Principles of traditional technology that produced mural paintings

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Accurate understanding of principles of traditional technology that used to produce mural paintings is the prerequisite in conservation of traditional mural paintings. This research was founded with an objective of exposing these principles by analysing existing paintings and a limited amount of literary records available. Two types of samples were used in this test. These were samples obtained from sites and simulated samples. Production processes of simulated samples were reformulated obtaining information from traditional Indian and Sri Lankan technical (*silpa*) texts and identifying constituent compounds by microchemical tests. Quantitative measurement of parameters of behavior was done with simulated samples. Resistance of processed compounds to oxidation, insect attacks and microbiological attacks were determined. Samples of paintings obtained from sites were placed under normal conditions and allowed natural aging to take place. The behavior of samples and actions occurring in them and response of samples to external actions were determined by physical tests, microchemical tests and microscopic observation. Samples were subjected to destructive chemical and physical testing after the end of this testing period. Physical nature of samples was examined under the microscope. Chemical constituents were identified using microchemical tests, IR and AAS. Porosity and permeability of layers to water transmission were also measured. Possible rate of evaporation of moisture was correlated with estimated rate of water absorption of paintings. Results indicated the use of microbiological, enzymatic and organo-metallic actions by traditional artists. This study revealed that the traditional techniques had been formulated using strictly followed principles based on the requirement of coordinated behavior of paintings with environment. Traditional technology contained strict guidelines that enabled preservation of paintings for long durations. Strict quantitative measurement had been followed throughout the production process. A greater level of coordination had also existed between production process and method of drawing. Following principles of traditional technology were identified according to obtained results: materials with highest chemical stability that do not interact themselves must be used in production of paintings; an adequate amount of microbiological, enzymatic and organo-metallic actions must be used during processing of material to generate antioxidant, insect-repellent and antiseptic properties in the medium; paintings must be produced to stand in equilibrium with their respective environments; adequate porosity must be provided in the ground to absorb and transmit available amount of water in the support and to evaporate at a rate allowed by environmental factors; permeability of paint layer must be controlled in relation to above factors; physical properties of produced paintings must support provision of adequate amount of surface moisture to suppress thermal movement, and homogeneous layers must be ensured during production.

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