

# Membrane Stabilizing Activity of *Viscum Album*

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**Abstract**— *Viscum album* is a species of mistletoe commonly known as as mistletoe. It is native to Europe and western and southern Asia. The main aim of this study was to determine the *Viscum album* extract on RBC membrane stability in female rats. In this study, female and male Wistar rats blood samples were divided to control group and groups exposed to 6, 8 and 10mg/kg/body weight of hydroalcoholic *Viscum album* extract. In each group 5 blood samples of 5 rats were examined. Membrane stabilizing activity of each blood sample was calculated and the data were analyzed using ANOVA. Membrane stability was significantly decreased in male groups exposed to extract compared to control group ( $P < 0.001$ ); however, there was insignificant increase in membrane stability of the female group exposed to 8 and 10 mg/kg/body extract compared to control group. Our results indicated that *Viscum album* has anti-membrane stabilizing activity in male rats.

**Keywords**— *Viscum album*, Membrane Stabilizing Activity, RBC, Rat.

## I. INTRODUCTION

**V**ISCUM album (mistletoe) is the common name for obligate hemi-parasitic plants of several families in the order santalales. These plants attach to the branches of a tree or shrub by a structure called the haustorium, through which they absorb water and nutrients from the host plant [1], [2], [3]. European mistletoe is readily recognized by its smooth-edged oval evergreen leaves borne in pairs along the woody stem, and waxy white berries in dense clusters of two to six. Their seeds are coated with a sticky material called viscin. The viscin survives such treatment and any bare seed that touches a stem sticks tenaciously [4], [5]. A broad array of animals depend on mistletoe for food, consuming the leaves and young shoots, transferring pollen between plants, and dispersing the sticky seed [6], [7], [8]. *Viscum album* has been used medicinally for centuries and has been employed to treat cancer, epilepsy, infertility, menopausal symptoms nervous tension, asthma, hypertension, headache, and dermatitis [9].

Interest in mistletoe began in the 1920s after it was first proposed for the treatment of cancer by Rudolf Steiner, the

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founder of anthroposophy and anthroposophical medicine. Since the 1980s, mistletoe therapy has been researched systematically [10]. Mistletoe extracts contain pharmacologically active proteins (lectins) that induce Macrophage cytotoxicity, stimulate phagocytosis of immune cells, increase cytokine secretion and enhance cytotoxicity effects on various cell lines in vitro [11]. The plant also contains a host of other ingredients such as acids, alkaloids, amines, flavonoids, terpenoids and viscotoxins. Throughout all sections of this assessment report, it is distinguished between these two main therapeutic areas abbreviated with cardiovascular and oncology [12], [13], [14]. In other reports observed that the extract also brought the elevated total plasma protein such as RBC, PVC and HB levels and indicating the ability of the extract to prevent marked changes in the blood viscosity [15]. The present research work deals with phytochemical studies of *viscum album* have been found to contain lectin and viscotoxin. The membrane interaction of male and female wistar rats blood sample with hydroalcoholic *Viscum album* extract by an in vitro method has been studied. Erythrocytes have been used as a model system by a number of workers for the study of interaction of drugs with membranes [16], [18]. Drugs like anesthetics tranquilisers and non-steroidal anti-inflammatory stabilise erythrocytes against hypotonic haemolysis at low concentration [19]. When the RBC is subjected to hypotonic stress the release of hemoglobin from RBC is prevented by anti-inflammatory agents because of membrane stabilization. Therefore, the stabilization of RBC membrane by drugs against hypotonicity induced haemolysis serves as a useful in vitro method for assessing the anti-inflammatory activity of various compounds [20]. During this present investigation, the membrane interaction of mistletoe components has been studied using male and female wistar rats blood cells as a model system and the mechanism of hemolytic effect produced by the components.

## II. MATERIAL AND METHODS

In this laboratory experimental study, male and female Wistar rats blood samples were divided to control group and groups exposed to 6, 8 and 10mg/kg/body weight of hydroalcoholic *Viscum album* extract. In each group 5 blood samples of 5 rats were examined. Membrane stabilizing activity of each blood sample was calculated and the data were analyzed using ANOVA.

## III. RESULTS

Membrane stability of RBCs was significantly decreased in groups exposed to 6, 8 and 10 mg/kg/body weight of hydroalcoholic *Viscum album* extract compared to control group ( $P < 0.001$ ); however, there Membrane stability of RBCs was insignificantly increased in female groups

exposed to 8 and 10 mg/kg/body extract compared to control group (Fig. 1 and Fig.2).

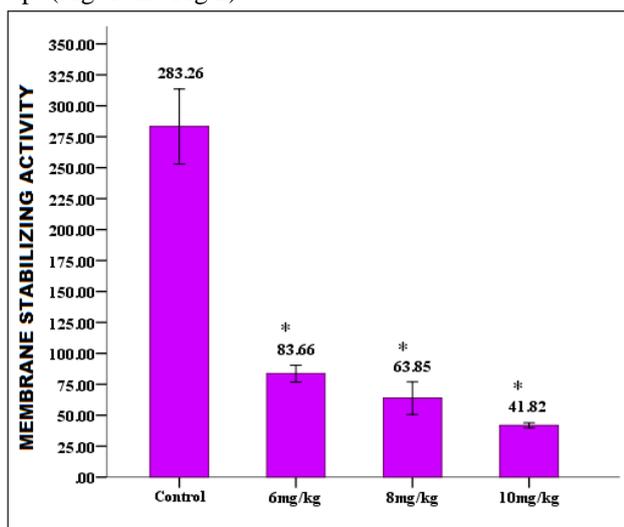


Fig 1 RBC membrane stabilizing activity of *Viscum album* extract in male rats blood samples exposed to 6, 8 and 10mg/kg/body weight of hydroalcoholic *Viscum album* extract. \* indicates significant difference compared to control group (P<0.001).

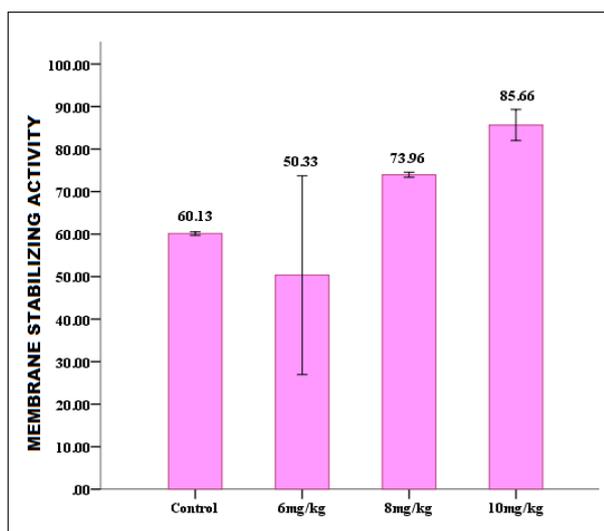


Fig 2 RBC membrane stabilizing activity of *Viscum album* extract in female rats blood samples exposed to 6, 8 and 10mg/kg/body weight of hydroalcoholic *Viscum album* extract.

#### IV. DISCUSSION

Our results indicated that RBC membrane stability was decreased in male groups exposed to 6, 8 and 10mg/kg/body weight of hydroalcoholic *Viscum album* extract compared to control group; however, in female rats membrane stability was insignificantly increased. This finding is consistent with research which have shown the stabilizing activity on RBC membrane stability properties of *Viscum album* extract in high salt-fed rats blood samples.[15] Many anti-inflammatory plants and agents modify inflammatory responses by accelerating the destruction or antagonising the action of the mediators of inflammatory reaction and increase RBC membrane stability [21], [22]. mistletoe extracts are used for the

electron-microscopic demonstration of carbohydrate receptors on the cell surface of human erythrocytes and murine tumor cell Ferritin conjugates of a lectin from it.[23]. Also, there are studies suggesting *Viscum album* is a plant lectin that possesses interesting potential therapeutic properties and immunomodulatory activities and it was claimed to have potent inducer of human neutrophil apoptosis accelerates the loss of antiapoptotic Mcl-1 expression and the degradation of cytoskeletal paxillin and vimentin proteins via caspases [24].recently mistletoe extracts are widely used in addition as Sedative, antiepileptic and antipsychotic effects[25] Since Stabilizing basement membrane involve the inhibition or total abolishing of action potentials from being propagated across the membrane, a possible explanation for the stabilizing activity of the extractive due to an increase in the surface area/volume ratio of the cells which could be brought about by an expansion of membrane or shrinkage of the cell, and an interaction with membrane proteins[26].

#### V. CONCLUSION

We have shown that *Viscum album* extract has antistabilizing activity on RBC membrane stability in male (and not in female) rats; according to which, may have pathophysiological effects on blood system in male.

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