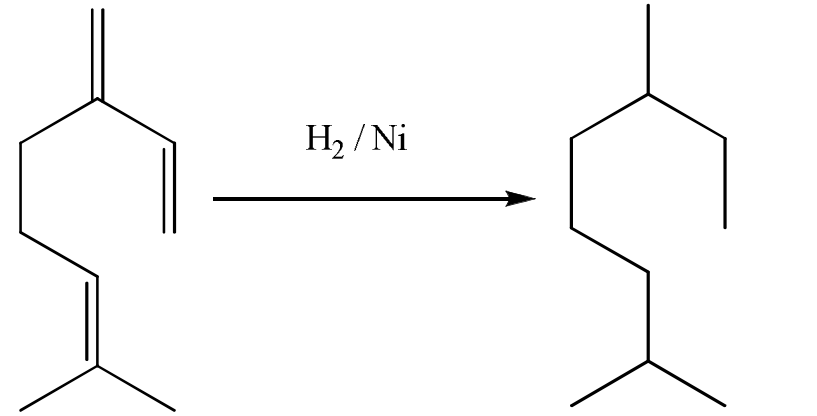
A-Acyclic monoterpenes

1-Myrecene $C_{10}H_{16}$



$C_{10}H_{16}$ myrecene

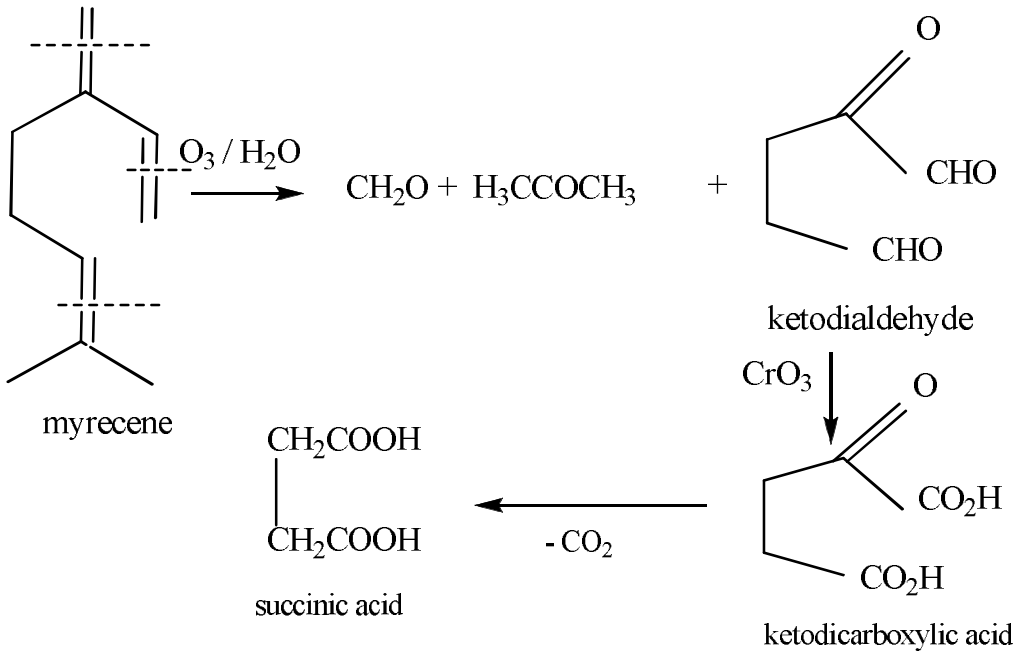
$C_{10}H_{22}$ = CnH2n+2 decane

This means that myrecene reacted with three molecules of hydrogen ,and three molecules of bromine ,thus, myrecene contains *three* double bonds .

The M.F. of decane is C_nH_{2n+2} , means that myrecene is acyclic compound.

Myrecene reacted with one molecule of maleic anhydride to give an adduct , this means that myrecene contain *two* conjugated double bonds , and the *third* is separated.

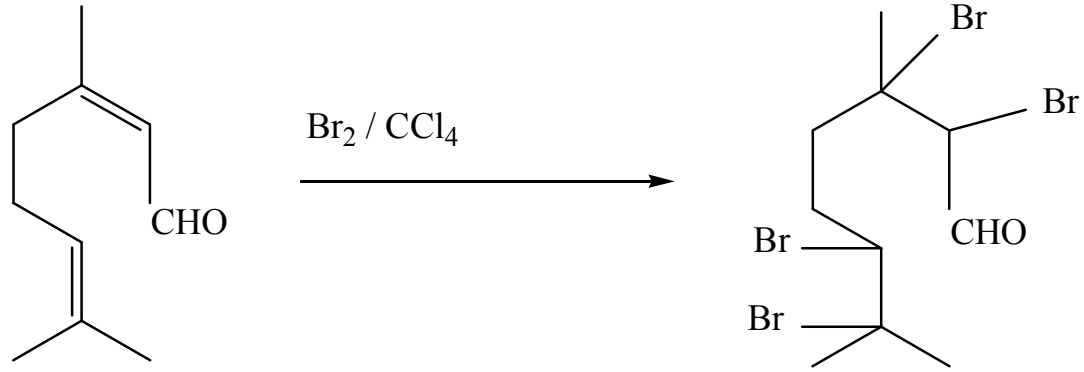
Degradative oxidation is used to indicate position of the *third* double bond .



Thus , myrecene has the above structure .

2- Citral M.F. $C_{10}H_{16}O$

Citral forming tetrabromo derivative on reacting with bromine , thus , citral contains two double bonds .

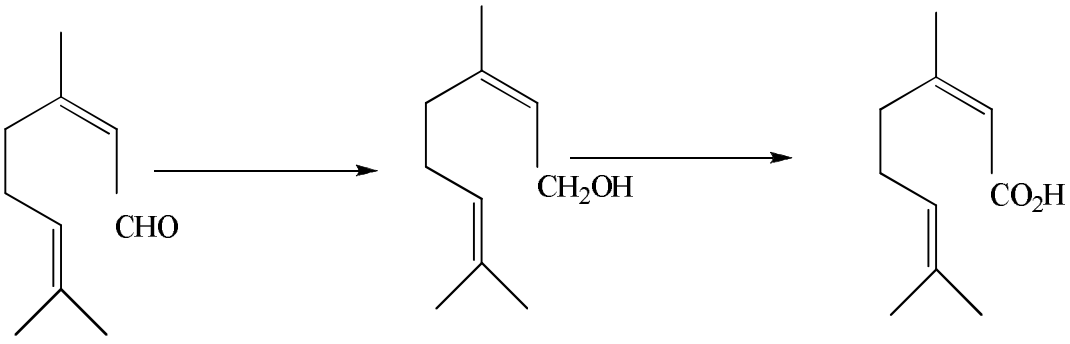


citral tetrabromo derivative

These two double bonds are separated , because citral did not react with maleic anhydride to form an adduct (*no D.A.R.*) .

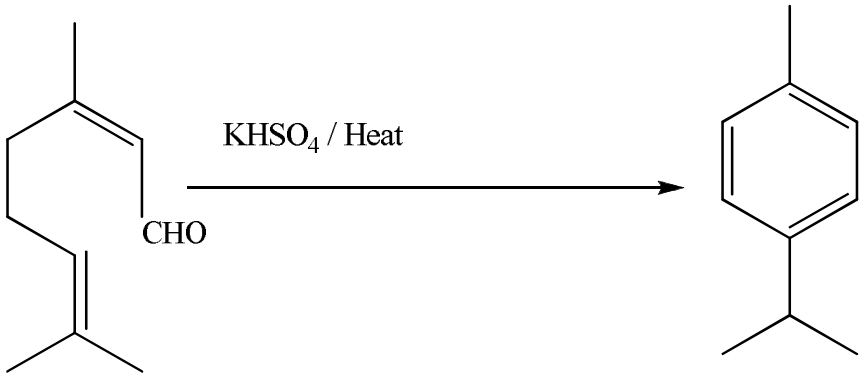
The oxo group of citral may be an aldehyde or ketone since it was condensed with hydrazine or hydroxyl amine to give the hydrazone or an oxime respectively .

Since citral reduced to geraniol (primary alcohol) , then oxidized to geranic acid (mono carboxylic acid) , without loss of carbons during the oxidation process , thus , citral is an aldehyde not ketone .



Citral geraniol geranic acid

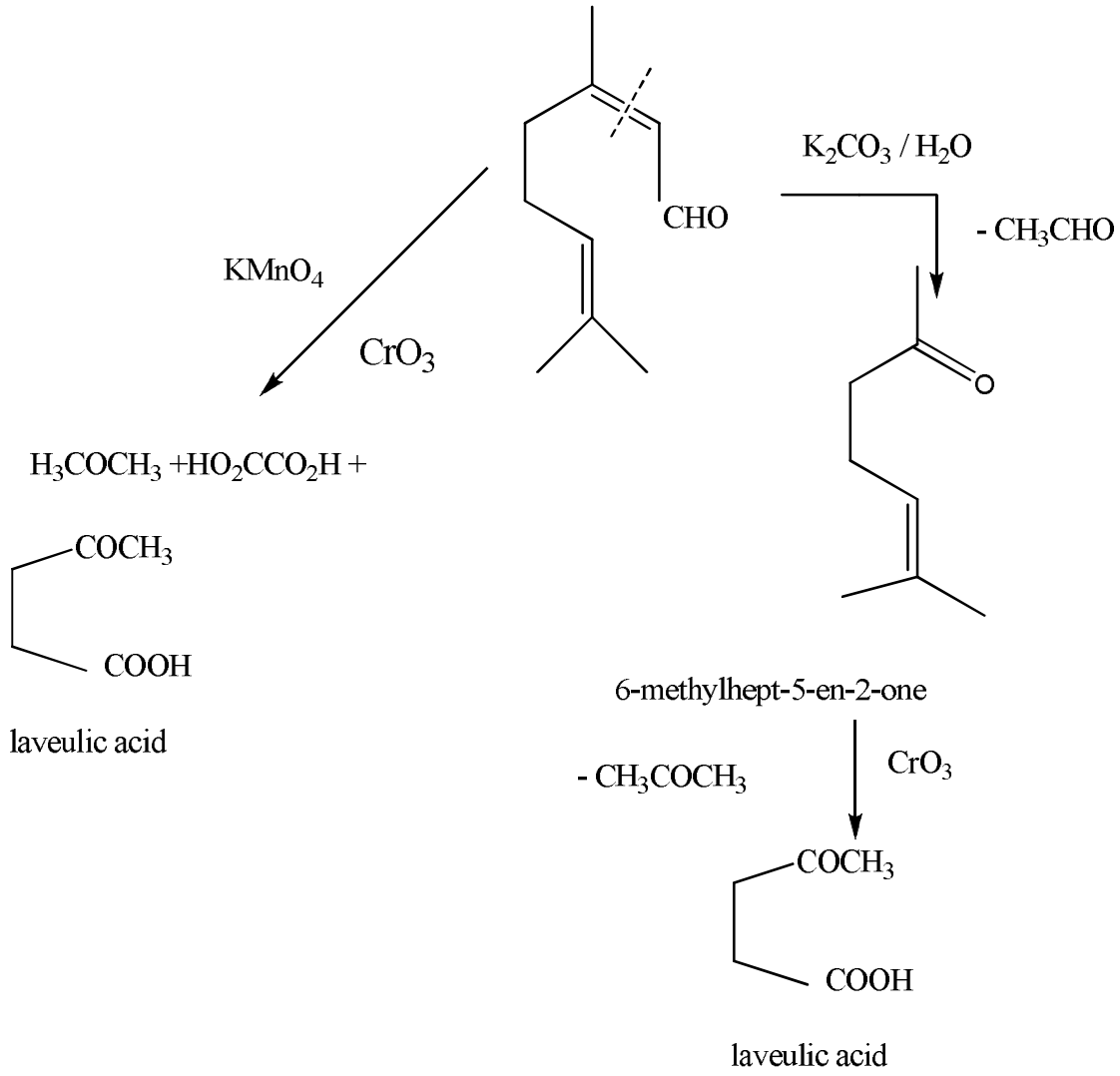
$C_{10}H_{16}O$ $C_{10}H_{18}O$ $C_{10}H_{16}O_2$



citral p-cymene

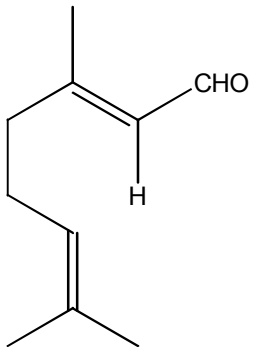
The above equation indicates that , citral give p-cymene on heating with $KHSO_4$,this means that citral consists of two isoprene units joined together head to tail .Also,indicates position of methyl group with respect to isopropyl group.

Thus ,positions of the formyl group and the double bonds can be indicated by *degradative oxidation* .

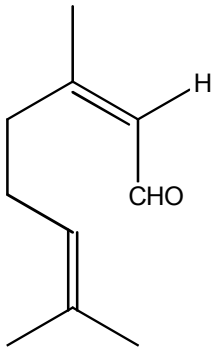


Reaction of citral with aqueous potassium to give 6-methylhept-5-en-2-one means that citral is α,β-unsaturated aldehyde .

There are two types of citral ;they are citral-a and citral-b as shown below :



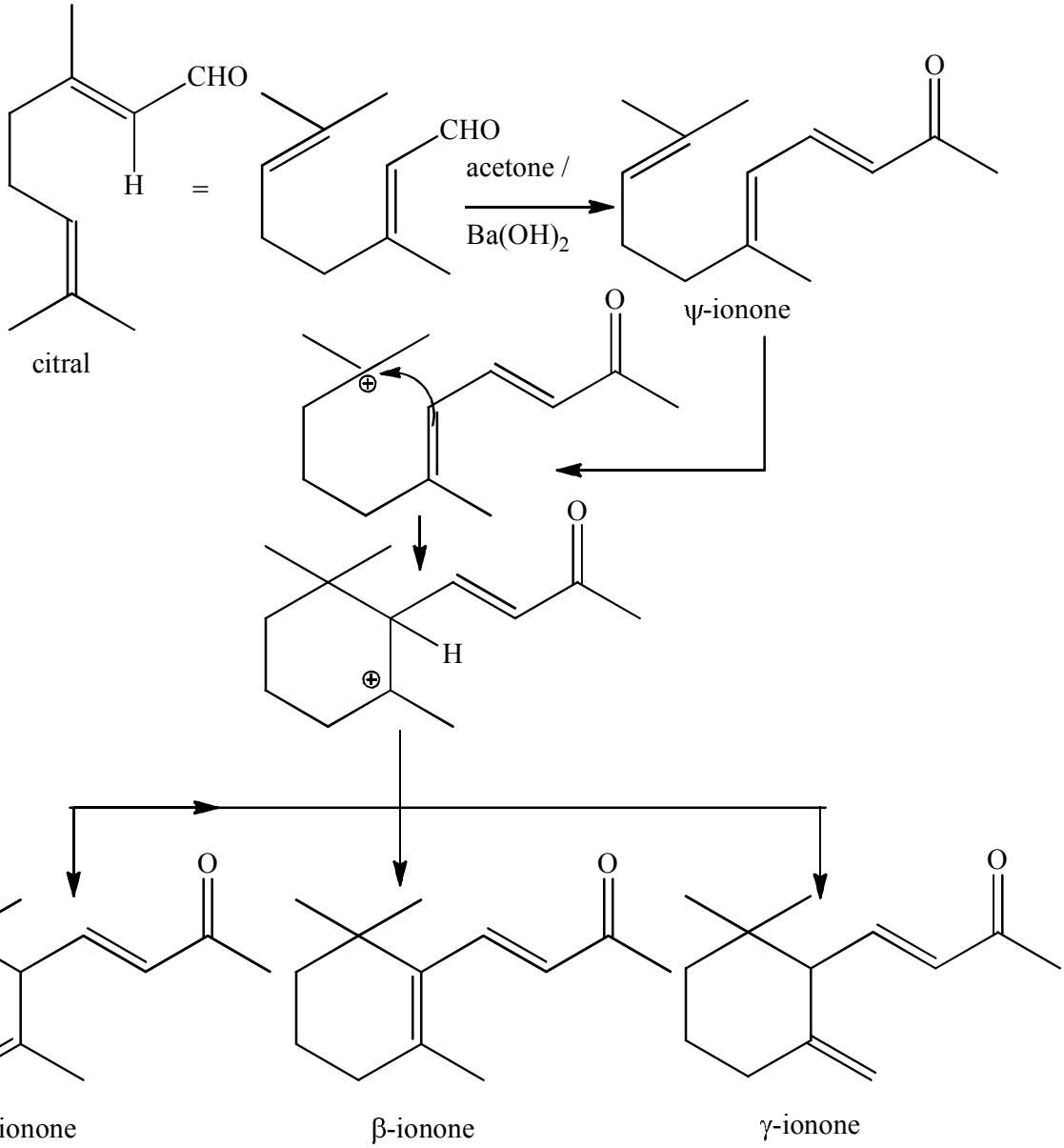
citral-a (geranial;trans; E)



citral-b (neral;cis; Z)

Ionones :

Prepared by condensation of citral with acetone in presence of alkali,followed by cyclization with acid.



α-ionone β-ionone γ-ionone

The preparation of α-ionone and β-ionone varies with the nature of cyclizing agent used e.g.with H_2SO_4 , β-ionone is the main product;with H_3PO_4 α-ionone is the main product.

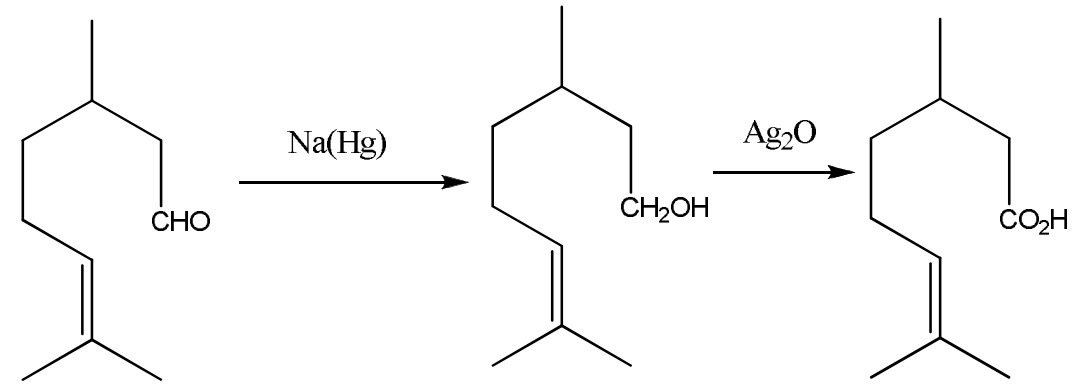
3- Citronellal M.F. $C_{10}H_{18}O$

It is an optically active compound occurs in citronella oil.

It contains one double bonds from bromination and hydrogenation and the parent hydrocarbon is acyclic compound with M.F.$C_{10}H_{22} = C_nH_{2n+2}$

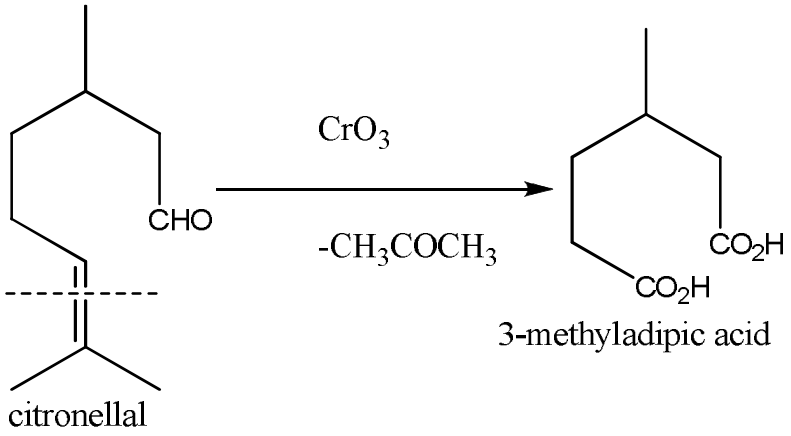
It is an aldehyde or a ketone since it condensed with hydrazine and hydroxyl amine to give hydrazone and oxime respectively.

It is an aldehyde from the following reactions:



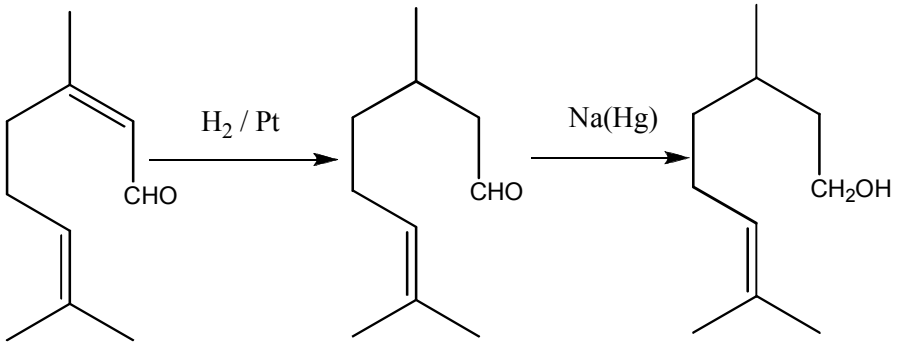
citronellal $C_{10}H_{18O}$ | citronellol $C_{10}H_{20}O$ | citronellic acid $C_{10}H_{18}O_2$

Degradative oxidation to *indicate* positions of the double bond and the formyl group.



citronellal

3-methyladipic acid



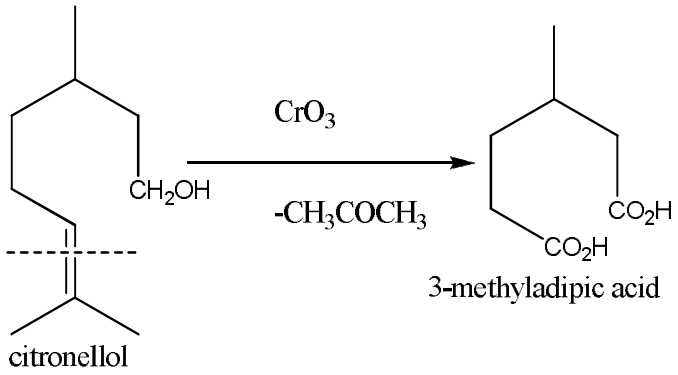
citral | citronellal | citronellol

4- Citronellol M.F. $C_{10}H_{20}O$

Occurs in rose and geranium oils.

Its structure was determined by the following:

and by degradative oxidation:



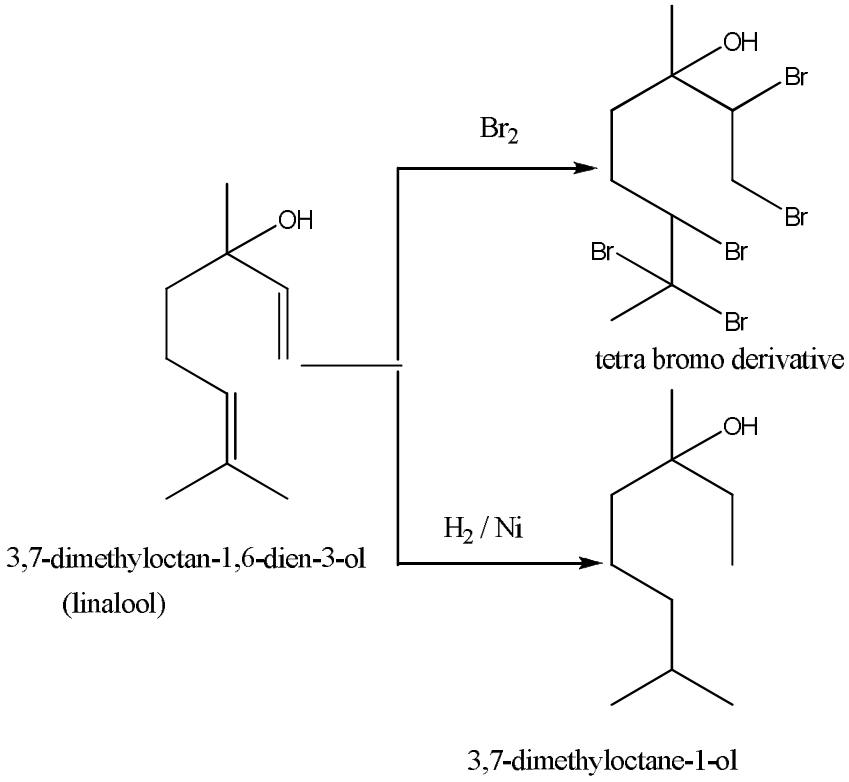
7- Linalool M.F. $C_{10}H_{18}O$

Occurs as(-) in rose oil and as (+) in orange oil.

Its hydroxyl group is a tertiary alcohol because it resists oxidation ,esterification and easily dehydrated.

It contains double bonds ,since it adds two molecules of H_2 and two molecules of Br_2.

The M.F.of the product 3,7-dimethyloctane-1-ol is $C_{10}H_{22}O = C_nH_{2n+2}$; this means that linalool is acyclic compound.These two bonds are separated since, this compound does not react with maleic anhydride.



Degradative oxidation to indicate positions of the double bonds and the hydroxyl group.