

INTERACTION OF COMPOUNDS WITH THE ETHYLENE BINDING SITE

Edward C. Sisler

Department of Biochemistry, NCSU University, Raleigh, NC 27695 USA

Burg and Burg (Plant Physiol.42:144-152, 1967) found the ratio of concentrations of alkene needed for a $\frac{1}{2}$ maximum ethylene response for pea growth inhibition was 1:130:140,000 for ethylene, propylene, and 1-butene. They concluded the ethylene binding site was a restricted site. In testing some 1-substituted cyclopropene inhibitors of the ethylene binding site it was found (Sisler *et al* Plant Growth Reg 40:223-228, 2003) that as the molecular size increases, most were more effective than 1-methylcyclopropene. The concentration requirements for a series of 1-alkenes starting with ethylene and ending with the 10 carbon 1-decene were tested for ethylene action in pea growth. These same compounds were also tested as ethylene inhibitors. Ethylene, propylene and 1-butene were active agonists in pea growth. Longer chain alkenes were inactive as agonists. 1-Butene, 1-pentene, 1-hexene, 1-octene, and 1-decene were active as ethylene antagonists in pea growth. These results show the change from ethylene agonists to ethylene antagonists in a single series with 1-butene being a pivotal compound active as both an agonist and as an antagonist. Probably hydrophobic interaction is involved. These results suggest the ethylene binding site is not very restricted.