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Possible Cellular Structural and Chemical Changes of Timber Under Water**Dissanayake D.M.N.A.¹, Mendis M.S.^{2*}, Jayasinghe G.Y.¹, Halwatura R.U.²**¹*Department of Agricultural Engineering, Faculty of Agriculture, University of Ruhuna, Sri Lanka*²*Department of Civil Engineering, Faculty of Engineering, University of Moratuwa, Sri Lanka*
malsharesearch@gmail.com*Abstract**

Mankind is closely intertwined with timber together along with a great history. The word timber defines the wood used for construction. It's a highly organised, versatile, complex biomaterial. Wood is made of two major polymeric materials such as Lignin and Carbohydrates and a minor quantity of organic extractives and inorganic minerals. However, the percentages of these content cannot be defined precisely for a same species or even for a same tree because it varies with part of the tree such as root, stem, branch, or geographic location, climate, and soil conditions. The study includes overall chemical composition of *Terminalia arjuna* in the main stem, which is commonly known as Kumbuk in Sri Lanka that is abound delights growing on river banks or near dry river beds. Conferring to the State timber corporation, *T. arjuna* has classified under class one as a special class or luxury timber. Strength, superior resistance to decay, durability and appearance make it excellent for flooring and decking. This study highlights the difference between the chemical composition of raw and under water timber samples of *T. arjuna*. Twenty five samples from each were collected at the same context as raw samples and under water samples. The micro chemical elemental characterisation of the particular *T. arjuna* 50 specimens were determined using Energy Dispersive X-ray analysis using Carl ZEISS fitted to EVO 18 Research Scanning Electron Microscope. It describes methods of analysis of the transformation of cellulose structure, chemical composition contrast when the fallen timber of *T. arjuna* lies on ground or raw timber and sunken in water for a long time. These watery woods have been preserved by the underwater, resulting long lasting timber and seemed to be protected from rot and insect infestation. When *T. arjuna* fallen timber get sunken in water results to stabilized on an anaerobic environment which preserves the original structure. Then and therefore it is accessible to mineral rich water in contact with its tissues where the structure simply begins to replace the organic structure with inorganic minerals and which are available the anaerobic environment. This results underwater *Terminalia arjuna* to absorb the minerals in higher percentages; Al (71.10%-92.5%), Mg (63.98%-75.46%), Cl (36.07%-47.09%), S (30.78%-65.33%), Si (30.78%-65.33%), and P (34.67%-55.05%) in higher concentrations comparatively to present in raw timber samples and achieve a novel attribute in the timber sediment deviating its original cellulose structure comparatively to the raw *T arjuna*.

Keywords: Chemical insertion, Cellular structure, *Terminalia arjuna*, Under water