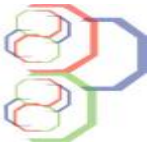
*Proceedings: International e-Conference on Biomedical, Env't & Nutritional Health Sciences 2008. Vol. 1: 14 - 15; ID.103b*

http://www.e-conference.elewa.org/biomedical



# Effect of Electrohydraulic Discharge (EHD) on Viscosity of Human Blood

G.M.El-Aragi

Plasma Physics and Nuclear Fusion Dept., Nuclear Research Center, AEA, P.O. Box 13759 Inshas, Cairo, Egypt

**Corresponding author email:** elaragi@gmail.com

## ABSTRACT

*Objective*: The electrohydraulic discharge reactor consists of a high voltage point discharge electrode above blood surface and cylindrical ground copper electrode containing the blood (at the same time acts as the vessel reactor). The discharge could produce both arc discharges in gas and liquid phases. The plasma arc produces a pressure shock wave, electromagnetic radiations, ozone and free radicals. The aim of this work was to examine the use of electrohydraulic discharge (EHD) system and the effect of pulsed plasma arc discharge directly on viscosity of the human blood.

*Methodology and results*: Before experiments were started, human blood was drawn from healthy donors and was anticoagulated with ethylene diamine tetra-acetic acid (EDTA). All experiments used whole blood. At least three 5 cm samples of blood were used for each exposure condition. The data demonstrate that the whole blood viscosity was increased with extended duration of exposure. It was found that the ratio of the

blood viscosity under the influence magnetic field $\eta_{mag}$ to the viscosity in the absence of magnetic field $\eta$ is directly proportional to the applied magnetic field H.

*Conclusion and application of findings*: Plasma viscosity is used as a marker for different diseases in humans such as coronary artery disease, lupus erythematosus and rheumatoid arthritis. The voltage pulsation introduces electric field and temperature jump at the same time leads to hemolysis of the blood cells. The hemolysis occur because of the osmotic imbalance generated by the leakage of ions and small molecules.

The blood exhibits magnetization and also holds the property of an electrically conducting fluid. Most of the biofluids due to the existing ions in the body may be influenced by the magnetic field only due to their electrical conductivity.

Key words: electrohydraulic, shock wave, viscosity, blood, electromagnetic radiations