

f. Carbamates:

Carbamate insecticides are synthetic derivatives of physostigmine, commonly known as eserine. It is the principal alkaloid of the plant calabar bean (*Physostigma venenosum*). A number of synthetic analogues of physostigmine such as prostigmine and NU683 were developed which were effective inhibitors of cholinesterase but since they were water soluble they could not gain importance as insecticides. Hence the modern carbamates were modified by eliminating the polar moiety of physostigmine so that they can easily penetrate the insect cuticle and nerve sheath.

Carbamate insecticides are the derivatives of carbamic acid and dithio-carbamic acid.  
(area & insecticides).

f1. Derivatives of carbamic acid: The derivatives of carbamic acid are classified as under:

Heterocyclic carbamates

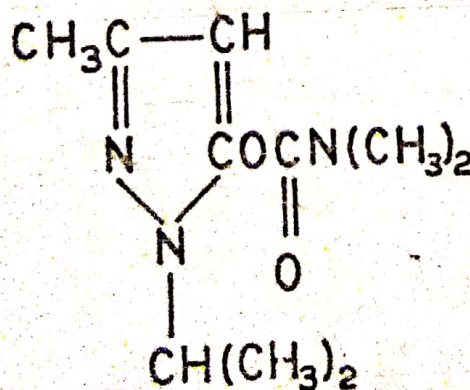
Naphthyl carbamates

Phenyl carbamates

Oxime carbamates

Heterocyclic carbamates:

Isolan:  $C_{10}H_{17}O_2N_3$ : 1-isopropyl-3-methylpyrazolyl-(5)N,N-dimethyl carbamate): It is a colourless liquid soluble in water and other organic solvents. It is a systemic insecticide effective against aphids. Other insecticides of this group are pyrolan and pirimicarb (Pirimor).

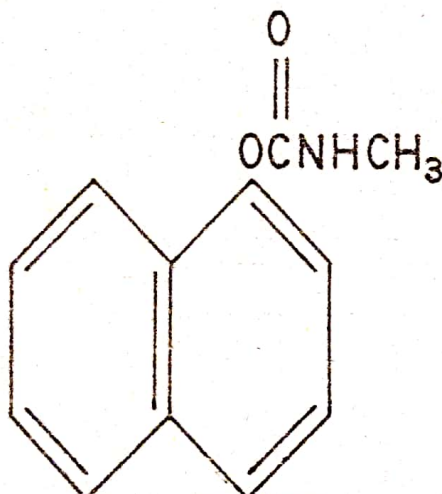


Isolan

Handwritten notes: NO, Oxime, Naphthyl, Abducts

Naphthyl carbamates:

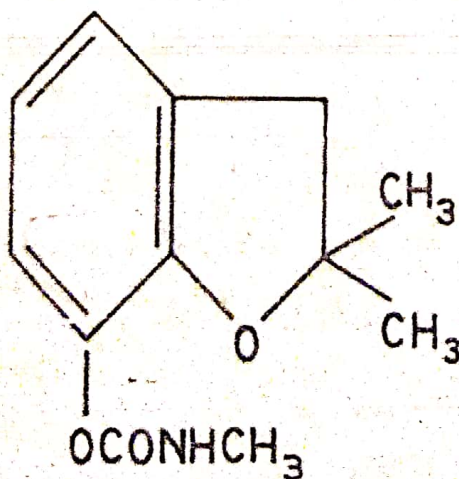
Carbaryl:  $C_{12}H_{11}O_2N$ : 1-naphthyl N-methyl carbamate: It is a white crystalline solid. The technical material is about 95% pure, practically insoluble in water but soluble in most of the organic solvents. It is a contact and stomach insecticide with long residual effect. It is hydrolysed to 4-hydroxy and 5-hydroxynaphthyl methyl carbamate which further break down with rupture of aromatic ring. It is marketed as Sevin.



Carbaryl

Phenyl carbamates:

Carbofuran:  $C_{12}H_{15}NO_3$ : 2,3 dihydro-2,2-dimethylbenzofuran 7-yl-N-methyl-carbamate: It is white crystalline solid, soluble in water (250-700 mg/l). It is a systemic insecticide with nematocidal action. It is very effective against shoot fly. It is marketed under the trade name Furadan. Other insecticides of this group are aprocarb (Baygon), aminocarb and dioxycarb.



Carbofuran

