

AIR POLLUTION INDICATIONS AND GROWTH OF
SPRUCE AND PINE NEAR A SULFITE PLANT

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ABSTRACT

A preliminary study has been made around a sulfite plant in the north of Sweden. The emission of sulfur dioxide increased considerably in 1950 as a consequence of the introduction of lye-burning. Using the pH in pine bark and two common lichen epiphytes as indicators, the resistant Parmelia physodes and the very sensitive Alectoria implexa, the area studied was divided into regions with different degrees of air pollution, mainly sulfur dioxide:

1. Very high level of pollution
2. High level of pollution
3. Low level of pollution
4. Reference

In the first two regions the measured contents of sulfur dioxide in the air during autumn and winter 1970-71 were 1.5-5.1 pphm/month, 0.5-8 pphm/day and max 70 pphm/hour.

By employing growth quotients it was proved that the growth of annual rings of spruce and pine of these regions differed over late decades. Growth diminished with the degree of pollution. Regarding the growth of spruce all the regions differed significantly, as to the pine the regions 1, 2+3 and 4 differed substantially. By multiple regression analysis it was confirmed that the test plots most exposed to the smoke from the lye-pans had the most acid pine bark and the greatest growth reduction, but simultaneously a slight stimulation of growth has occurred near the factory. The pines were affected as early as 1950.

Later lichen investigations showed that region 2 and 3 cover 3-4000 ha and more than 10,000 ha of forest respectively.