













Figure 4: Histopathological study of liver tissue

Treatment with ME-CQ has neutralized isoniazid as well as rifampicin induced biochemical and histopathological changes, therefore it suggests the protective action against isoniazid as well as rifampicin challenge is probably because of radical scavenging activity and also prevention of lipid peroxidation

#### CONCLUSION

It can be concluded that the hepato-protective effect of *C. Quadrangularis* is due to elevated action of antioxidant enzymes as well as non-enzymatic antioxidants or preventing the free radical formation by the presence of the electrophilic by constituents present in the ME-CQ or by activation of conjugation of anti-tubercular drugs with GSH in liver.

Hepato-protective as well as anti-oxidant action of ME-CQ was confirmed by biochemical as well as histopathological studies. Hence, it possesses hepato-protective and anti-oxidant activity. Further studies are necessary to confirm for better understanding the mechanism of anti-hepatitis activity.

#### ACKNOWLEDGEMENT:

The authors are thankful to Nalanda College of Pharmacy for permitting us to carry-out our research work.

#### CONFLICT OF INTEREST:

The authors declare no conflict of interest.

#### REFERENCES

- [1] Remmer H. The role of the liver in drug metabolism. *The American journal of medicine*. 1970;49(5):617-29.
- [2] Grant DM. Detoxification pathways in the liver. In *Journal of inherited metabolic disease* 1991 (pp. 421-430). Springer, Dordrecht.
- [3] Ahmed A, Wong RJ, Harrison SA. Nonalcoholic fatty liver disease review: diagnosis, treatment, and outcomes. *Clinical Gastroenterology and Hepatology*. 2015;13(12):2062-70.
- [4] World Health Organization. *Traditional medicine: growing needs and potential*. World Health Organization; 2002.
- [5] Naseri M. The school of traditional Iranian medicine: The definition, origin and advantages. *Iranian Journal of Pharmaceutical Research*. 2010 (Supplement 2):20-.
- [6] Mishra G, Srivastava S, Nagori BP. Pharmacological and therapeutic activity of *Cissus quadrangularis*: an overview. *International journal of pharmtech research*. 2010;2(2):1298-310.
- [7] Mohanambal E, Shobana K, Sowmya Sree M, Kusuma GM, Satish K, Vijayakumar B. Isolation of alcoholic extract of *C. Quadrangularis* and evaluation of in-vitro anthelmintic activity. *Int. J. Novel Trends in Pharm. Sci*. 2011;1:6-9.
- [8] Shirwaikar A, Khan S, Malini S. Antiosteoporotic effect of ethanol extract of *C. Quadrangularis* Linn. on ovariectomized rat. *Journal of Ethnopharmacology*. 2003;89(2-3):245-50.
- [9] Panthong A, Supraditaporn W, Kanjanapothi D, Taesotikul T, Reutrakul V. Analgesic, anti-inflammatory and venotonic effects of *C. Quadrangularis* Linn. *Journal of ethnopharmacology*. 2007;110(2):264-70.
- [10] Mate GS, Naikwade NS, Magdum CS, Chowki AA, Patil SB. Evaluation of anti-nociceptive activity of *C. Quadrangularis* on albino mice. *International Journal of Green Pharmacy (IJGP)*. 2008;2(2).