Lab.1: Introduction

Definition: **Algae (singular alga)** are the main microorganisms involved in photosynthesis process and may be defined as simple plants (lacking roots, stems, and leaves) that have chlorophyll type (A) as their primary photosynthetic pigment and lack a sterile covering around the reproductive cells. Algae range in size from microscopic organisms (**micro-algae**) to macroscopic forms which are visible to the naked eye and appear plant-like(**Macro-algae**). Algae most commonly occur in water. However, they have been also found in almost every other environment on earth.

Algae can be distinguishing from plant by the following:

1-they **do not** have root, leaf and stems, but plant **do** have.

2- they **do not** form true embryo, but plant **do** have

3- they **do not** have a vascular system. but plant **do** have

Algal classification: Algae are being distributed in two kingdoms:

1-monera: prokaryotic algae (cyanophyta) are placed in the monera

2-protista: eukaryotic algae (all other algal divisions) are placed in the Protista

Algae are classified into seven divisions

1- Division: **Cyanophyta** (Blue-green algae)

class: cyanophyceae (myxophyceae)

2- Division: **Chlorophyta** (Green algae)

Class: chlorophyeae

Class: charophyceae

3- Division: **Euglenophyta** (Euglenoids)

Class: Euglenophyceae

4- Division: **chrysophyta** (Yellow-green)

Class: chrysophyceae

Class: xanthophyceae

Class: bacillariophyceae (Diatomes)

5- Division: **pyrrophyta** (Dinoflagellates)

Class: desmophyceae

Class: dinophyceae

6- Division: **phaeophyta** (Brown algae)

Class: isogenerate

Class: heterogenerate

Class: cyclosporae

7- Division: **Rhodophyta** (Red algae)

Class: Rhodophyceae

Algal forms:

a-unicellular form: this form exists in most alga except red and brown algae

b-multi cellular form: there are several multicellular form of algae:

1-colonial: assemblage of individuals cells with constant or variable numbers of cells.

2-filamentous: this form is characterized by vegetative cells divide in linear threads either branched (**multiserate**) or unbranched (**uniserate**)

3-coenocytic: this form is characterized by one large multinuclear cell that protoplasm is **not subdivided** by cross walls.

4-parenchymatous (tissue form): mostly found in macroscopic algae

Photosynthetic pigments: there are three photosynthetic pigment in algae

1-chlorophylles :(A, B, C, D,E,F)

2-carotenoids: B-carotene found in most algae

3-biliproteins: phycocyanin and phycoerytherine

Algae motility:

1-Gas vesicles: Buoyancy mechanism for positioning in the water column (in most phytoplankton)

2-Gliding movement :(in some filamentous form)

3-flagella: Some unicellular and colonial algae with flagella

Reproduction in algae:

1-**Vegetative reproduction**:

a- **simple division** (binary fission): the mother cell divide and the daughter cell are produced (in unicellular algae)

b- **fragmentation**: algal body breaks into several fragments and each such fragment develops into new individual (in filamentous forms)

c-**Hormogonia** formation:

short pieces of **trichome** that become detached from the parent filament and

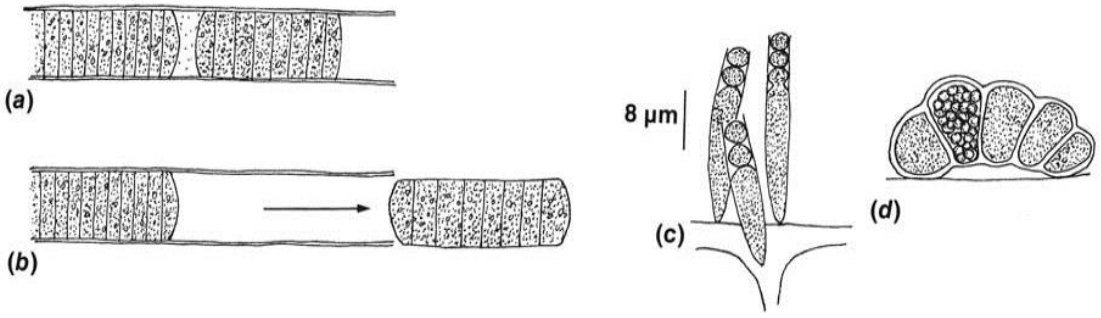
move away by gliding and developing in to new filament (in filamentous algae)

d-**akinate**: specialized vegetative cell full with food reserve responsible for reproduction in some blue green algae

2-**asexual reproduction**:

a-**endospores**: formed by multiplication inside the mother cell

b- **zoospores**: swimming by flagella



Figure(1)(a), (b) Formation of a hormogonium , (c),(d) Formation of endospore

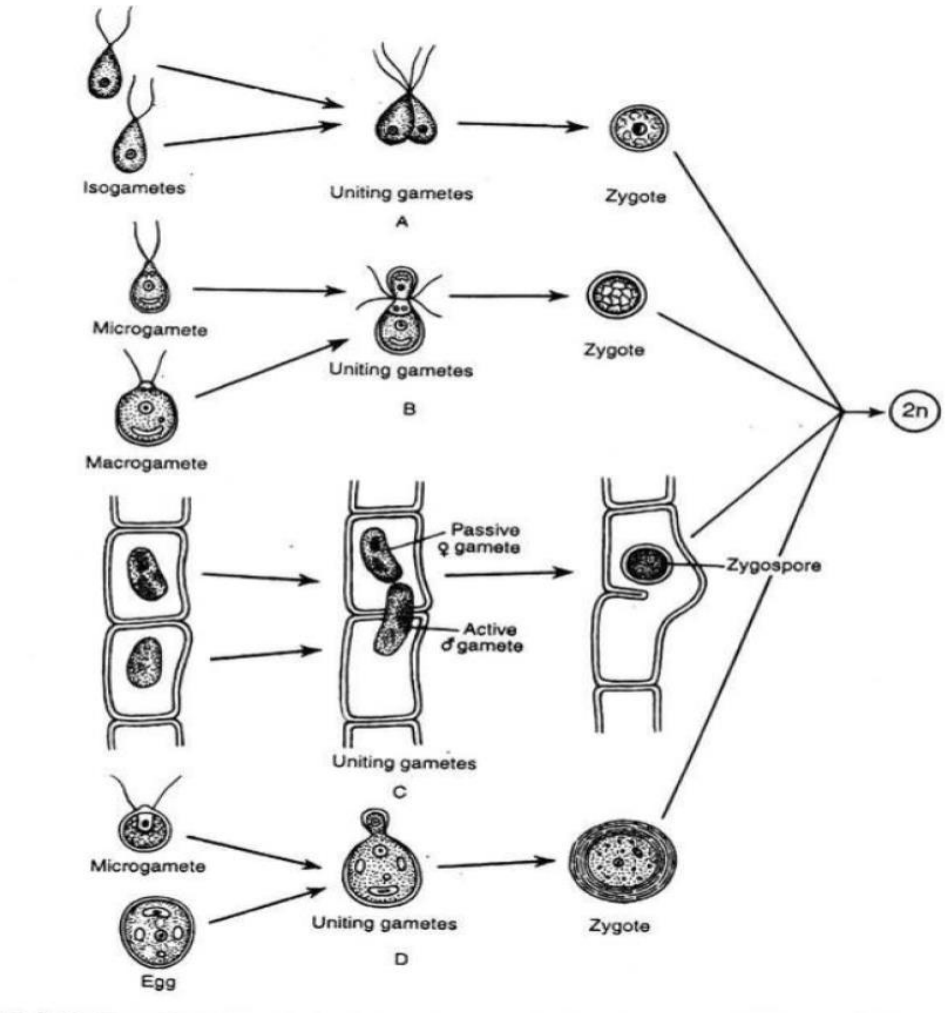
3-**sexual reproduction**:

a-**Isogamy**: sexual fusion between flagellated gametes that are similar in size and shape

b-**Anisogamy**: sexual fusion between flagellated gametes that are different in size

c-**Oogamy**: sexual fusion between flagellated gametes (sperms) and non-flagellated gametes (egg)

d-**conjugation**



Figure(2): types of sexual reproduction in algae