The Enhancement of Blood Imaged through Confocal Microscope Using Technical Graphics Program

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Abstract. The modified confocal microscopy, which works with white light, using laser with different wavelengths (red, blue and green) by angle 45Odegree, was used in this study, by this tannic laser covering all samples. Charge Coupled Device CCD camera used to image samples, which it connected with computer, and take blood sample imaged by ordinary confocal microscope and compare with sample of blood imaged by modify confocal microscopy. All blood sample images analysis by origin program (contour and histogram), taken as results and show what the difference between imaged by ordinary confocal microscope, and imaged by modify confocal microscope. The red laser color imaged presents the clear and gives more information about the blood sample. The imaged with laser tannic gives more information especially when the color is near the sample color wavelength. This can enhanced the image as well as possible and solve the unclear problems.

Key words: modify confocal microscopy, blood sample, origin program, contour, histogram, image processing.

Introduction

Due to the spread technology over hole the world namely in computers and digital cameras, the image processing has attracted more and more researchers. In recent years, many various researches have been looks forward enhancing these images either in medical or any other fields. A digital image is generally represented with a square grid consisting of picture elements (pixels) in 2D and 3D, the elements are referred to as voxels (Gonzalez and Woods, 1992: 126-134; Van der Heijden, 1994: 72-98; Castleman, 1996: 24-87). Each element has a value that describes the content of the position of the imaged object that it represents. In a binary image the value is either 1 (part of an object) or zero (part of the non-object or background regions) (Susstrunk et al., 1999: 127-134; Li et al., 2002: 1493; Granier and Heidrich, 2003: 171-184). In a gray valued or gray scale image, the range of values changes depending on how the structure that stores the information is defined. If an 8-bit representation is used 2^8, which is the upper limit and each element can have a value ranging between 0–255 (Wen and Chou, 2004: 23-32). This is the most common form of representation but it is so uncommon to use other representations such as the 16-bit representation that gives a value between 0–65535 (Harmeet et al., 2014: 319-322). The appropriate representation can be decided, which is based on the amount of information needed to represent the object of interest and the amount of storage available (Originlab, 2012).

Histogram processing is a technique with numerous applications, e.g., in image normalization and enhancement, object recognition, and invisible watermarking (Nikolova and Steidl, 2014: 4087-4100; Gonzalez and Woods, 1993: 23-44; Caselles et al., 1999:

220-230; Sen and Pal, 2011: 1211). For a uniform target histogram we speak about histogram equalization. Histogram Equalization (HE) is no doubt, is one of the most effective technique to process the digital images for contrast image enhancement. Histogram Equalization (HE) and their complex methods are measured for contrast image enhancement.

Thereby it has become one of the most promising candidates for enhancing the image generally and specially the color one in image processing field. However, most of these studies used mathematical methods, while the living cells and origin programs of the image are rarely mentioned. As known, the image processing improved via the last decades (Gonzalez and Woods, 1993: 21-36). This paper presents some research results on the enhancement of confocal image microscopy for blood cell using origin lab program (Kelda et al., 2014: 319-322; Savant, 2014: 5898; Savant, 2015: 55-57; Hsieh et al., 2012: 167-176).

Material and Methods

In this part, the materials and measurement techniques were discussed, namely the data collection and the devices that used. The studied imaged of Blood sample that taken by lens 40/60 in four times by different methods, the first one was confocal microscope and three other times were by modify confocal microscope as the same lens using (white light, laser red, and laser blue). Moreover, it was compared between all images after processing by origin lab program in two different methods (contour and histogram) method to find out the clearest picture. This work was in two perfumes, the first one is modify confocal for the microscope and used three type of light (white light, laser red, and laser blue) with the same lens using of confocal microscope. In addition, the second perfumes consider the image processing aspect used origin lab program by two methods (contour and histogram). After that, we compare the results to access the clearest picture. The blood sample collected from the Biology laboratory of the Faculty of Science and Technology of Alneelain University was chosen as the main object, after that the three light; using white light, red and laser blue, whereas the one confocal lenses (40/60) were used in various angle situation to improve the image taken by the microscope. Finally, the images were analyzed using origin lab program and getting the contour and histogram to illustrate the appropriate light that gives clear image from the used light type.

Results

Blood sample was imaged using lens 40/60 four times by different methods (Fig. 1), the first one was confocal microscope and three other times by modify confocal microscope as the same lens using (white light, laser red, and laser blue) (Fig. 2, Fig. 3).

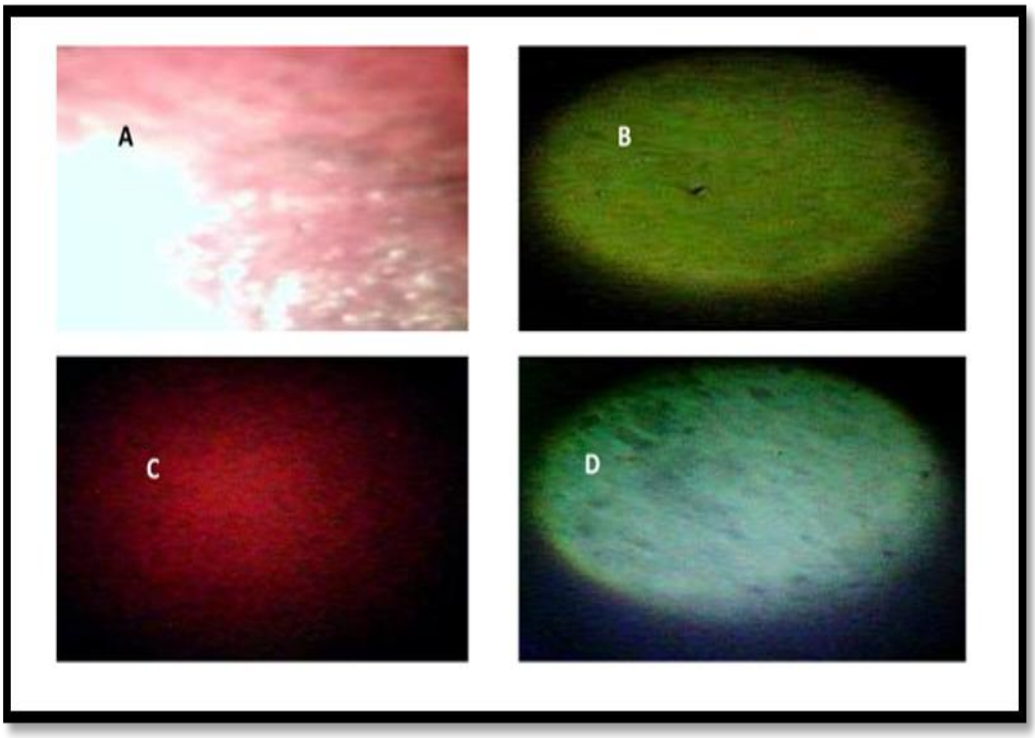

Fig. 1. Blood sample imaged by confocal microscope lens 40/60 and three times modify confocal microscope as the same lens using (white light, laser red, and laser blue)

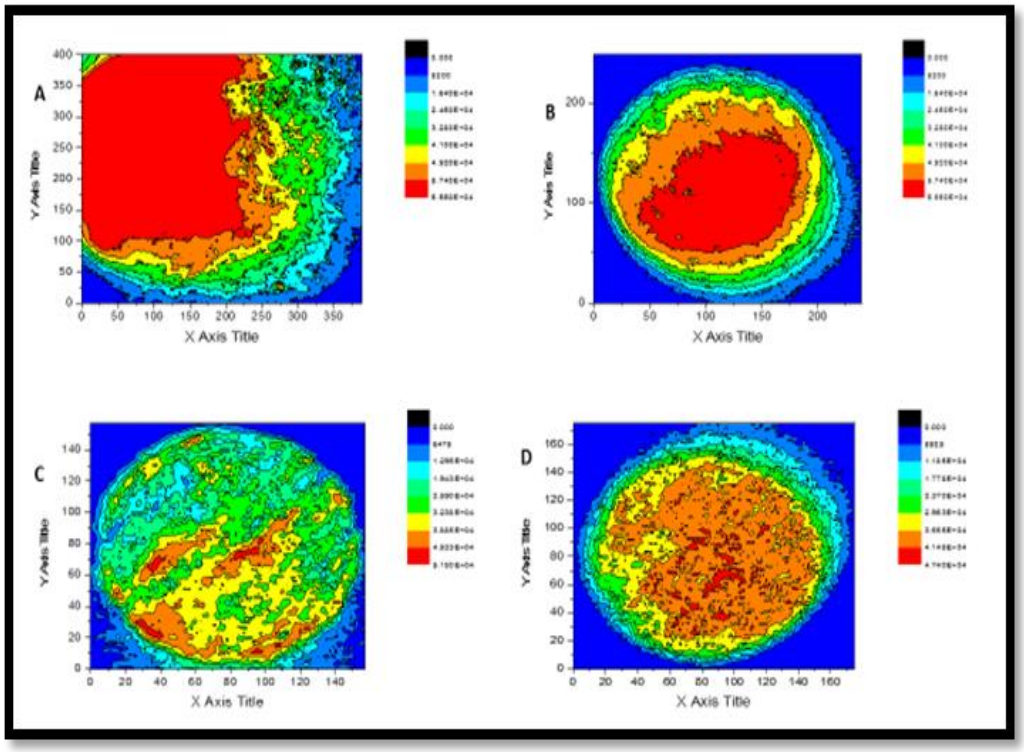

Fig. 2. Pressing Blood sample imaged by confocal microscope lens 40/60 and three time modify confocal microscope as the same lens using (white light, laser red, and laser blue) using Origin program software by contour method

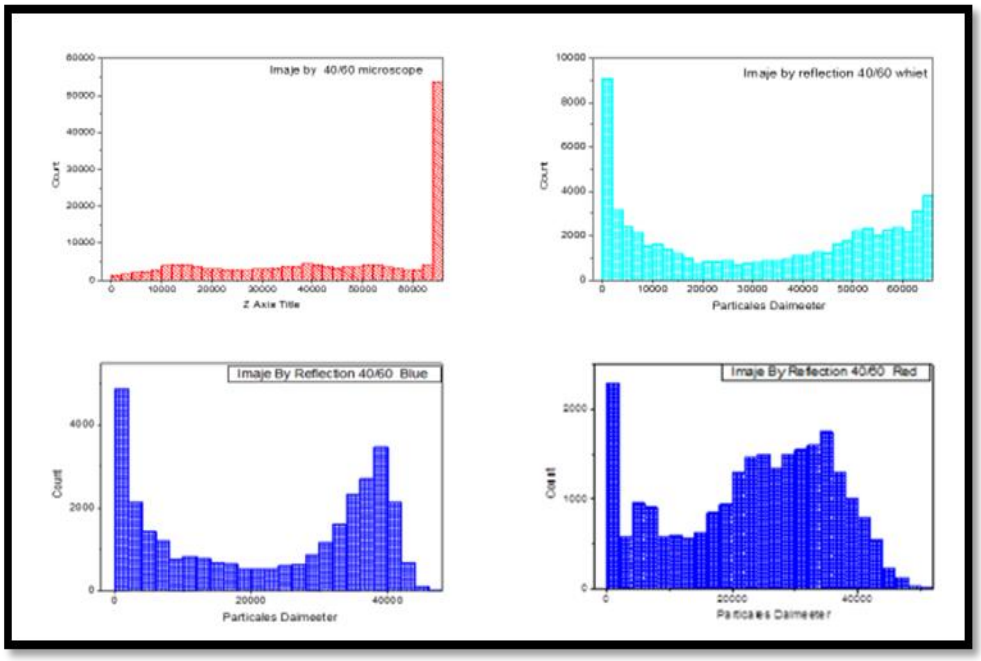

Fig. 3. Pressing Blood sample imaged by confocal microscope lens 40/60 and three time modify confocal microscope as the same lens using (white light, laser red, and laser blue)using Origin program software by histogram method

Discussion

Fig. 1 shows that Blood sample imaged by confocal microscope lens 40/60 and three time modify confocal microscope as the same lens using (white light, laser red, and laser blue). For Image is (A) Blood sample imaged by confocal microscope (lens 40/60), and for the (B) image is the sample that imaged by confocal modify microscope (lens 40/60) white light, and in (C) image was the sample imaged by confocal modify microscope (lens 40/60) blue laser, at last in (D) image for the sample imaged by confocal modify microscope (lens 40/60) red laser light. Form the first stage, it became clear the image taken by the confocal modify microscope (lens 40/60) red laser as show in Fig. 1 (C). Fig. 1 will show the pressing of all that imaged using Origin program cantor method, image (A) is pressing of imaged for microscopy with lens 40/60 pros sing by program contour, (B) contour image of modify microscope by white light for lens 40/60, at (C) contour imaged sample that caption with modify microscopy by red laser and lens 40/60, and in (D) is contour imaged of modify microscopy white blue laser light for lens 40/60. And compare between contours imaged pressing for the Blood sample with the help of color key ,as is well known, the accuracy of details the clear image taken by the confocal modify microscope (lens 40/60) red laser as shown in Fig. 2 (C). At last, in Fig. 3 will show the pressing of all that imaged using Origin program histogram method, from (A) is histogram processing imaged by microscopy for lens 40/60 pros sing by program histogram, (B) is histogram pressing imaged by modify microscopy for lens 40/60 white light, (C) is histogram pressing imaged by modify microscopy for lens 40/60 red laser, (D) is histogram pressing imaged by modify microscopy for lens 40/60 blue laser. It is known that histogram when the form is regular pyramid; it indicates the high resolution of the image. Also the subtler the shape, the more accurate it is, and based on what is male in Fig. 3 shows that (C) is histogram pressing imaged by modify microscopy for lens 40/60 red laser high accuracy and accurate details.

From the obtained results, it is clearly found that the imaged with laser tannic give more details and information, and when we near of colors of the sample by ecstasy wavelength we get more information.

Conclusion

In the present work image processing of Blood sample was reported using lens 40/60 in four times by different methods and the comparison between all images is conducted by using origin lab program. From all processing image, it was found that imaged by modify microscopy for lens 40/60 red laser gives high accuracy and more detailed image this because of the nearst wavelength of the red laser. This may leads to choose the appropriate laser color to enhance the image information.

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