

Spring 1964

A Convenient and Rapid Method for the Comparison of Soils

H. S. Longia

Follow this and additional works at: <https://scholarlycommons.law.northwestern.edu/jclc>

 Part of the [Criminal Law Commons](#), [Criminology Commons](#), and the [Criminology and Criminal Justice Commons](#)

Recommended Citation

H. S. Longia, A Convenient and Rapid Method for the Comparison of Soils, 55 J. Crim. L. Criminology & Police Sci. 165 (1964)

This Criminology is brought to you for free and open access by Northwestern University School of Law Scholarly Commons. It has been accepted for inclusion in Journal of Criminal Law and Criminology by an authorized editor of Northwestern University School of Law Scholarly Commons.

A CONVENIENT AND RAPID METHOD FOR THE COMPARISON OF SOILS

H. S. LONGIA

H. S. Longia, M.Sc., is a Scientific Assistant in the Biology Section of the Forensic Science Laboratory, Punjab, Chandigarh, India.—EDITOR.

The comparison of soils is most essential in criminal investigations, and several chemical and physical methods of analysis have been developed for this purpose. The traditional chemical, spectrographic, and microscopic analyses are lengthy processes and often tend to be faulty for with a long process there are numerous chances of errors. The density gradient method which is widely employed, seems to be convenient and particularly useful for the comparison of small quantities of soils.¹ Another method for the identification of soils was developed in 1955 based on the fact that microbial populations vary greatly from one soil to another.² All these methods are useful supplement to each other.

To establish the identity or non-identity of soils, experiments were performed with 85 different samples of soils in the Laboratory. The present paper elucidates the results obtained and the conclusions drawn from these experiments.

Technique and illustrative experiments.

A. Equipment required:

1. Set of sieves
2. Suitable sets of test tubes with appropriate stands (depending upon quality of soil)
3. Centrifuge machine

B. Reagents required:

1. Distilled water
2. Nitrobenzene

Three samples each of different soils marked A, B, and C were sieved through No. 10 sieve to separate any coarse extraneous matter. The soil sample A was divided into two equal parts A/1 and A/2 and A/1 was kept as control. All these soil samples A/1, A/2, B, and C were sieved through No. 55 sieve, and the retain and pass were collected separately. The first experiment was performed with

the retain. One gram of the retain from each sample was carefully weighed and put into four separate test tubes. 3 cc of nitrobenzene was added in each tube, and the tubes were shaken for 5 to 10 seconds and allowed to rest for 10 minutes. The tubes were again shaken for 5 to 10 seconds. 3 cc of distilled water was then added in each tube, and the tubes were shaken again for 5 to 10 seconds and corked. The tubes were then centrifuged for 2 to 10 minutes at 2000 revolutions per minute, taken out, and put in a stand.

The stand was placed against a fluorescent light tube and colours of all the layers both water and nitrobenzene were compared. It was found that the colour regions exactly corresponded in tubes A/1 and A/2 but in tubes B and C, the colour distribution did not match with each other or with the samples A/1 and A/2.³ The shape of the miniscii formed at the junction of water and nitrobenzene also was identical in A/1 and A/2 but differed in other samples. (Fig. 1)



Figure 1

Layers as seen in transmitted light (Soil samples obtained from Chandigarh).

The tubes were then examined in reflected light to compare the colour of the soil and the way it

¹KIRK, P. L., DENSITY AND REFRACTIVE INDEX: THEIR APPLICATION IN CRIMINAL IDENTIFICATION, Springfield, Ill, 1951, and KIRK, P. L., CRIME INVESTIGATION, New York, 1960, 249.

²HANSEN, O. ROSENLUND, Soil Identification, I.C.P.R. No: 86 (March 1955) 76-77

³The colour varies from sample to sample of different soils, hence it cannot be standardized. It should be directly compared with the colour of layers of the tube kept as control.

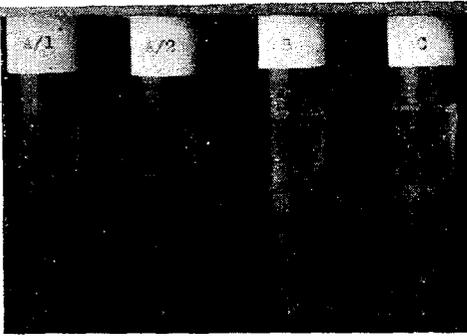


Figure 2
Layers as seen in reflected light

settled at the bottom in each tube. From the careful study of each tube, as mentioned above, it was found that the tubes A/1 and A/2 displayed identity in every respect whereas the samples in tubes B and C were non-identical and also differed from sample A. (i.e. A/1 and A/2). (Fig. 2)

The pass of No. 55 sieve was sieved again through No. 70 sieve, and the retain subjected to the same treatment as above.

The pass of No. 70 sieve was further sieved through No. 85 sieve, and the retain as well as the pass were treated separately as stated above.

The results for all the 4 sets of centrifuged tubes were tabulated and identity of A/1 and A/2 established. To confirm the results further all the four centrifuged tubes in each experiment were once more shaken and allowed to remain as such for 20 minutes to 2 hours. The results further confirmed the identity of A/1 and A/2.

Conclusion. With the help of this experiment the identity and non-identity of different soils may be established with reasonable accuracy. The method seems to be very useful for the comparison of soils in forensic work as it is very rapid and within a short time the identity and non-identity of soils can be evaluated. It is also economical, as small quantities of reagents are used and very simple equipment is required. Its chief advantage lies in the fact that any number of soils can be compared at a time, which entails practically no complications.

Acknowledgement. My thanks are due to Sardar Ajaib Singh I.P.S., Deputy-inspector-general of police, C.I.D. Pb., Chandigarh, for providing me facilities to work in the laboratory.