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### Altitudinal variation of oleoresin yield in different needle color morphotypes of *Pinus roxburghii*

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*Pinus roxburghii* (F-Pinaceae) is one of the most common chir-pine found in the mid-Himalayan region. The crown of this species display three different needle color morphotypes (dark green, light green and yellow) and all have a considerable economic importance. Wood of the tree exudes oleoresin which yields rosin and turpentine oil having important role in commercial industry. Present study was focused on the identification of superior phenotypes possessing higher quality resin yield from three morphotypes of *P. roxburghii* of Himachal Pradesh. Three sampling areas were selected with varying latitude; each provenance was divided into three altitudinal clines (800 m, 800 m-1500 m, 1500 m-2000 m onwards) and from each altitudinal cline research material was collected from six different trees representing different morphotypes. Selected trees were tapped for one month (May-June) using Borehole method and the yield was detected. Results showed that dark green needle morphotypes produced significantly higher yield of resin than other morphotypes. The maximum oleoresin yield production (904.60 g) was obtained from the trees located on site with altitude 1500 m-2000 m and latitude 32°-33° N whereas maximum oleoresin production (253.40 g) was observed from trees located on site with altitude 700 m-1500 m and latitude 31°-32° N.

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### Modulation of anti tuberculosis drugs induced toxicity in spleen and bone marrow chromosomes of Wistar rats by using *Berberis aristata* extract

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Tuberculosis (TB) is a global health concern and is a leading cause of mortality worldwide in humans and animals affecting nearly 32% of the world's population. The first-line treatment available for tuberculosis includes use of drugs like Rifampicin, Isoniazid, Pyrazinamide and Ethambutol. All of these drugs are associated with a lot of side effects and we are already aware that combinational therapy is given for the treatment of tuberculosis and when these first-line drugs are given in combination the toxicity that caused by them is enhanced in a synergistic manner. The major side effects associated with the use of anti-tubercular drugs are: Hepatotoxicity, nephrotoxicity, ocular toxicity, arthralgia, urticaria, hypersensitivity, hyperuricemia and many more. Till date not much has been studied about the splenic toxicity and genotoxicity that is caused due to these first-line anti-tuberculosis drugs. So this study was designed to study the toxic effects that these drugs cause on spleen and chromosomes. Our herbal industry was in vogue for thousands of years. But it has a lot of potential to cure many ailments. So in this study, we are trying to ameliorate the toxicity caused by anti tubercular drugs on spleen and bone marrow chromosomes and by use of ancient herb *B. aristata*. Rats were divided into different groups: Control group, toxicant group, positive control and treatment group and treatment of anti tubercular drugs was given with and without *B. aristata* extract. Results showed that levels of lipid peroxidation was 87% higher in toxicant group, reduced glutathione was 51.7% lower in toxicant groups compared to control group. Histopathology of anti tubercular drug treated spleen revealed many alterations like lack of demarcation of red and white pulp, WBC infiltration in many places etc. Many chromosomal alterations were there in the toxicant group like chromatid breaks, centromeric fusion, elongated chromosomes, wooly chromosomes etc. Groups treated with *B. aristata* showed near to normal values of LPO, GSH and also very few alterations in histology and chromosomes were seen.

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