

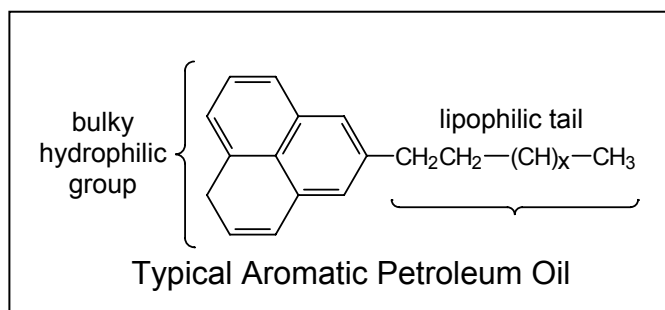
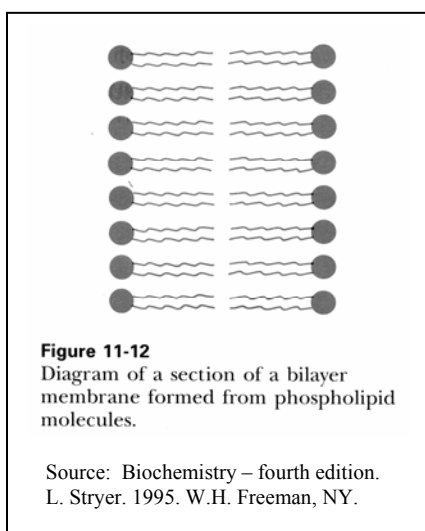
## Chapter 24

### Miscellaneous Mode of Action

### Solubilizer of Plasma Membranes

#### 1. General Information - Solubilizer of Plasma Membranes

Compounds with this mode of action interact with lipids in the plasma membrane/cell membrane. Since “like dissolves like”, such compounds to include aromatic petroleum oils solubilize or dissolve the lipids in the cell membrane. The plant response would be much the same as described for “membrane disruptor / contact” herbicides where death to the cell would occur very rapidly.



#### 2. Mode of Action – Solubilizer of Plasma Membranes

The chemistry behind this interaction is that petroleum oils/crop oil concentrates have lipophilic tails and hydrophobic heads, the same as for the lipids that comprise the cell membrane. The combination of the two would result in solubilization of the cell membrane and subsequent destruction and cell death.

#### 3. Site of Action – Solubilizer of Plasma Membranes

The site of action is the plasma membrane in outer epidermal cells.

#### 4. Symptoms – Solubilizer of Plasma Membranes

- contact type activity with rapid destruction of cell membranes and leakage of cell contents
- symptoms would include initial water soaking of plant tissue due to leakage of cell contents into the intercellular spaces followed by chlorosis and necrosis

#### 5. General Comments – Solubilizer of Plasma Membranes

Compounds with this mode of action would not be translocated in the plant and would provide control of only tissues contacted by the spray.

One example of a compound used in agriculture would be a phytotoxic crop oil, which is often added to certain herbicides to enhance control. The phytotoxic oil would help to solubilize the cuticle and enhance herbicide uptake into the leaf.

Although not labeled, diesel fuel is sometimes used to control vegetation and in some cases is combined with systemic herbicides to “make the herbicide hotter”. This rationale is not valid since the oil burns the tissue before the systemic herbicide is allowed to translocate within the plant. Diesel fuel is allowed for use with certain herbicides applied as basal treatments to woody plants. This combination enhances the ability of the herbicide to penetrate the bark and to move into the phloem for transport to roots.

#### 6. References

Ahrens, W. Herbicide Handbook, seventh edition. 1994. Weed Science Society of America, Champaign, IL.

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