Study alcoholic extract effecting of *Actinidia* in the growth of two types of algae *Microcystis sp.* & *Chroococcus sp.*

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**ABSTRACT:**

The main objective of this study is examine the effect of (*Actinidia*) Kiwi Peel extract against growth two species of blue-green algae (Cyanobacteria) : Chroococcus sp and Microcystis sp. the growth rate of algae counted directly by Chamber. The algae farms were divided in Three groups as following : the first group(C1): Treatment control concentration 0% , the second group(C2): Treatment of alcoholic extract concentration of the Kiwi plant 1% , the third group( C3): alcoholic extract concentration of the Kiwi plant 5% . All groups were noted during the time periods.

The results showed the (*Actinidia*) Peel extract caused a significant inhibition (p<0.05) in the rate of growth of algae at concentration 5% for two species, and the colonies were reached in Microcystis sp (72) cell in ml compared with control , in Chroococcus sp. was least cells (60 ). Microcystis sp was more resistance for *Actinidia* Peel extract.

**KEYWORDS:** Cyanobacteria, Chroococcus algae, Microcystis algae, (*Actinidia*) Kiwi Peel alcoholic extract.

**INTRODUCTION:**

The pollution of the problems facing the world, especially water pollution, which is defined as the change in the river's water conditions directly or indirectly as a result of the activities of the human problem and thus it causes changes in environmental ecosystems and constitutes a danger to human health, can some types of algae live in water contaminated with feces sewage, as used large amounts of nitrogen compounds and phosphates in waste during its growth (sprue, 1992). Nutrient direct impact on the density of phytoplankton, is the large increase in nutrients.

The large increase in plant nutrients (nitrogen and phosphorus) in the water of the problems that threaten the water ecosystem is, and this increase grow large numbers of algae and prosperity on the surface of the water layer, causing Algae Blooming phenomenon and which are effects adverse to the aquatic environment and organisms that live in them and so lead to a reduction in the diversity of algae (2003, Klug), and that the viability of algae make the water taste and smell is not good, and it has the ability to change the pH and water color and turbidity. Considering algae from organisms that change the chemical and physical properties important to the water, such as turbidity, temperature, color and materials radioactive and organic materials, bio-oxygen demand (BOD) and pH and dissolved oxygen (DO) (Perscott, 1975). The use of some immune extracts found in some fruits and vegetables that feed the human in the daily food *Actinidia* protect the body from damage resulting from toxins microbiology because they contain effective groups at high rates have the ability to protect body cells from damage these toxins by increasing the production of enzymes antioxidants when strep (Freeman, and Kodera, 1995; Lawson and Hughes, 1992) These are rich source of vitamin-C (Ascorbic acid). The peel of the *Actinidia* contains various active constituents and essential oils.
**Actinidia** peel is one of the important dietary sources of antioxidant phenolics (Jayaprakasha et al., 2008) 

Kiwi (**Actinidia**) is an important medicinal plant of the family Actinidaceae. It is cultivated mainly for its alkaloids, which are having anticancer activities and the antibacterial potential in crude extracts of different parts (awaii et al., 2000). Many polymethoxylated flavones have several important bioactivities, which are very rare in other plants (Ahmad et al., 2006).

The aim of the study to know the vital effects of alcoholic extract of **Actinidia** peel, in terms of the fact that this extract Stimulator or an inhibitor of the growth of two types of algae Cyanophayta namely: *Chroococcus* sp. & *Microcystis* sp.

**MATERIAL AND METHODS :**

**Washing and sterilizing instruments used:**

Washed and sterilized all-glass tools used in the media culture preparation and in the isolation, purification and cultivation of microalgae acid, hydrochloric acid HCl concentration (20%) then washed tools tap water and then distilled water was dried and sterilized using electric oven at a temperature of (105)°C for two hours were used flasks conical glass various sizes (250, 500) ml in culture experiments after closed at clean and sterile cotton, of the agar media have been used sterile plastic dishes.

**Sampling:**

Subsurface water samples were collected from the Different areas of the River Gharraf, the samples were collected by using clean polyethylene bottles, it installed to sample part using formalin concentration of 4% for the purpose of microscopic examination while leaving the other without installed for the purpose of of culture.

**Media Culture:**

Attended the media (Chu -10) and the modified from (Al- Aarajy, 1996) in Stock solutions Table (1) and use distilled water in the preparation and without sterilization while using it and save the media in the refrigerator at a temperature(4°C) in dark.

Then mixed equal amounts (1) mL of each Stock solutions and then complete the volume to 1 liter with distilled water then justice the pH between (7.4 - 7) by adding drops of sodium hydroxide solution NaOH concentration of 10 mg / L or acid Hydrochloric HCl concentration (10%) using pH - meter and infertility media in Autocleave under temperature (121) °C and pressure (15) lbs / Ang for 20 minutes, then leave to cool degree lab temperature then phosphate salts added to it after sterilized by filtration using filtration paper their openings diameter (0.45) microns to prevent the deposition of phosphate on the walls of the glass bottle during sterilization. The culture media solid has attended the same liquid media components after the addition of Agar him by 15 g / liter, and sterility and left to cool then pour in the petri dishes dry and sterile near flame burner and preserved all the dishes after hardening in the refrigerator temperature (4) °C in the upside-down while in use.

**Table 1: The chemical composition of the media (Chu -10) modified by (Al – Aarajy , 1996).**
<table>
<thead>
<tr>
<th>mg/l</th>
<th>Compound</th>
<th>mg/l</th>
<th>Compound</th>
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<td>Na2SiO3. 9H2O</td>
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<tr>
<td>0.01</td>
<td>CoCl2. 6H2O</td>
<td>31.8</td>
<td>Na2EDTA</td>
</tr>
</tbody>
</table>

**Isolation and purification of algae:**

For order to obtain unialgal Culture Used dishes agar planning method and after a series of dilutions for a unialgal Culture (Stein, 1973).

The purification of unialgal Culture from bacteria, according to (Wilson and Demmig-Adams, 2007; Kyung and Lee, 2001) described detail in (Pereira et al., 2006).

**Diagnosis species of algae:**

The following sources adopted in the diagnosis of species of algae used in the study: (Gowda et al., 2004; Kivanc and Kunduhoglu, 1997; Topal, 1989) Where it was isolated algae Classified and described below:

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

**Class:** Cyanophyceae

**Order:** Chroococcales

**Family:** Chroococcaceae

**Genus:** Chroococcus sp., Microcystis sp.

**EXTRACTION PROCEDURE:**

The plants used in this study were Actinidia (kiwi), The peels were collected from the local fruit juice shops. After collection, the peels were shade dried at room temperature (30 - 35°C). 20 gm of peels of kiwi were coarsely powdered using a mortar and pestle and were further reduced to powder using an electric blender. The powder was transferred into closed containers for further use.

The dried and powdered peel materials (10 gm) were extracted with 200 ml of each solvent separately by using soxhlet extractor for 2 to 5 h at a temperature not exceeding the boiling point of the Solvent. The solvents used for the study were ethanol. The extracts were filtered and then concentrated to dryness. The extract were transferred to glass vials and kept at 4° C before use. The extracts were dissolved in 25% aqueous dimethyl sulfoxide (DMSO) to produce a stock solution of 100 mg/ml. Ladd et al. (1978)

It was prepared concentrations of alcoholic extract of the plant kiwi (Actinidia) was calculated by the following formula:

\[ N1 \times V1 = N2 \times V2 \]
Whereas:

C1: Treatment control concentration 0%

C2: Treatment of alcoholic extract concentration of the Kiwi plant 1%

C3: Treatment of alcoholic extract concentration of the Kiwi plant 5%

Testing of extracts activity for (peel kiwi) *Actinidia* for growth rate of algae:

Appoint isolates the addition of (0.10) from the farm pure liquid inoculums for each of the two algae to volumetric flasks (250 ml) container at media culture supported by alcoholic extract of pomegranate previous concentrations above, and using three replicates per concentration, incubter at a temperature (27 ± 2)°C with the level of lighting (50) Maekerooanstein / m 2 / s and system Lighting (16: 8) Lighting: darkness bearing in mind the continuous shaking of samples a day for the purpose of obtaining the desired growth (Tomaselli *et al*., 1981), as well as the sample Culturing without adding alcoholic extract kiwi of her mind in order to control sample.

Measuring the rate of growth:
The growth rate of algae counted directly by Chamber Shidu (Coombs *et al*.,1986).

RESULTS:

The results of the current study showed a decrease in the number of cells *Chroococcus* sp. and *Microcystis* sp. With increasing concentrations of alcoholic extract (peel kiwi) and gradually during the period of incubation as in Figure (1.2), and confirmed by the statistical analysis of the existence of a negative relationship between the number of cells and increasing concentrations of alcoholic extract (kiwi peel).

**Figure 1: Role of alcoholic extract (kiwi peel) *Actinidia*. in growth rate of *chroococcus* sp.**
Figure 2: Role of alcoholic extract (peel) Actinidia.(kiwi) in growth rate of Microcystis sp.

The results of the present study shown in figure (1,2). The result showed the first day a significant Resistant (p<0.05) in growth of rate of Microcystis sp of alcoholic extract (Kiwi peel) more than Chroococcus sp , Where the rate of growth at calculation found that the highest number of algae cells Chroococcus sp. When treatment to differing concentrations of alcoholic extract (Kiwi peel) (439cells / ml when the treatment C1 (0%) in the ninth day of treatment and the lowest number was (60) cells / ml when the treatment C3 (5%) on the same day , either Microcystis sp. has reached a higher number of cells (435) cells / ml when the treatment C1 (0%) in the ninth day also and the lowest number (72) cells / ml when the treatment C3 (5%) on the ninth day showed the results of the statistical analysis and the presence of significant differences (P≤0.05) between treatments and between periods of incubation.

DISCUSSION:

Results showed isolation from the local environment and the spread of the species and genus of algae, mostly of blue-green algae and diatoms, and between these genuses is more Chroococcus sp. A unicellular algae assembles in colonies and characterized cells form spherical and be the contents of the cell to an area distinct dark and light area.

The blue-green alga Microcystis sp. It is also present in our environment, but it will be longer growth rate than growth rate Chroococcus sp. And present in the colonies also because the colony be either regular or elongated or circular or irregular, a toxic algae because it produces toxic compound Microcystin a polypeptide as mg per kg body causing death (al-Saadi & Sulaiman, 2006).

Widespread use of the two genus in the our environment and local bluegreenalgae from being encouraged to isolate and purify and study the effect of alcoholic extract Actinidia (Kiwi peel).

Indicate the negative relationship between the concentrations of alcoholic extract of (Kiwi peel) and the rate of growth two algae to influence the inhibitory extract may be due to the effectiveness of Actinidia against two algae to fit on a number of effective compounds against microorganism such as compounds alkaloid, flavonoid, glycosides , polyphenol , tannin(Al-Brahim 2008; Lu et al. 2002; Ahmad & Beg. 2001)

The resistance may be due to the permeability barrier provided by the cell wall or to the membrane accumulation mechanism (Abu-Shanab et al.,2004).
Another reason may be due to the fact that these two algae belongs to a class of blue-green algae which resemble bacteria in many of the character of so called Cyanobacteria (Saadi Sulaiman, 2006), they are to walk the path of the bacteria in the fact that the alcoholic extract inhibitor of Kiwi is very effective against bacteria (Ghalibi, 2013).

Plant also contains a number of phenolic compounds such as Caffic acid( Lu et al., 2002) which has shown to be effective against bacterial and against fungal (Cowan, 1999). The effectiveness of the alcoholic extract was due to the synergistic action of a group of chemical compounds such as phenols, flavonoids and alkaloids present in the extract and a different side chains, giving it the flexibility to work on several targets from microscopic cell (Hugo & Russell, 1987) has pointed Reed (1995) to the ability of these compounds on the deposition of proteins and so by the composition of hydrogen bonds between the hydroxide cyclic groups and proteins, thus inhibiting an enzyme necessary for the metabolism microorganism. Algae differ among themselves in terms of resistance to him for alcoholic extract *Actinidia* (Kiwi peel), as expressed *Microcystis* sp Resistant more than the other algae in response to different concentrations of the alcoholic extract *Actinidia* (Kiwi peel) reason may be due to the presence of the genes of the virulent organism poison gives him recipe the direction of the resistance effects.

It became clear from this study that alcoholic extract *Actinidia* (Kiwi peel), a broad impact on microbiology (algae) and different algae with each other in terms of him resistance to extract alcoholic *Actinidia* (Kiwi peel), where showed *Microcystis* sp Resistant more than the other algae response to different concentrations of the extract alcoholic *Actinidia* (Kiwi peel). We recommend further studies on *Actinidia* (Kiwi peel). and extract effective materials and isolate them to increase their impact on the algae, especially poisonous ones.

REFERENCES :


