

Optimize the Sensitivity by Best Gain Value Setting

INTRODUCTION

In the KETA series imaging systems, Magic software provides few more parameter settings of the camera for users to improve their quality of image capturing. However, the more parameter that user can define for their own experiments, the more setting problem they may encounter during setting. In this article, with the using of standard light source, gain value setting against image detection is presented by using KETA GL system to explain how users can set the gain value for their own experiments.

MATERIALS

- KETA GL imaging system (Wealtec)

PROCEDURES

1. Put the standard light source in the middle of the KETA GL dark room, and adjust the zooming to make sure all lights are in the screen.
2. Adjust the aperture of iris setting and make sure the focus is posited at proper site.
3. Take pictures with different gain value and with the same exposure time.

RESULT



Figure 1. Signal detected by KETA GL imaging system with 60 seconds exposure.

DISCUSSION

Since gain value representing the response intensity from the photons, while increasing the setting with higher gain value, signal response will be enhanced and makes the signal detection of the CCD camera becoming more sensitive. As in the *fig. 1*, with the increasing of the gain value, same intensity lights will be responded in very different way. Moreover, when using the low gain value to detect samples, the image that captured will be very dark and gray, as in *fig. 1* gain 170. Increasing the gain value largely improve the image quality with much clear and bright response. Although it is allowed to set with higher gain value to get better detection limit in the image systems while detecting chemiluminescence sample, it can only be used for weak signal detection. Setting with over high gain value will make the image easily get saturated. As in *fig.1* with 1000 gain value, the OD values from first spot to fifth are all saturate with 4096 OD and make it no difference while analyzing the images. Proper working ranges of the gain value in KETA system were tested and listed in table 1. Users should be referred to this table to operate their own imaging system with proper gain values.

Table 1. *Gain value setting reference*

KETA systems	Camera	Default Gain value	Working range
G	K12R	320	300~350
GL	K12C	270	240~300
GLX	K12CH	240	220~280
M	K12CH	240	220~280
ML	K12CHS	230	210~250

(2nd stage)

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