the test box, can be replaced, can be purchased separately. Therefore, the test box has a long service life and saves environmental protection.

УДК 2

毛发宏扫描全息分析系统

任新宇（Ren Xinyu）
东北大学（Northeastern University）
e-mail:rxy18202423697@163.com

Summary. *The existing disease diagnosis techniques are more or less harmful to the human body, so a simple and non-invasive disease screening technology is urgently needed. This paper introduces a hair scanning technique for the diagnosis of diseases.*

Anatomically, human scalp hair is divided into thalamic layer, cortex and medulla. The medulla is located in the center of the cortical fibers and can be missing, broken or continuous. Existing studies have found that the thalamic layer and cortex of hair have different functions and functions. However, the hair medulla is simply considered to be an irregular gap with many holes in the center of the hair, and the research on the function and function of the medulla is not satisfactory. It can be used as a diagnostic tool to study whether changes in the medulla structure of hair are related to some diseases. Scanning hair samples can be used as a simple, cheap and non-invasive screening technique for the diagnosis of diseases, which has practical significance.Research progress of the project.

At present, the construction of hair scanning device, the collection and induction of hair data and the stitching of hair images have been completed. The specific contents of these three aspects of work will be introduced below.

The first is the construction of the hair scanning device, which includes four modules. The image acquisition module collects the microscopic image of the hair from the microscope by using a digital camera and saves the microscopic image; the transmission module, a mechanical device, is used to control the movement and straightening of the hair under the microscope, which is easy to focus and take a complete microscopic image of the hair. Include a hair tension unit (for straightening the hair, convenient for digital camera focus and microscopic image acquisition), a hair movement unit (for automatically moving the hair and taking continuous hair microscopic images), and a hardware control module for controlling the work of the transmission device and digital camera. The image analysis module is used to process and analyze the microscopic image of the hair collected by the image acquisition module, and obtain the data information such as the length of the hair pith, and obtain a complete microscopic image of a hair through the image mosaic technology.

Then there is the collection and induction of hair data. at present, 133 groups of hair images of cancer patients and 43 groups of healthy people have been collected, and the hair image data are numbered, and an information index table is established according to the number. record the age, disease, hair length and other basic information of the person to which the hair belongs.

The last part is the stitching work of the hair, which adopts the following stitching algorithm: first, the background of the hair is changed to white by logical operation, and the background of the hair image is separated; second, the pixel points of the hair image are searched, and the hair is fixed at the same horizontal line by clipping. Thirdly, the three-channel hair image channel is divided into three single-channel hair images. The three-channel R-MagneGMagneB three-channel image is weighted fused, and the three-channel image after fusion is fused to get the mosaic image.

To explore the feasibility of diagnosing immune diseases through hair: with the continuous development and progress of information technology, how to use these techniques to help patients or doctors make preliminary diagnosis quickly and efficiently has become a hot topic. This project provides a new method for disease screening and diagnosis by exploring the correlation between hair medulla structure and disease.

Simple, non-invasive disease screening method: scanning hair samples is simple, cheap and non-invasive, which not only facilitates diagnosis and treatment, but also promotes the work efficiency of doctors, which is of positive significance to disease diagnosis.

The hair microscope macro-scanning system has been basically built: the hair micro-scanning system can automatically and quickly collect complete hair microscopic images. The built hair scanning device can be used to collect the microscopic images of each segment of the hair. By stitching the segmented hair images, a complete and non-repetitive microscopic image of the whole hair can be formed.

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秸秆还田结合氮肥减施对东北黑土细菌真菌多样性影响

王俊凯（Wang Junkai）
东北大学（Northeastern University）
e-mail: 20207660@stu.neu.edu.cn

Summary. *Straw return to the soil and chemical fertilizer application reduction and efficiency increase are so important that we analyzed the bacterial and fungal diversity under different straw return and chemical fertilizer treatments. The results between microbial diversity and soil physico-chemical properties will provide a basis for the conservation of black soil and farmland management practices in China.*

Black soil is an important non-renewable soil resource and plays an important role in grain production. For the loss of the black soil resources in northeast China [1–2], combining with the agricultural industry structure and the natural climate conditions and increase the intensity of straw returned to work, this project study how different ways of straw returned in combing with nitrogen reduction effect the northeast black soil microbial community structure, function and the role of the relationship between soil environmental factors. We hope to solve the black soil problem by returning straw to the field and reducing fertilizer application.

This project adopted returning directly (SD), carbonized (BC) and conventional methods of straw counters-field ridge tillage with no straw returning scale (CK) and ammonia fat reduction approach of combining, through 16s/18s/ITS rDNA high-throughput sequencing technologies, and data processing software, Measurementing a variety of different conditions corporal soil physical and chemical properties of pH, total carbon (TC), total ammonia (TN), total phosphorus (TP), and effective phosphorus. This project analysis the genetic diversity of northeast black soil bacteria and fungi, at the same time, this project analysis the relationship between microbial diversity and soil physical and chemical properties.

Under the same type of straw treatment, with the increase of the amount of N applied, the quantity of the microorganism increased. According to data observation, together used with straw and nitrogen fertilizer had a significant impact on bacterial species diversity ($P < 0.001$), while separate use of straw and nitrogen fertilizer had no significant impact on bacterial species diversity and richness.When only use bio-carbon, bacterial richness and diversity reached the highest. And fungus' OTUs were not significantly different under these treatments. The differences between groups were significantly greater than the differences within groups ($P < 0.01$), and proves the rationality of grouping.

Most of samples from soil under straw returning were positively correlated with pH, AK, TC, TN, C/N, SOC.Bacteroidetes,Proteobacteria were observed to have a positive correlation with AK($P < 0.05$), pH, TC, TN, C/N, SOC. Actinobacteria, Gemmatimonadetes were negatively affected by these soil parameters and positively correlated with AP, WC and TN.All SD-treated samples were positively correlated with SOC, pH, C/N, AK and TN. Ascomycota,Blastocladiomycota were observed to have a positive correlation with TN, TP, AP and WC contents in soils.

The dominant fungal phyla across all soil samples were Ascomycota and Basidiomycota. Cluster analysis showed that returning straw shifted soil fungal community structure greater than