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IMMUNOMODULATORY ACTIVITY OF ARGAN OIL (*ARGANIA SPINOSA* L)

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ABSTRACT

Immunomodulatory activity of Argan oil was evaluated on phagocytic activity by carbon clearance test. Adult Albinos Wistar rats randomly divided into four groups, were the first was served as a control, while animals of treatment group were given Argan oil at dose of: 2.5, 5 and 10 mL kg^{-1} by gavage respectively 10 days before injected the carbon ink suspension. In carbone clearance test, Argan oil exhibited significantly phagocytic index dose-dependent against control group, indicating stimulation of the reticulo-endothelial system. Present study thus reveals that argan oil holds promise as immunomodulatory agent, which act by stimulating dose dependent phagocytic function.

Keywords: Immunomodulatory, Phagocytic Activity, Carbon Clearance Rate, Argan Oil

1. INTRODUCTION

Herbal drugs are know to possess immunomodulatory properties and generally act stimulating both specific and non specific immunity (Singh *et al*., 2011). Many plants used in traditional medicine are reported to have immunomodulating activities, some of these stimulate both humoral and cell mediated immunity while others activat only the cellular components of the immune system, i.e., phagocutic function without affecting the humoral or cell mediated immunity a number of medicinal plants as rasayanas have been clained to possess immunomodulatory activity (Shivaprasad *et al*., 2006).

Recent biochemical studies have shown that fatty acids could modify immune responses. Indeed, lymphocyte proliferation, lymphocyte-derived cytokine production, or cell-mediated immunity can be influenced by dietary lipids. The effect of dietary argan oil on the immune system has been evaluated on rats. Those studies have shown that argan oil effect on immune cells is similar to that of olive oil, a widely consumed oil and that argan oil has no marked effects on immune cell function (Benzaria, 2006).

Pharmacological studies have confirmed that *Argania spinosa* have several biological effects including: antiproliferative (Bennani, 2009; Matthaus *et al*., 2010; El Monfalouti *et al*., 2010), Hypolipidemic, hypocholesterolemic (Souidi *et al*., 2011), antiatherogenic, antiradical and anti-inflammatory activities (Necib *et al*., 2013).

The present investigation was undertaken to evaluate the immunostimulatory effect of argan oil using phagocytic activity by carbon clearance test in vivo experimental model.

2. MATERIALS AND METHODS

The Argan oil used in this study originated from Tindouf (south-west of Algeria), It was extracted by a

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traditional method.Animals *Albinos Wistar* rats were housed under hygienic conditions in the departmental animal house. Animals were housed under standard conditions of temperature (21±1°C) and up to 12 h of light daily, fed with standard pellet diet and had free acess to water. All the experiments were performed in accordance with the institutional animal ethics committee.

2.1. Phagocytic Activity

Phagocytic activity index was determined as per the method reported by (Cheng *et al*., 2005). Phagocytic activity of reticulo-endothelial system was assayed by carbon clearance test. Phagocytic index was calculated as a rate of carbon elimination of reticulo-endothelial system by clearance test. In this test four groups of animals were used. GroupI was kept as a control, while animals of treatment group: II, III and VI were administrated argan oil at dose of: 2.5, 5 and 10 mL kg^{-1} by gavage respectively 10 days. Carbon ink suspension was injected via the tail vein to each rat 48 h after the 10 days treatment, at a dose of 0.1 mL/10 g. After 48h of i.p injection, the mice were administered with carbon, the mixture consisted of black carbon ink 3ml, saline 4ml and 3% gelatine solution 4 mL. Blood samples were taken from the retro orbital vein by using glass capillaries, at 5 and 10 min. Blood sample drops (14) were mixed with 0.1% sodium carbonate solution (4 mL) for the lysis of erythrocytes and the absorbance measured at 675 nm using a spectrophotometer.

The phagocytic activity is expressed by the phagocytic index K which measures all the reticuloendothelial system function in the contact with the circulating blood. The clearance rate is expressed as the half-life period of the carbon in the blood ($t_{1/2}$, min). These are calculated by means of the following equations (Shah *et al*., 2008) Equaion (1):

$$K = \frac{\ln OD1 - \ln 0 D2}{t2 - t1}, t_{1/2} = \frac{0.963}{k} \quad (1)$$

where, OD1 and OD2 are the optical densities attimes t1 and t2 respectively.

2.2. Statistical Analysis

The data were subjected to student t test for comparison between groups. The values are expressed as mean ± SEM. Significance level was set at $p<0.05$, $p<0.01$, $p<0.001$.

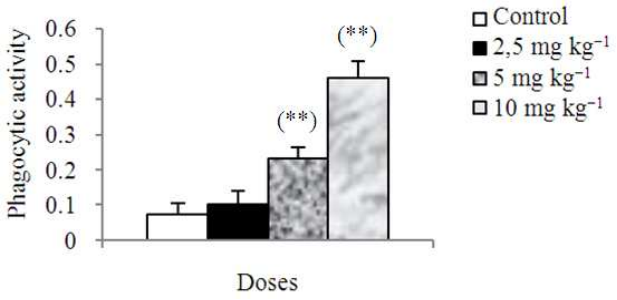

Fig. 1. Effect of argan oil on phagocytic activity

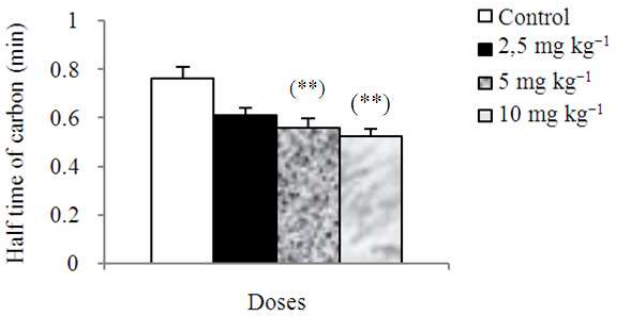

Fig. 2. Effect of argan oil on half time t1/2 of carbon in blood

3. RESULTS

3.1. Effects of Argan Oil on Phagocytic Activity

Significant increase in phagocytic activity was observed in treated group dose dependent were compared with control (**Fig. 1**).

3.2. Effects of Argan oil on half-time $t_{1/2}$ of Carbon in Blood

Figure 2 show a significant decrease in half-time of carbon in blood dose-dependent in treated group were compared with control.

4. DISCUSSION

The Reticulo-Endothelial System (RES) consist of the spleen, thymus and other lymphoid tissues, together with cells lining the sinuses of the spleen, bone marrow and lymph nodes and capillary enthelium of the liver (kuppfers cells) and of the adrenal and pituitary glands, these comprise the sessile or fixed macrophage, are transported by the body fluids or wander through the tissues. The RES is the best defined functionally by its ability to scavenge debris or other foreign matter and forms first line of defense the rate of removal of carbon

particles, by the sessile intravascular phagocytes in the liver and spleen, from the blood stream is a measure of reticulo-endothelial phagocytic activity. In the present study, carbon clearance test, argan oil treated groups, exhibited significantly high phagocytic index (Smriti *et al*., 2012; Hajra *et al*., 2012). This indicates stimulation of the reticulo-endothelial system by drug treatment. It may be possible that the argan oil influence the mechanism of phagocytosis, largely distributed monocytes macrophages or R.E.S which result in significant increase in the phagocytic index with carbon clearance test (Singh *et al*., 2012).

5. CONCLUSION

Present study thus reveals that argan oil holds promise as immunomodulatory agent, which act by stimulating phagocytic function measured in terms of phagocytic index and this could be attributed to its natural components.

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