

AN INDIGENOUS RESIN FOR THIN SECTION OF SOILS

J.S. CHOUDHARI

Central Arid Zone Research Institute, Jodhpur - 342 003

Polyester resins were found to be superior over epoxy and Canada balsam as impregnating material for micromorphological studies of soils (Innes and Pluth 1970; Fitz Patrick 1984). Different brands of resins were recommended for preparation of thin section are Escon Ex 375 (Cent 1979), Crystic (Fitz Patrick 1984), Hylak (Biswas et al. 1968) and Autoplax (Sarkar and Jenkin 1979). Nonavailability of these recommended brands in the country, is one of the limitation in undertaking micromorphological studies. To overcome this limitation an attempt was made to find out from a large number of indigenous resins and catalysts which can impregnate soils of varying textures and provide a hard product suited for cutting, grinding and polishing operations and optically suited to study under polarizing microscope.

Amongst the large number of resins tried UP/M/121 (a product of Dr. Beck and Co. (India) Ltd., Pune) was found satisfactory for impregnation of coarse and moderately fine textured soils. This unsaturated polyester resin is a clear, light yellowish, low viscous liquid which can be cured at room temperature. The cured product beside having high temperature of distortion has low water absorption capacity.

The procedure involved for impregnation and preparation of thin section :-

The samples to be impregnated are first kept in well ventilated place for air drying. Air-dried samples were then placed in oven for 48 hours at 40°C. The dried samples were then transferred to disposable paper or aluminium foil cups containing a label showing sample number, depth and orientation.

A mixture of resin UP/M/121 hardner C and activator UIV in ratio of 1000:5:1 on weight basis has given impregnation of soil a desired sawing, grinding and optical property. Dilution of resin (10% by weight) with monostyrene however, increased the entry of the resin in moderately fine textured soils and gave a better impregnation.

While preparing the mixture, hardner was added first following by activator to the resin or diluted resin. Both are added by separate pipette, and stirred thoroughly after each addition.

The impregnating mixture was added slowly to the side of the sample container in such a way that it reached the floor of the container. The addition continued till

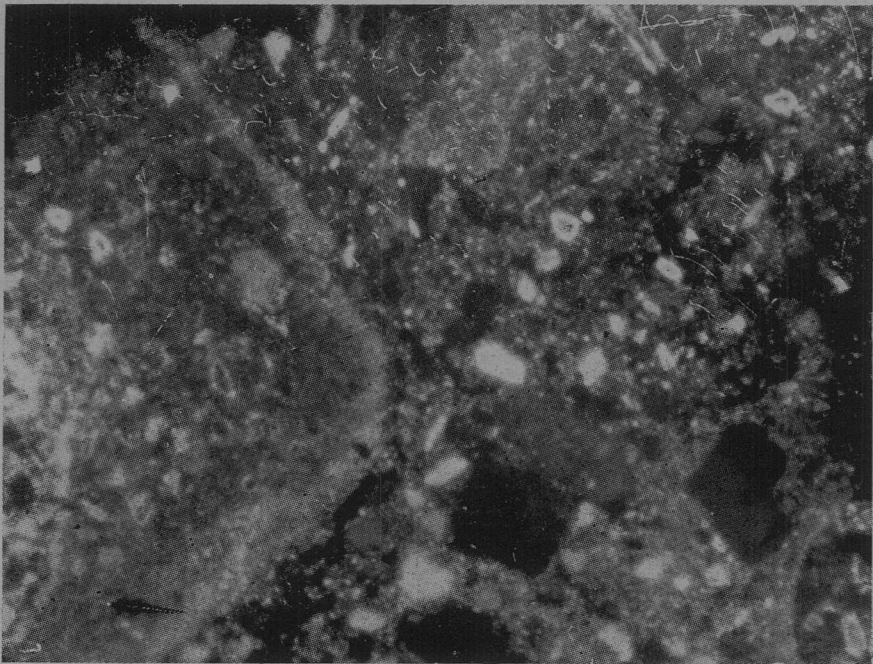
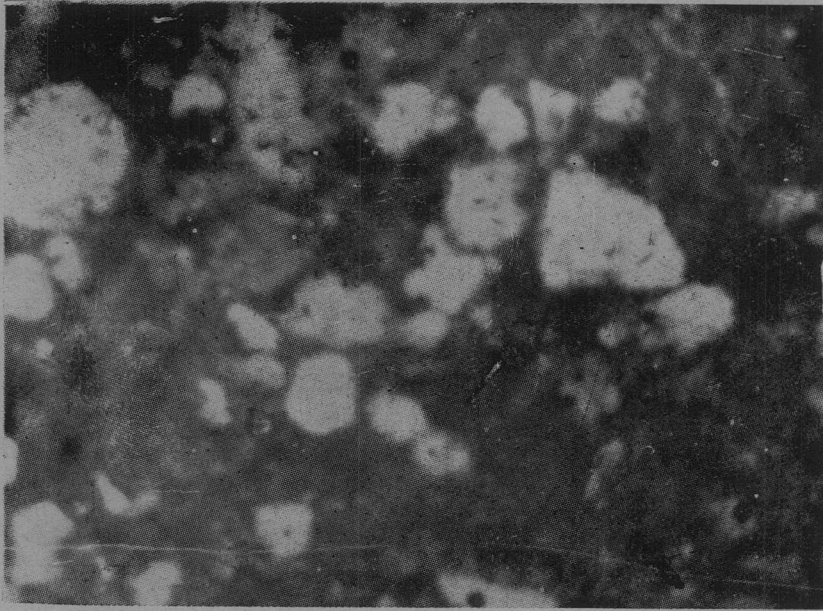


Fig. 1. Microphotographs of thin sections under cross polarizer of B horizon of coarse textured (Top), and B23ca horizon of moderately fine textured (bottom) Aridisols.

one fourth part of the specimen immersed in mixture. After few minutes the level lowered down due to absorption. Mixture was than again added to the level of wetting of the specimen. The addition of resin mixture was continued till the specimen was completely saturated with mixture which was shown by the wetting of specimen top. After complete saturation, the sample, was covered with the resin mixture upto 3-5 mm height. The sample containers were than placed in vacuum desicator and subjected to suction till gauge read 650 mm. After 10 minutes, vacuum was released slowly. This process repeated till no air bubbles appeared during vacuum which normally required five to six cycles. The sample containers were than removed from vacuum desicator and kept in fume hood. The polymerization was completed in 3 to 6 days.

From impregnated polymerized blocks, 5 mm thick sections were cut down by sawing machine using kerosine as coolent. One face, after grinding on fine carborandum plate and washing with petroleum ether was mounted on glass slide using Araldite and kept overnight for setting. Grinding of the section was done on different mesh carborandum plates to a thickness of 40 micron or till quartz shown yellow colour. After fine grinding, washed with petroleum ether and covered with cover slip using araldite. Thin sections so prepared showed complete impregnation and clear images of the soil components (Fig. 1).

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