AROMA CHEMISTRY

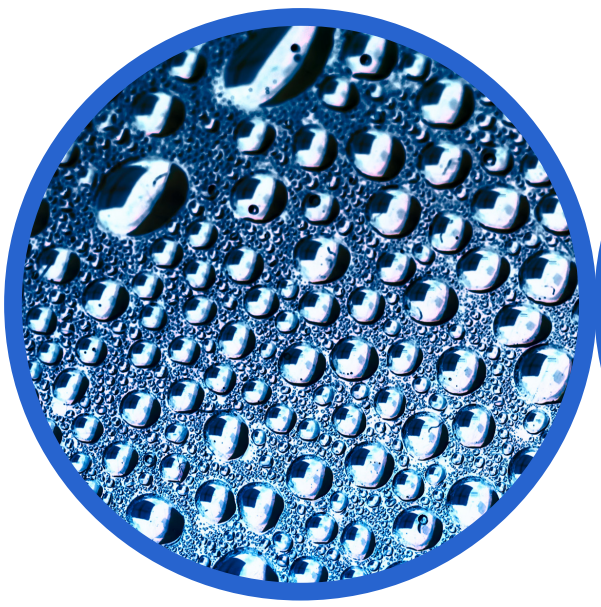
THE AROMA OF RAIN

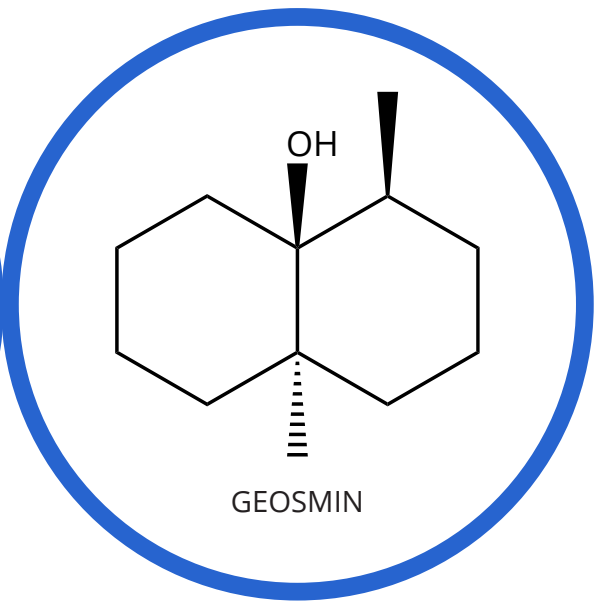
WHAT CAUSES THE SMELLS BEFORE & AFTER RAINFALL?

PLANT OILS, BACTERIA & OZONE

The distinctive smell of rain, referred to as 'petrichor', is contributed to by a number of factors. These include oils secreted by plants during dry periods, chemical compounds secreted by bacteria, and also, for stormier showers, the splitting of atmospheric chemicals to form ozone.

COMPOUNDS FROM BACTERIA



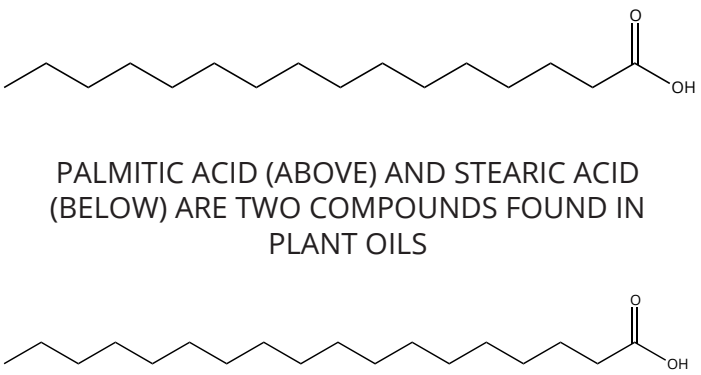


GEOSMIN

A group of soil-dwelling bacteria called actinomycetes secrete the compound geosmin, which has an earthy aroma, when they produce spores. Rain can disturb the compound from the soil. Human noses can detect it at less than 5 parts per trillion - equivalent to a teaspoon in 200 Olympic swimming pools.

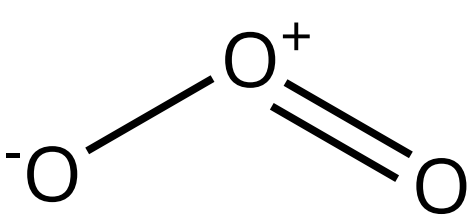
VOLATILE OILS SECRETED BY PLANTS

Plants secrete oils in dry periods, which accumulate in rocks & soil. Rain then causes smaller, volatile compounds within them, likely created by oxidation of fats, to be released. The term 'petrichor' was coined in 1964 to refer to this smell. Scientists think the purpose of these compounds is to prohibit growth during dry periods and limit competition for water.



PALMITIC ACID (ABOVE) AND STEARIC ACID (BELOW) ARE TWO COMPOUNDS FOUND IN PLANT OILS

PRODUCTION OF OZONE



OZONE

In stormy weather, electric discharges from lightning strikes can split the diatomic oxygen (O_2) in the air into individual oxygen (O) atoms. These can combine with other diatomic oxygen molecules to form ozone (O_3), which can be carried down from high altitudes by thunderstorms, giving rise to the 'pre-rain' smell.

FOR REFERENCES & SOURCES, SEE:
WWW.COMPOUNDCHEM.COM/2014/05/14/THESMELLOFRAIN