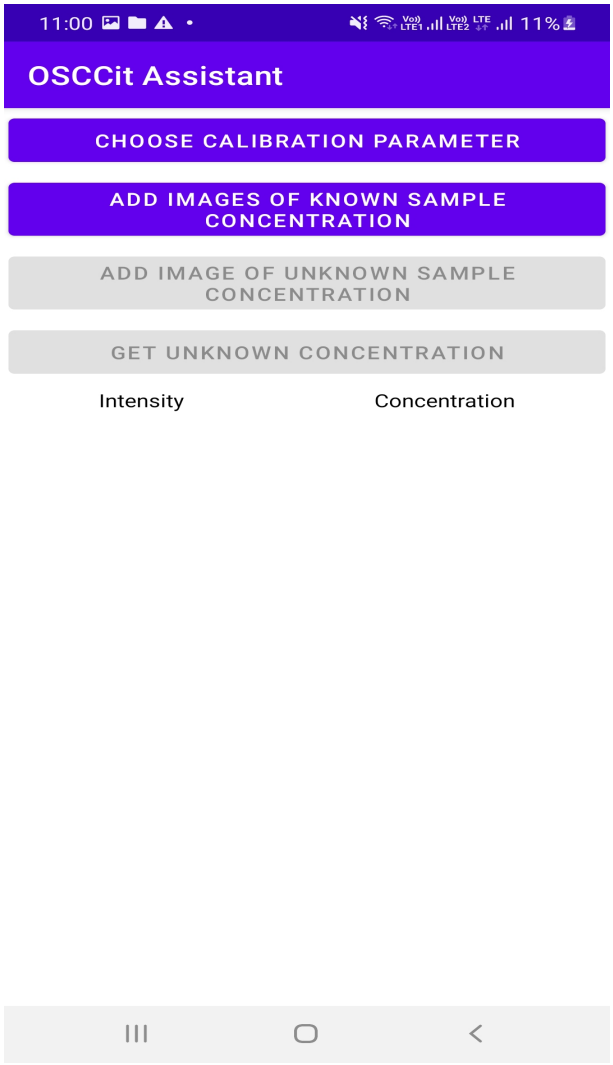
4.5 A dialog box will appear. Give a name to your calibration parameter and press ‘Save’.



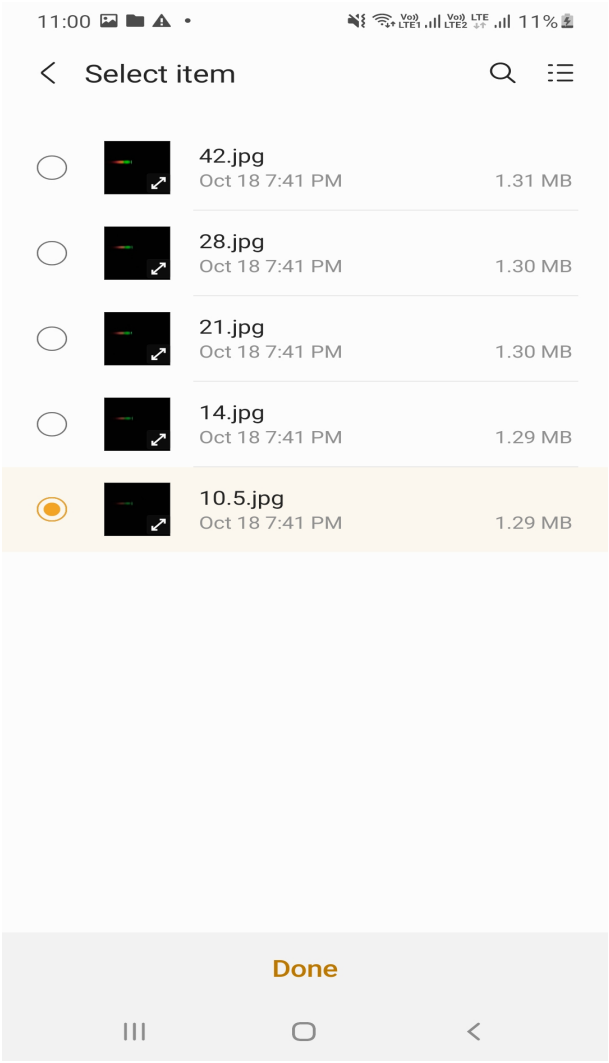
4.6 This would only store the calibration parameter. This doesn't select the calibration parameter automatically. So, click on 'Choose Calibration Parameter' button again and select the parameter you just saved. Now follow the steps given below:



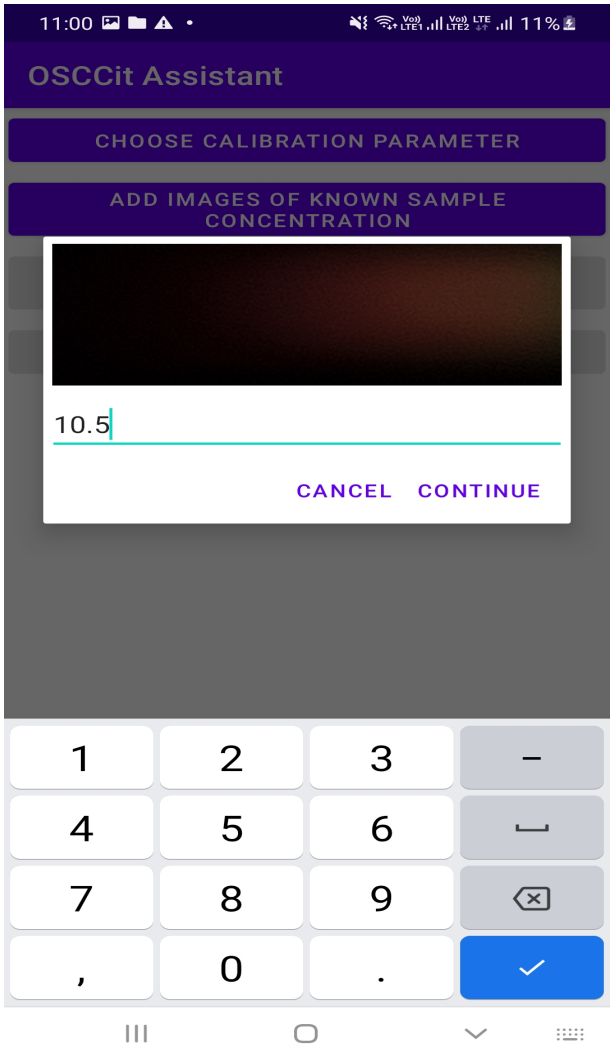
5. Click on ‘Continue’.



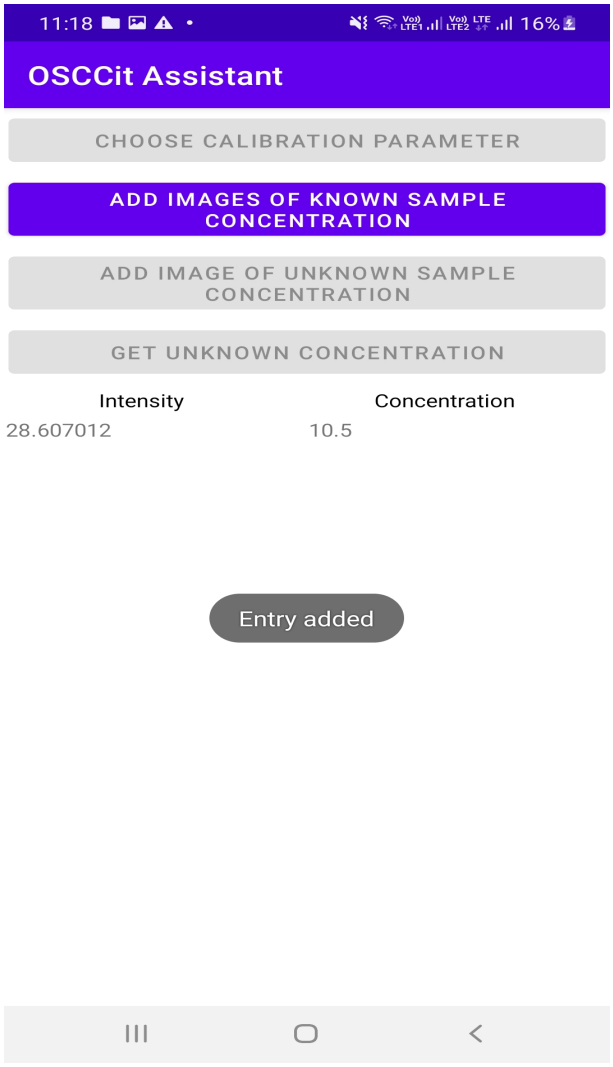
6. Press ‘Add Images of Known Sample Concentration’ button.



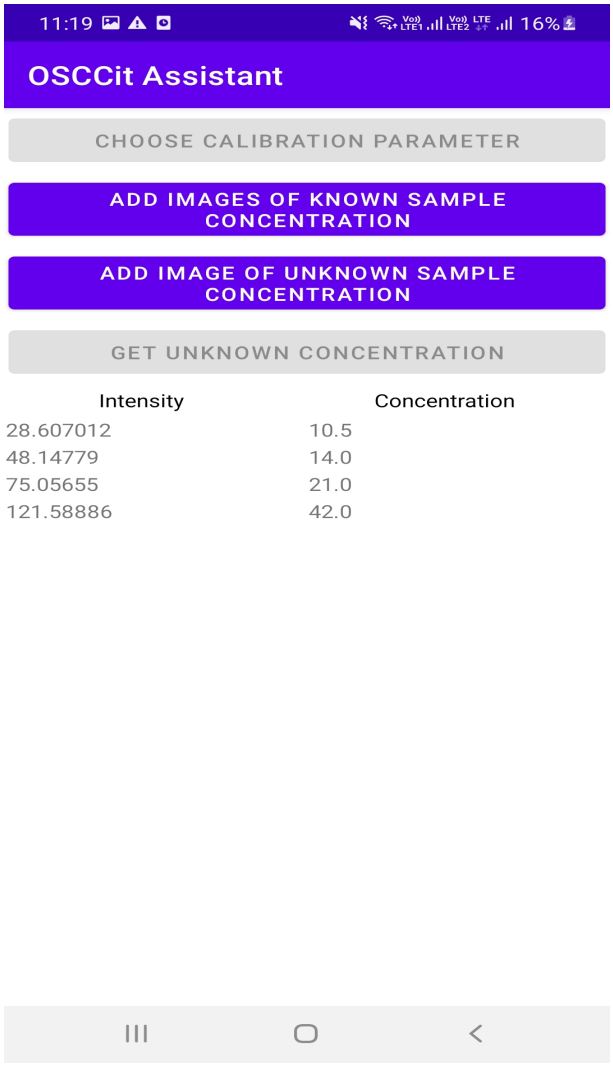
7. Select an image from the gallery.



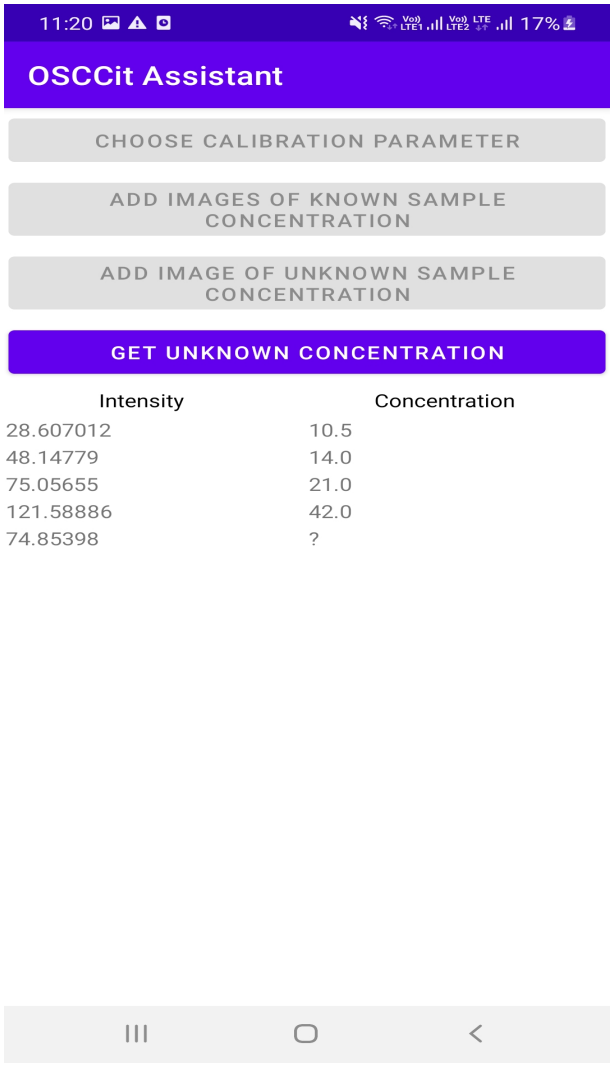
8. A dialog box containing the cropped image will appear. Enter the concentration of the sample(without units) and press continue.



9. The intensity and concentration will appear on the screen.

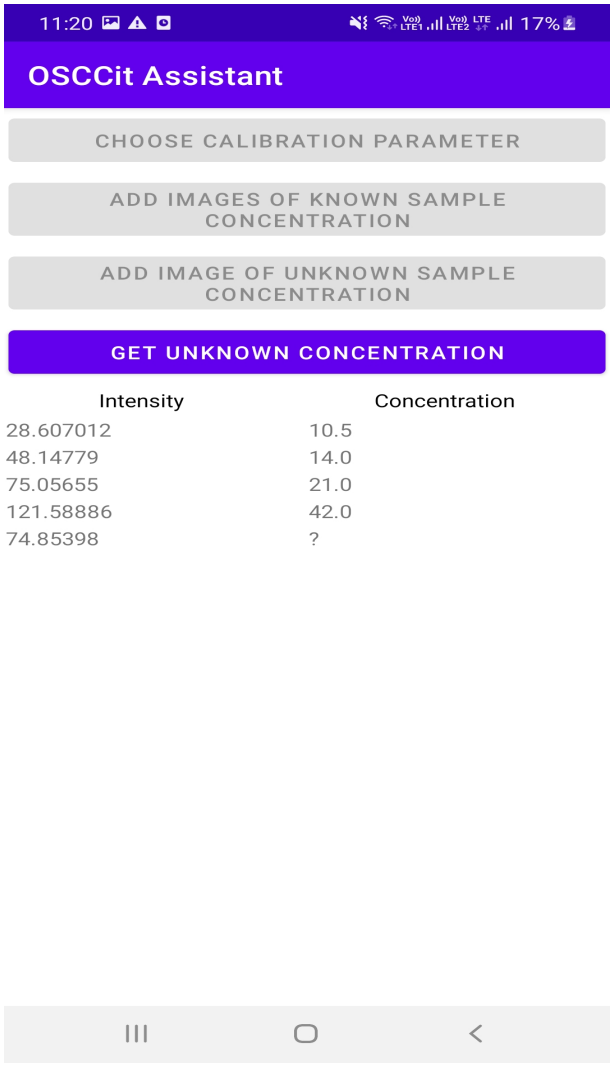


10. Add multiple images in the same fashion.



11. Click on 'Add Image of Unknown Sample Concentration' button.

12. A dialog box containing the cropped image will appear. Click on 'Continue'.



13. Press 'Get Unknown Concentration' button.

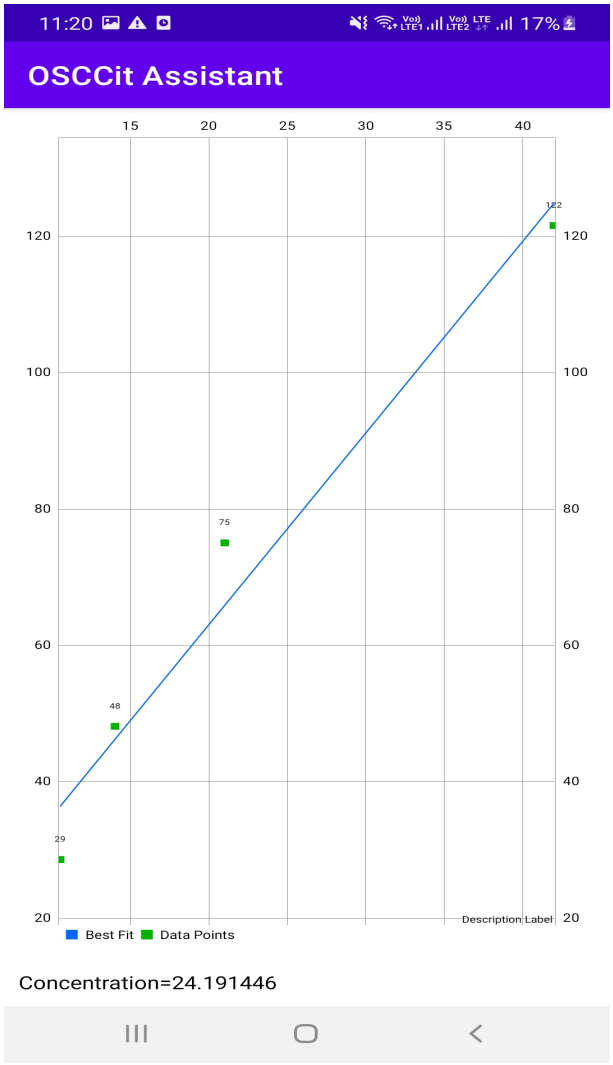
14. A new activity showing the graphs of best fit will appear. You can read the concentration of the unknown sample at the bottom.

Precautions:

1. Camera setting like shutter speed, exposure time etc. should be fixed.

2. Camera position should be fixed.

Results:



The actual concentration of the CY3 dye is $28\mu M$. The concentration predicted by OSCCit assistant is $24\mu M$ which is close to the actual value.