THE PERFECT FIELD TEST RESULT OF RAPID PORTABLE ANALYSIS SYSTEM

, M. Asogawa[1], Y. Yamashita[2], H. Hagiwara[1], Y. Mishina[1], Y. Iimura[1], R. Yamazaki[3], A. Inaguma[1], R. Hashimoto[1], T. Momiyama[3], H. Oka[1], and M. Sugisawa[1] J. Dowden[4]
[1] NEC Corp.
[2]NEC Engineering, Ltd.
[3] NEC Solution Innovators, Ltd.
[4] NEC America

We have been developing the total human identification system. For that purpose, we have to have fingerprint, and face recognition, and DNA analysis system. We already achieved both fingerprint recognition system, and face recognition system with high performance. To accomplish our ultimate goal, "portable and rapid human DNA analyzer" is indispensable.

The portability and rapid DNA analysis system performs the process of DNA abstraction, PCR and electrophoresis in fully automated manner in 60 minutes. All these features are realized in one plastic analyses chip (27x10[cm]). This chip consists of a few silicon films (100 [um]) pasted together. Reagent packages (DNA abstraction reagent, reagent for PCR and DNA denaturant) and polymer for electrophoresis are placed on chip just before usage. There are eight sets of PCR chambers and electrophoresis channels, and those are operated independently respectively. Therefore, even if some defect of PCR chamber or electrophoresis channel happens, we still be able to obtain information on other loci which is normally operated. Analyzed loci are nine (D3S1358, D16S539, D5S818, D8S1179, D18S51, FGA, TH01, vWA, Amelogenin). Amplified PCR products are injected into electrophoresis channel on the chip (8x4 [cm]). The resolution is rather low due to the short capillary of a migration length, but an analysis program for resolution improvement was developed and an analysis result is with the accuracy of 0.5[base]. PCR products and size markers are labeled by a different fluorescence. The system can operate not only AC power but also with 12 volts battery. It is installed in a suitcase and much ruggedized and not so heavy 35[kg]. Thus it is mobile and can be operated in the car while it is running on the road.

With the collaboration of Defense Forensic Science Center of U.S. Army, we have experimented using twenty of buccal swabs samples. We have succeeded in PCR amplification and electrophoresis for all experiments with no defect. The results are perfectly concord with the previously known result. Several samples were processed

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