

Collection and Examination of Significant Clue- Blood from the Crime Scene

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Abstract: Studies have been conducted on collection of blood samples from the crime scene. It has been critically observed that collection of blood stained soil has not been found to be very much useful but soaking blood in cotton wool swab /cotton thread and cotton gauze pieces have given better result during serological analysis of these blood stained exhibits, if these samples were found to be air dried before packing. Removing of semi clotted blood from the crime scene has been found to be hazardous associated with non significant non relevant result of serological nature. Scratching of dried blood from the crime scene has also been found to be far- far better with regards to determination of blood origin was concerned but better output was achieved by soaking the blood into cotton wool swabs moistened with normal physiological saline duly drying them at room temperature and their proper packing in porous containers. Sanguivorous arthropods breakdown the blood for digestion and edaphic factor with mortal remains of these creatures yield non-reliability of result during analysis.

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Introduction:

Blood (a liquid connective tissue) is the most significant clue in established heinous crimes of ghastly nature. Blood, while flowing through the closed blood vessels does not clot due to a pigment "heparin" released by the liver of a particular victim but after stabbing/assassination/shooting/accident of the victim the blood quickly oozes and flows from the wounds in downward position due to gravitational pull. Blood may fall on street, pucca road, field, and open ground, pucca floor in a house or shop on the slopes of water channels near wells or on vegetation. Even fountain of blood can be seen ejected upwards even on ceilings of the rooms, walls and fissures of floors or up to gutters of water. Pressure exerted on the veins or arteries lead to widely different pictures of blood splashing in or around the crime scene. But geoparabolic trends of blood trails are often seen along with minute droplets of blood as a result of release of excessive pressure from the arteries/veins in spreading the liquid blood at the time of fatal injuries. Blood may fall on the earth or objects of vivid nature. Blood takes time for clotting/drying up completely due to binding of fibrinogen and separation of serum having essential proteins and minerals etc.

There is no ideal habitat or platform which can establish the normal processes involved in clotting/drying up of blood and colour appearance in different type of fabrics. Foreign matter may include

small particles of vegetable, fruit etc. which can interfere and may indicate decisive trend in establishing the sequence of active metabolism pertaining to true blood. A person may peel potatoes or may handle weeds such as Croton (a wild bush) frequently prevalent on the slopes of the river specially SYL canal (passing through distt. Kurukshetra in Haryana). While grasping, nails may also come in to the contact with juices, nectar, soups etc and these get smeared with variety of colours.

Blood may be washed away by torrential rain, shower, floods, hail stones etc and can be blown or displaced along with the fine exhibits to which the blood was found to be sticking closely by wind/tornadoes. Blood can also be consumed by specific carnivorous birds/rodents and other wild creatures/flesh eaters, who feed on detritus. Process of egg lying upon blood by humming bees and other lapidopetrans is not an exception.

Several inhibiting enzymes, lysins and saliva which come in contact with oozed blood at the crime scene did not show conclusive result pertaining to analysis of blood. Blood prevalent on the exhibits may become toxic and pose a serious threat to the health of the forensic scientists who remove cuttings of exhibits or their remnants and process blood analysis. Putrefied blood may be found even contaminated with mycorrhizae and spores of fungi, different type of soil particles, wood and leather etc. Though concrete enzymological findings can be seen

in vivo or in vitro but different trends of patterns and forms of blood due to categorically involvement of enzyme reactions cannot be revealed as specific tests

cannot be duly applied at place of occurrence due to lack of infrastructure owing to heavy budget.

Table 1 Soil samples which are collected are found to be contaminated with Haematin compounds of plants (Devanport, 1971) as-Values are given as μ moles X 10^2 /g. fresh wt.

Types of tissue	Materials	Total Haematin
Non photosynthetic	<i>Allium cepa</i> (bulb)Onion: Developing shoot	2.3-3.1
	Inner scale leaves	0.46-0.77
	Outer scale leaves	0.07
	<i>Solenum tuberosum</i> (tuber)potato	0.6
	<i>Beta maritime</i> (petiole),sea kale beet	0.5
	<i>Cochlearia armoracia</i> Root), horse radish	4.62
Photosynthetic	Soya bean (root nodules)	11.8
	<i>Lamium album</i> , white dead nettle (leaves)	4.6
	<i>Triticum Vulgare</i> , Wheat(leaves)	5.2
Yeast	<i>Spinacea oleracea</i> , Spinach (leaves)	1.5-5.0
	Baker's yeast	29.0

Material and Methods:

Time of drying of blood drops was observed in field as well as in AMBASSADOR incubator kept in Forensic Science Laboratory, Haryana, Madhuban (Karnal). Readings duly observed were tabulated and represented through bar diagrammed also. For this purpose 2mm blood was taken on each glass slide and twenty replications at varying temperature were noticed under ideal habitat but in nature reading and colour of blood drops was also noticed simultaneously.

Control samples of varying nature of soils i.e. sandy, sandy loam and clayey loam were recovered in the vicinity of butcher houses, piggery farm, cattle house, poultry farm, hatchery, dump houses, cultivated soil with and without fertilizers, plain area, hilly areas, laundries, hospitals sites, near mountain of minerals especially near Nizampur and wild tracts.

Result and Discussion:

To take blood stained soil sample instead of collection in gauze pieces or cotton wool swabs pose a negative threshold for the purpose of testing, as in the earth harmful chemical, all kind of fluids i.e. urine, milk, beverages etc and other pollutants have been generally found to be mixed and blended in a varied form. Even latex and exudates of some wild plants cannot be considered as an exception. Minerals and other essential and non essential elements mixed in the soil may change the texture, colour, and thickness of soil which may hamper or alter the process of further analysis.

Therefore, soaking blood in the cotton wool swab soaked in physiological normal saline at the crime scene provided possibilities of desired result because that may contain only vital blood factor and not essentially derivatives of soil i.e. "edaphic factors" which play a crucial role in changing the detritus of soil as well as clinching proportional to the changing environment. Colour of blood may or may not be only reddish or reddish brown but oozed blood from mollusks, and special type of crustaceans and ejected from echinodermites may be of varying shades especially bluish green or violet. It has been well visualized by the author that in the vicinity of the coastal areas, meat sellers, sell flesh of mollusks and flesh of other delicious marine creatures which poses a serious threat in confirmation of place of occurrence from where the corpse had already been found to be removed as meat sellers chop the sea animals in and around the vicinity of their dwellings and depiction of irregular patches of various shades of colour sometimes confuses the expert in establishing the sequence and location of the exact crime scene where the corpse had been found to be lying or displaced to a nearby place even in dense plantation of mangroves. Especially in tropical countries like Africa situation has become cumbersome as many bushes and trees have been found to be flesh eaters to derive essential proteins from them to get supplemented their nitrogen needs. Even a dead body found partially submerged can be overpowered by the tentacles of some carnivorous plants. But remnants of flesh can be very well engulfed by pitcher plant, *Nepenthes* especially in

India to compensate the deficiency of nitrogen which is a big requirement to compensate proteins.

Taking of soil samples after digging their site may not deliver the goods as the soil strata may be found to be infected with crushed larvae, maggots; telson of tiny creatures and even haemocyanin of non vertebrates especially having open circulatory system but indicate result of pure blood essentially not of chordates or mammals as being frequently tested in our laboratories. Skeleton remains found mingled in soil strata may also pose a hazardous effect while determining kind and type of blood. Result for blood testing has also been found to be positive in these cases as omnipotent haemopoetic tissue is the resultant factor for giving better output of blood testing. Even during parturition of cattle and other animals, various biological fluids including blood spread on the layer of the soil which may further intrigue with the confirmatory test later on in the processes involved while analyzing blood in the laboratory.

Most of the animals are cold blooded and these cannot maintain their thermoregulatory activities and often go for aestivation or hibernation during critical temperature. When blood is taken from the places where animals have been under sleep (passive way of life) then their chopped pieces can mix with the samples while digging to procure soil samples, hence origin test which turns out to be good for nothing is generally labeled as “Material Disintegrated”. Soil strata can be mixed with placental blood or foetal blood. Tests applied in the field can be held as positive but hemoglobin may have variation. Though variants of hemoglobin can be detected and well differentiated by electrophoresis techniques which are neither difficult nor time consuming (Kirk, 1970). Serology division of Forensic Science Laboratory, Haryana is fully equipped with electrophoresis apparatus to fulfill even the marginal needs related to blood differentiation and its proper exposure.

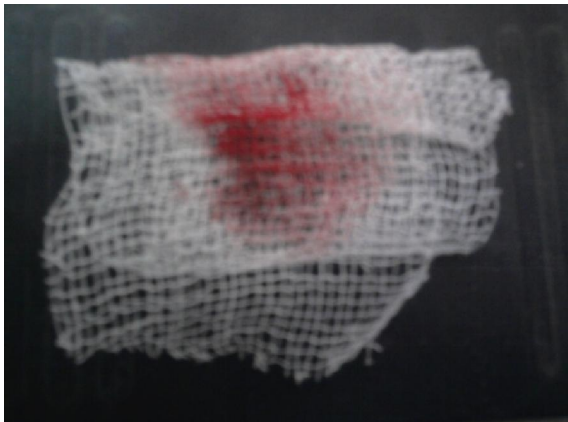


Fig.1 Blood on Gauze piece

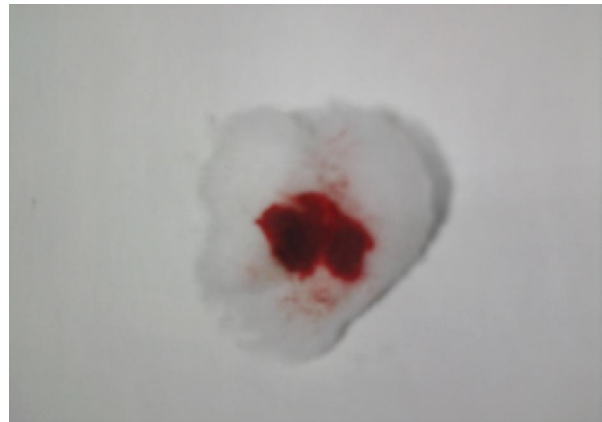


Fig.2 Blood on cotton wool swab



Fig. 3 Blood of mollusks

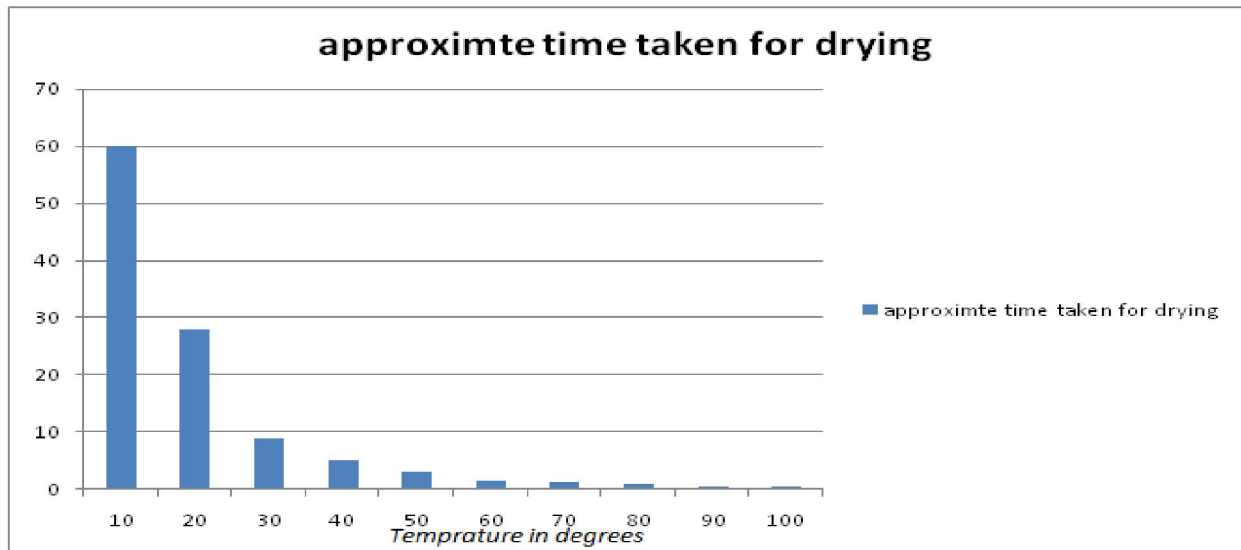


Fig. 4 Time taken by blood for drying.

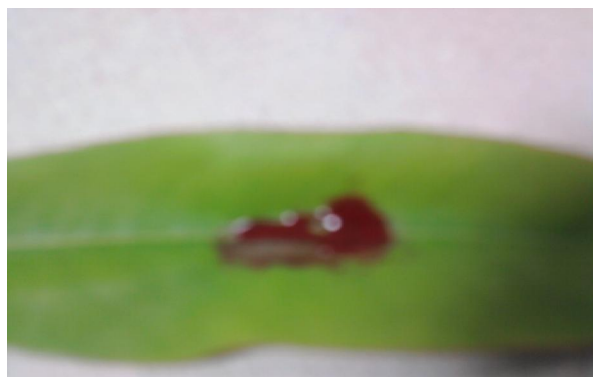
By gently rubbing the rinsed cotton wool swab on presumptive site where plenty of blood trails are available furnished better result as compared to scratched soil samples removed with small and sharp implement used by the investigating agencies. Usually to display supremacy it is a practice to deploy the laymen to pick up the samples. The actual place of occurrence by the investigating officer which further aggravates the situation and hampers the analytical work as they tend to remove unwanted and weak samples of the blood stained earth rather restricting and confining up to removal of blood fragments. Some of the investigating officers stand and stare to watch and some of them pass orders only leaving the important task on the layman. Until and unless blood, the major and vital connecting link is properly collected from the crime scene, then and there no expectations of excellent analytical results could be made from the forensic science laboratories and one has to rely upon the proverb “as you sow so shall you reap”.

If damp blood samples or blood stained earth samples are poured in the containers without proper drying then putrefaction of the blood samples takes place and further continues in the store rooms due to denaturation of enzymes in the closed containers facing higher temperature. There is no remedy as most of the store rooms in forensic science laboratories lack cooling facilities in India and only a few of the laboratories have centrally air conditioned systems. When the experts lay stress on maintaining coolness in the store rooms then a reply is given that due to lack of the sufficient funds it is not possible

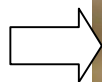
for the authorities to install cooling apparatus. It is very much surprising that when a person was alive he might be sleeping and retiring under modest temperature but after his death his mortal remains were being subjected to face high temperature. Situation get more worsen when tiny creature start creeping in these tight containers strictly in consonance to the theory of “spontaneous evolution”, Secondly giving true notion of 8400000 living creatures in the reign of this content, out of which only a few of them are mammals and more than 8300000 tiny creatures which are spread throughout the world and signify the channelization of energy with a small protoplasm impregnated with preponderance of mitochondria- batteries of the cells to provide sufficient energy by soaking large amount of pure oxygen. Problem of the scientist may not be overlooked and police personal may be properly trained to recover healthy blood from the crime scene for onward transmission to State Forensic Science Laboratories.

It has been significantly observed that in the same climate and similar geographical conditions, state of drying of a broken vegetative leaf and blood have been found to be of approximately same nature and in similar order. The leaf gets shriveled after evaporation of water contents and from the blood serum gets separated. Stomata of a leaf being guarded by guard cells offer resistance and in the similar way originating fibrinogen start functioning by converting it into a thick pulpy clot after few minutes and then both of these gets parched and their colour turns reddish brown from red in blood and green colour

due to chlorophyll in leaves turns to brownish colour after 2-3 days and afterwards colour of both turns black showing partial resemblance in natural outlook and activity . Red colour of the blood due to pigment haemoglobin shows close resemblance of tetrapyrrole ring bound to ferritin, an iron element while in chlorophyll tetrapyrrole ring is bound to Magnesium revealing that both of these elements are vital for necessary growth of animals or plants. In addition to it chlorophyll gets converted to chromophyll in living plants and haemoglobin asserts on pigmentation of skin by irradiation of ultra violet rays. Therefore, haemoglobin is a crucial factor in determination of potency of a person. The persons



Blood drop on fresh leaf



After drying

Moreover, if tiny blood droplets are found on dried and shriveled leaves of a dried plant then ambiguous situation is seen to detect the presence of blood which can be detected by chemical tests only.

After locating the blood from crevices and dark surroundings by application of luminol test ,the only alternative to collect the blood is to remove and then to get the same transferred in soaked cottonwool swab for further analysis. Similarly, similarities not to be overlooked as the crushed mosquitoes and mites underneath garments contained remains of ectodermal derivatives mixed with tissue and blood bearing a close relationship to that of blood oozed from crushed syndrome during minor accidents.

From the bare perusal of the file records of the last 5 years it was crystal clear that test for origin of blood against blood stained earth samples was found to be positive in 42% cases while gauze samples/cotton wool swabs were found to be positive in 76% of cases. Therefore, it is advisable to collect the blood through gauze pieces or cotton wool swabs. Extraction of soil samples further precipitates filth also which affect and interfere in sensitivity of reactions whereas less filth was obtained with samples in gauze piece or cotton wool swabs.

with an adequate and appropriate amount of haemoglobin can perform coitus in a better way as successive strokes are chalked out in a better way due to ample iron which has been synthesized and stored in the liver after consuming plenty of palak (spinach- *Spinacia oleracea*), millets *Pennisetum typhoides* which yield and generate better amount of iron and thermostable energy necessitate to trigger mitochondria to release more energy and stimulating prostate glands to release lubricated fluid to derive proper nourishment and streaming movements and provide alkaline media to combat acidity of urethral fluids .

About 20 - 45% control samples of soil recovered gave fake reactions of blood during testing trial i.e. due to presence of mineral oxides or activities arising as a result of precipitation of similar interlocking co-enzymes and prosthetic group. Therefore, strong remedy to overpower the false mechanism of reactions released by different samples may be taken into account and blood must be picked on cotton wool swab/gauze pieces as these contain cellulose or macerated cellulose.

On the cotton wool swab there is a centrally located reddish brown area and the surrounding area turns pale due to flow and spread of serum bearing a striking resemblance with that of tourniquet of an injured one. But if the cotton gauze is gently rubbed on the blood prevalent on the ground or other surfaces then no spread of pale yellow colour is seen which is especially observed if liquid blood is soaked in cotton gauze or cotton wool swab. Pale yellow irregular rounded picture of serum can also be detected on ground, the soil surface but the expert should be choosy enough to rub gently cotton swab or gauze piece on the reddish or reddish brown area and not on the feeble pale yellow area showing a distinct demarcation of colours.

Blood of a human being has been found equally viscous to that of milk of a cattle but milk of a cattle shows uninterrupted movements on a smooth surfaces but yellow trail of serum is noticed leaving reddish brown material behind revealing that serum liquid portion flows quickly at a faster rate than the blood in a collective form.

Blood has dissolved salts, glucose, minerals, vitamins, essential amino acids and proteins. Viscosity of the blood also depends upon the threshold of the nourished victim or stamina in pale or weak victim. Enormous quantity of serum gets accumulated in patients suffering from AIDS or bitten by poisonous snakes or stung by poisonous scorpions. Therefore, the analysis of blood gives a wide variation which could not be predicted easily without knowing the past history of the victim. Similarly, accused persons may be sturdy or strong or suffering from mental illness.

Red blood corpuscles of certain birds or animals owl or camel can be well depicted as these contain nucleated cells whereas in most of the mammals R.B.C's have been found to be non nucleated therefore, distinction can be made by viewing the fresh blood pertaining to these animals under trinocular zoom microscope. "To Every Action There is Equal And Opposite Reaction" If the police personnel are choosy enough to pick up only qualitative stains of blood rather in adulterated form that will be fruitful in their findings where only one clue found prevalent on the accused garments has high evidential value and can be corroborated with that of blood picked from the crime scene. The investigating agency is found to be on the horns of the dilemma when they insists for matching of a group at an advanced and belated stage, unmindful of the fact their brethren fellows have not cared to collect excellent quantity blood in a proper way due to status symbol and left the task on a layman and therefore, evidential value of the blood has eventually lost. To take blood as circumstantial evidence in a very light way becomes pecuniary for them at certain occasions. If the judicious investigating agencies handle the situation in a perfect manner then there is no retardation. Even partially matching of blood groups sometimes leads to suggestive values for future course of action. But there is no proper remedy for improper collection.

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Even collection of traces of stains from the exhibits in case of blood stains found to be washed by water can make the picture crystal clear after studying their enzymatic patterns, serum proteins and serum alkaline phosphatase activity. Broad spectrum realities can be established by subjecting the faint stains to further analysis associated with spectrophotometric studies which will indicate a peculiar wave length of blood.

If there is disagreeable smell of menstrual blood due to its acidic nature, presence of endometrial cells with squamous epithelium then there is slight variation in colour. Losing its brightness and decline in glistering may be fully watched which takes 6-8 hours as per schedule but pure blood loses its tinge only after 12 hours at normal room temperature.

Lipoproteins level in the blood can be established by stain therapy at the primary stage, trials are still in process to give conclusive remarks on lipoprotein factors in blood stained exhibits which have to be analyzed afterwards.

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