



## RESEARCH ARTICLE

### ANTINEOPLASTIC EFFECT OF SELECTED ESSENTIAL OILS ON ETHANOL INDUCED LIVER TOXICITY IN ALBINO WISTAR RATS

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#### ARTICLE INFO

##### Article History:

Received 25<sup>th</sup> September, 2017  
Received in revised form  
08<sup>th</sup> October, 2017  
Accepted 16<sup>th</sup> November, 2017  
Published online 31<sup>st</sup> December, 2017

##### Key words:

Antineoplastic, Hepatoprotective,  
Ethanol, *Syzygium aromaticum*,  
*Rosa damascena* essential oil,  
Albino wistar rats.

#### ABSTRACT

Liver is a solid glandular organ made up of hepatic lobules separated from one another by connective tissue. Each lobe consists of a mass of polyhedral hepatic cells, which are glandular in appearance containing spherical nuclei. A network of blood vessels pierces the lobules. The hepatic cells are arranged in longitudinal cords. It has a gall bladder and secretes bile. Liver is the major metabolic centre and any damage to this organ would subsequently lead to so many physiological disturbances. In the present study antineoplastic effect of *Syzygium aromaticum* and *Rosa damascena* essential oils on ethanol induced liver toxicity in male wistar rats were carried out. From the results it is evident that the administration of N-nitrosodiethylamine considerably reduced the protein, non enzyme antioxidants such as glutathione, vitamins C and E, and enzymatic antioxidants such glutathione peroxidase, superoxide dismutase and catalase. All the values are statistically significant.

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Citation: Christina, K. J., Balwin Nambikkairaj, Umasankar, K. and Ramya, D. R. 2017. "Antineoplastic effect of selected essential oils on ethanol induced liver toxicity in albino wistar rats", *International Journal of Current Research*, 9, (12), 63120-63122.

#### INTRODUCTION

Liver is the first organ to metabolize all foreign compounds. The liver is a vital organ present in vertebrates and some other animals. It has a wide range of functions including detoxification and protein synthesis (Heinrich and Barnes, 2004). The liver is a necessary organ for survival. This organ plays a major role in metabolism and has a number of functions in the body, including glycogen storage, decomposition of red blood cells, plasma protein synthesis, hormone production and detoxification (Kaul et al., 2000). It lies below the diaphragm in the abdominal- pelvic region of the abdomen. It produced bile an alkaline compound which aids in digestion via the emulsification of lipids (Yassa et al., 2009). The liver highly specialized tissues regulate a wide variety of high volume biochemical reactions, including the synthesis are necessary for normal vital functions (Gholamhoseinian et al., 2009). In the present investigation antineoplastic effect of *Syzygium aromaticum* and *Rosa damascena* essential oil on ethanol induced liver toxicity in male wistar rats was carried out. The antioxidant and the herb *Syzygium aromaticum* and *Rosa damascena* essential oil used for hepatoprotective (Thomas et al., 2004).

#### MATERIALS AND METHODS

Study on the selected herbal plants *Syzygium aromaticum* and *Rosa damascena* essential oils were orally treated in different concentration of liver toxicity in male albino wistar rats compared to control animals. Hepatoprotective activity of different factor such as total protein, glutathione peroxidase, superoxide dismutase and catalase were analyzed by sigma Diagnostic kit (Sigma chemical company catalogue, 1997). The test animal used was albino wistar rats. LD<sub>50</sub> analysis was measured using albino wistar rats treatment with *Syzygium aromaticum* and *Rosa damascena*, essential oil. The LD<sub>50</sub> analysis was orally fed with different dose of ethanol and the LD<sub>50</sub> value was calculated as per the method of Finney (1971).

##### Eight groups were maintained

1. Control rat fed with normal diet
2. Albino wistar rat induced ethanol
3. Rat + ethanol + 100µl/ ml *Syzygium aromaticum* essential oil
4. Rat + ethanol + 200µl/ ml *Syzygium aromaticum* essential oil
5. Rat + ethanol + 300µl/ ml *Syzygium aromaticum* essential oil

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6. Rat + ethanol + 100µl/ ml *Rosa damascena* essential oil
7. Rat + ethanol + 200µl/ ml *Rosa damascena* essential oil
8. Rat + ethanol + 300µl/ ml *Rosa damascena* essential oil

The rats were maintained in the above condition for 10 weeks and analyzed for various biochemical factors and antioxidant enzymes in the blood sample of the chronically alcohol exposed rats.

**Statistical Analysis:** All the data were analyzed as per the method of Pillai and Sinha (1968).

## RESULTS AND DISCUSSION

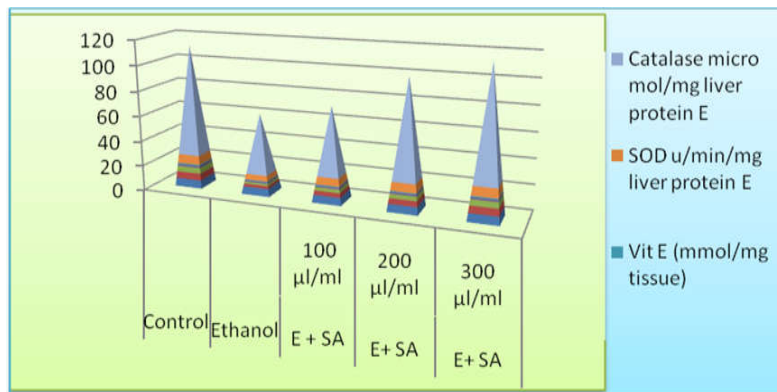
Table 1-2 and Fig 1-2 Plate 1-2 indicate the result of the factors. The plant show *Syzygium aromaticum* and *Rosa damascena* essential oil in the ethanol induced hepatotoxicity in the rats were studied. The serum biochemical, non enzymatic and enzymatic antioxidants in the ethanol hepatotoxicity induced *Syzygium aromaticum* and *Rosa damascena* essential oil ingested rats (Jirovetz et al., 2006) were analyzed. The results indicate that the administration of ethanol had considerably affected the various metabolic

**Table 1. Biochemical, Non enzymatic antioxidant and enzyme antioxidant in *Syzygium aromaticum* treated ethanol toxicity induced rats**

Parameters	Control	Ethanol	E+ SA 100 µl/ml	E+ SA 200 µl/ml	E+ SA 300 µl/ml
Protein g/l	6.5±2.02	6.0±2.02	6.1±2.02	6.25±2.02	6.7±2.02
Glutathione peroxidase micro g/min/mg liver protein E	5.40±3.12	2.20±3.12	3.4±3.22	4.3±2.12	5.60±3.12
GSH (mg/mg protein)	4.64±1.22	1.72±1.24	2.8±1.36	3.48±1.36	4.75±1.34
Vit C (mmol/mg tissue)	1.42±1.26	1.01±3.00	1.19±2.34	1.36±2.30	1.46±2.32
Vit E (mmol/mg tissue)	0.96±2.14	0.67±2.24	0.71±2.12	0.78±2.12	0.98±2.12
SOD u/min/mg liver protein E	7.16±3.16	4.4±3.12	6.0±3.12	6.7±3.14	7.18±3.12
Catalase micro mol/mg liver protein E	86.5±2.14	47.0±2.12	54.0±2.22	78.0±2.12	88.24±2.12

Values are mean ± SD of 6 individual observations.

Values are significant at P = 0.001.



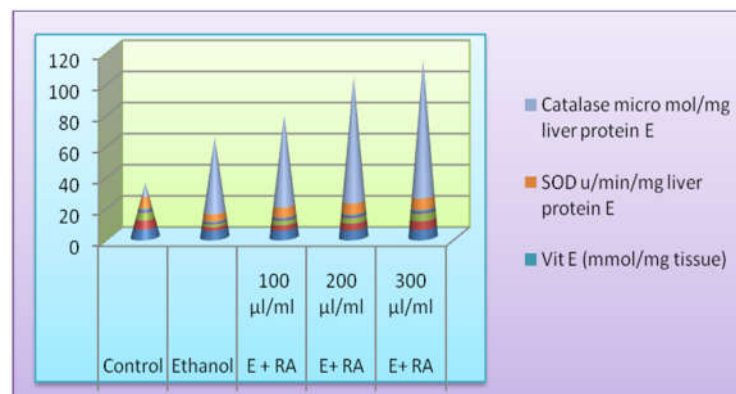
**Figure 1. Biochemical, Non enzymatic antioxidant and enzyme antioxidant in *Syzygium aromaticum* treated ethanol toxicity induced rats**

**Table 2. Biochemical, Non enzymatic antioxidant and enzyme antioxidant in *Rosa damascena* treated ethanol toxicity induced rats**

Parameters	Control	Ethanol	E+ RA 100 µl/ml	E+ RA 200 µl/ml	E+ RA 300 µl/ml
Protein g/l	6.5±0.14	6.0±0.14	6.1±0.14	6.2±0.14	6.5±0.14
Glutathione peroxidase micro g/min/mg liver protein E	5.40±0.16	2.20±0.16	3.2±0.16	4.3±0.16	5.50±0.16
GSH (mg/mg protein)	4.64±1.12	1.72±1.12	2.9±1.12	3.48±1.12	4.70±1.12
Vit C (mmol/mg tissue)	1.42±2.18	1.01±2.20	1.20±2.20	1.38±2.18	1.45±2.18
Vit E (mmol/mg tissue)	0.96±1.21	0.67±1.21	0.74±1.21	0.78±1.21	0.96±2.21
SOD u/min/mg liver protein E	7.16±3.14	4.4±3.14	6.2±3.14	6.9±3.14	7.16±3.14
Catalase micro mol/mg liver protein E	8.65±2.16	48±2.16	58±2.16	80±2.16	87.54±2.16

Values are mean ± SD of 6 individual observations.

Values are significant at P = 0.001.



**Fig. 2. Biochemical, Non enzymatic antioxidant and enzyme antioxidant in *Rosa damascena* treated ethanol toxicity induced rats**

pathways and had reduced the biochemical and antioxidant factors (Seidemann *et al.*, 2005). The level of Glutathione, Superoxide dismutase and Catalase have reduced from 4.64 µg/min/ml SOD liver protein, 7.16 u/min/ml Catalase liver protein E and 86.5µmol/mg Glutathione peroxidase liver protein, 2.20 µg/min/ml SOD liver protein, 4.4 u/min/ml catalase liver protein and 48 µmol /mg liver protein in ethanol exposed rats. Whereas the administration of 300 µl/min/ml of *Syzygium aromaticum* had improved factors such as glutathione, superoxide dismutase and catalase have reduced from 5.50 µg/min/ml SOD liver protein, 7.16 u/min/ml catalase liver protein and 87.54 µmol/mg liver protein respectively (Shahriari *et al.*, 2007). The increase in the *Syzygium aromaticum* concentration had linearly increased the levels of antioxidant and biochemical factors, thus improving the liver health with ethanol induced hepatotoxicity (Lisin *et al.*, 1999).

### Conclusion

- It is concluded that orally treated *Syzygium aromaticum* and *Rosa damascena* essential oil can be used for the hepatoprotective activity.
- It is a complementary study that is also applied to humans.

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