

## Lecture 7: Chemicals used in Ripening

### Chemicals for hastening and delaying ripening of fruits and vegetables

Hastening ripening: These some times stimulate ripening of gathered fruits. It seems that the treatment is effective especially when the application is made very early soon after the picking. Stems of bananas immersed in solution containing 1000ppm sodium 2,4-D, 2,4,5 -T or Para- chloro- phenoxy acetic acid showed that ripening was accelerated. 2, 4,5 -T and to some extent 2,4-D when sprayed in a wax emulsion delayed the development of yellow colour in the rind of lemons during storage increases the storage life..

Application of ethephon promotes degreening and early ripening in grape, tomato, coffee, pear, plum, peach and citrus. Smoking is commercially employed to hasten de-greening and ripening of banana and mango. Calcium carbide release acetylene which on hydrolysis hasten ripening process. ABA at 1ppm, thio- urea at 20%. CCC 4000ppm, ethrel 200-300ppm sprays one week before harvest hastens ripening.

Delaying ripening: Auxins may slow down (generally) or even sometimes accelerate ripening process. Ethylene formation is inhibited by auxin and therefore auxins have to be broken down by peroxidases (IAA Oxidases) to control fruit ripening. Ripening is accompanied by a rise in auxin degrading enzymes. Gibberellins also stop colour changes in fruits like banana. Accumulation of abscisic acid (ABA) is also associated with ripening. Chemicals that delay ripening are (1) Kinetin, (2) GA, (3) Auxin, (4) Growth retardant (MH), (5) Alar, (6) CCC. (7)CIPC. (8)Metabolic Inducers- (a)Cycloheximide, Actinomycin-D(b)Vitamin-k,(c)Maleic acid, (d)Ethylene Oxide, (e)NA-DHA, (f)Carbon monoxide,(9) Ethylene absorbents- (a)KMnO<sub>4</sub>(b)Fumigants like methyl bromide(c)Reactants

**Volatiles:** Non-ethylinic volatiles can stimulate ripening. Air purification with activated carbon, H<sub>2</sub>SO<sub>4</sub> and NaOH slowed down the ripening of pre-climacteric apples in a recirculation system. Carbon (activated) reduces the effect in both the cases.

**Growth regulators:** These some times stimulate ripening of gathered fruits. It seems that the treatment is effective especially when the application is made very early soon after the picking. Stems of bananas immersed in solution containing 1000ppm sodium 2,4-D, 2,4,5 -T or Para- chloro- phenoxy acetic acid showed that ripening was accelerated. 2, 4,5 -T and to some extent 2,4-D when sprayed in a wax emulsion delayed the development of yellow colour in the rind of lemons during storage. The storage life increases.

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The shelf life of fruits like apple, banana and others can be improved by storing the fruit in low oxygen tension (203%) or by absorbing ethylene with a suitable absorbent like alumina or silica gel impregnated with potassium permanganate. MH, GA(10-6M), IAA(10-6M) sprays one to two weeks before harvesting and post harvest dip of cycocel, Alar, GA(150ppm), Vit K3, KMNO<sub>4</sub>, Ca Cl<sub>2</sub>, Waxol delays ripening.