IMPACT OF THE TOXICS CYANOBACTERIA IN FRESH WATER "DAMOF THE EAST ALEGERIA"

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Abstract :

Cases of morbidity caused by toxins of Cyanoprokaryotes have been associated to the public distribution water consumption. Blooms of Cyanoprokaryotes, because of the production of toxins, constitute a new topic of sanitary preoccupation and remain studied otherwise little in our country. Indeed, these lower-case letters small green blue algae, synthesis cyanotoxineses of which effects at the man are neurotoxiques or hèpatotoxiqueses. Also, the Cyanoprokaryotes impair the quality of the necessary water to the balance of the aquatic ecosystem and therefore, contribute to the eutrophication accelerated of Lakes.

The survey of the dynamic spatio - temporal and permitted us of parameters of growth of the poisonous Cyanoprokaryoteses at the level of the Cheffia dam:

- To identify and to inventory the poisonous Cyanoprokaryotes kinds that populate the Cheffia dam, of December 1999 to November 2000.
- To determine the seasonal recorded poisonous microalgues dynamics on the one hand and on the other hand to follow their evolution according to certain physico - chemical parameters of the waters of the dam.
- To identify the poisonous Cyanoprokaryotes, as bio - indicatory of Eutrophisation and potabilité of the stagnant waters of surface.

Key words: Blooms, poisonous Cyanoprokaryotes, identification, freshwater, poisoning, eutrophication.

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- To contribute to a better knowledge of these microorganisms that constitutes a source of nitrogen and phosphorus imports, to the promising application perspectives in biotechnology.

Thus, through this survey, we noted that to the level of the Cheffia dam the poisonous Cyanoprokaryotes develop especially since the spring, generating strong troubling demographic explosions, in summer and in fall. Indeed, these two seasons are most auspicious, to unite conditions favorable to the development of the Cyanoprokaryotes, to know,: a hot and sunny time, a water to elevated basic pH and enriched in nutriments azotés and phosphaté.

I) - Introduction:

The aquatic environment of fresh water is subjected to a series of parameters the most important of which are his chemical composition, its biologic contents, its temperature and the periodicity of its lighting. In these parameters add, the climate and the geologic nature of the ground, the factors the influence of which on the characteristics of the aquatic environment is far from being unimportant. Indeed, according to Wasmund, 1997; eutrophes lakes which are characterized by the progressive disappearance of the biocénose, are careful there, where tributaries, streamings and precipitation join to enrich the water in nitrates, in phosphates, in silicates and in carbonates.

The eutrophisation can as well, to favor the fast reproduction of certain microbial florae which take advantage of the noxious change of the composition of the water. For that purpose, one observes a net ascendancy of cyanophycées (blue algae), with regard to planctoniques algae belonging to the other groups (Anonyme,1995). The density of Cyanobacteria becomes so important as it(he) forms on the surface of the water a greenish froth (dixit flowers of water). In fact, these flowers of water correspond to called demographic " blooms " explosions and their buoyancy is due to the presence in the cytoplasm of the cells of Cyanophycées, gas vacuoles (Klemar, on 1990).

The massive proliferation of Cyanobacteria, is a more and more frequent phenomenon worldwide. In Europe, several led studies indicate that 40 in 75 % of blooms possess toxic properties (neurotoxin, hépatotoxin, cytotoxin and endotoxin). As example: in the Scotland and in Portugal, toxin was discovered in 68 % of blooms and in Finland 44 % (Codd and al ., on 1989; Sivonen and al ., on 1990).

So, we justify our interest concerned the study of the blooms of Cyanobacteria by:

· The important production of toxin; what generates a new subject of sanitary concern , as well for the man as for the animals of breedings or wild.

· The fact that, the appearance of these blooms is at the origin of problems of treatment (in cost and in efficiency) and of olfactive nuisance at the level of the installations of potabilisation some water, difficult to resolve.

· The fact that they carry damage in the ecological balance dulcicole, and contribute to Eutrophisation accelerated by Lakes. · finally, the contribution to a better knowledge of these micro-organisms which establish a source of nitrogen and phosphor important for the perspectives of promising applications in biotechnology.

In this study we settled for objectives:

· The identification and the inventory of the kinds of toxic Cyanobacteria which populate the dam Cheffia.

· The follow-up of the distribution and the seasonal dynamics of the microphone algae listed.

· The evolution of toxic Cyanobacteria according to certain physico-chemical parameters of the water of the dam, which serves for feeding the population with drinking water.

· The identification of one or several Cyanobacteria's kinds as bio-indicator of eutrophisation and of potabilité of the stagnant waters of surface.

II.1. Presentation of the sites of study:

II.1. 1. The Dam of Cheffia:

The dam of Cheffia is situated on the oued Bou Namoussa in 50 km in the South - East of Annaba in Algeria, and the starting of the installations of which dates 1969. The dam built in the entrance of the gorges of Cheffia has a capacity of 170 Km3 and allows to store 140 Km3. The settled volume is 90 Km3. The dam of the cheffia settles annually 95 millions of m3: 61 are reserved for the agriculture, 34 in cities and in industry.

II.1.2. The station of treatment Chaiba:

The transfer of the water of the dam Cheffia towards the station of treatment Chaiba is made through a behaviour of adduction in concrete 50 km that of the dam on the oued Bou Namousa and the debit of water to be treated is 1.000 l/s. Treatments made at the level of the station of treatment are the following ones:

1) - meàdow chloration.
2) - Coagulation.
3) - Settling.
4) - Filtration.
5) - Sterilisation.

II.2. Methods:

II.2.1. Harvest of the samples:

The takings of the samples of water for the identification of Cyanobacteria, as well as the measures and the dosages of the physico-chemical parameters of the water of taking, are realized once a month at the level of the two stations of studies and it, from October, 2000 until September, 2001.

Six sites of taking were held among which four at the level of the dam of Cheffia and two for the station of Chaiba's treatment (1 site upstream before treatment and 1 site downstream after treatment).

The harvest of Cyanophycées consists in filtering 50 liters of raw water by means of a net with plankton of a diameter of 20 µm, where from one takes 100 ml of filtrat that one pays into a glass ombré flask (of 125 ml) sterilized and closed by a hermetic lid. The taking which is not examined within some hours which follow the harvest should be added from 3 to 5 ml of solution of formalin to 35 % for 100 ml of water, this to avoid a proliferation of the alive bodies (Nasri, 1998).

II.2.2. Generic identification:

The generic identification of Cyanobacteria was realized according to a key of determination based on the following morphological criteria (Geitler, 1932; Boufrely, 1985 and Coute, 1995):

· The colour
· The size
· The shape of colonies
· The shape of the trichome
· The presence or not of akinète
· The presence or not of the gas vacuoles

· The presence or not of hétérocyste
· The presence or not of gelatinous girdles as well for the trichômes as for the colonies.
· The colour and the aspect of the gelatinous girdle if it is present.

II.2.3. Determination of the density:

The counting of the populations of Cyanobacteria was made under photonique microscope from a precise volume of a drop of 0,1 ml of a sample beforehand homogenized. The drop being included between blade and small strip one makes a horizontal route on all the length of the small strip; this operation is 5 times repeated by moving sharply on the width of the small strip, about a field of microscope, so that there is no overlapping.

During these 5 horizontal routes all present Cyanobacteria independently of their kinds is counted under the objective x40. (Leitao and al ., 1984; Champiat and Larpent, 1998).

The calculation of the average of the monthly and global densities was made according to the following formulae:

· **Average of the monthly densities:**

A.M. D. = x. 103 / 50 (Pers. / l).

X: average of the number of the individuals in the five (05) small strips Of every sample.

· **Average of the global monthly densities:**

A.G.M.D. = D.M.M. (By site) / N

N = Number of sites.

II.2.4. Analysis of the physico-chemical characters of the water:

The measures of the physico-chemical parameters concerned the estimations of the temperature, the pH, dissolved l'O2, the turbidité, the concentration of nitrates and orthophosphates.

The takings of the water of surface were made with glass bottles of 0.5 L and carried during the day in the laboratory of the E.P.E.A. for the measure of the parameters.

II.2.5. Used statistical parameters:

one used the Minitab software for Windows (Minitab Release 12.21) for the

III-Results and interpretation:

III-1-identification generic of the toxic Cyanobacteria in both sites of study:

After observation in the photonique microscope of the taken samples, we were able to identify (according to the key of determination of Geitler, 1932; Bourrely, 1985 and Coute, 1995), six Cyanobacteria's kinds potentially toxic, on the 40 Kinds potentially toxic listed worldwide according to Bourrely, 1985; the identified Kinds were present in periods different from the year in the six sites of studies chosen (Table 1).

- The Kind Microcystis And Synechocystis is of cellular shape and appear in colonies. One counts approximately 5000 cells by Microcystis's colony, and 20 cells by colony of Synechocystis.

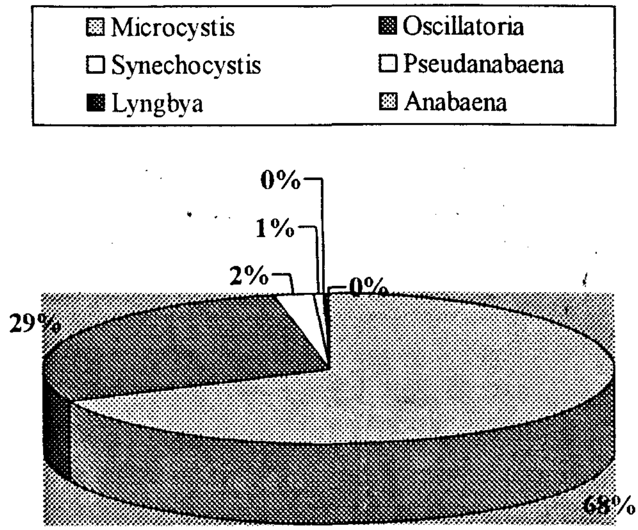
- Oscillatoria, Pseudanabaena, Lyngbya and Anabaena is of filamentous forms or trichomes.

Table 1: Monthly generic Distribution of Cyanobacteria potentially toxic at the level of the dam Cheffia and of the station of Chaiba's treatment during period from December, 1999 till November, 2000.

Month	Dam of Cheffia	station of Chaiba.'s treatment	
		upstream (pond of settlin)	Downstream (after treatment).
	Forms in colonies (in fat) filamentous forms or trichomes	Form in colonies (in fat) filamentous forms or trichomes	Forms in colonies (in fat) filamentous forms or trichomes
Décember	Oscillatoria	Oscillatoria	-
January	-	-	-
February	-	-	-
March	Microcystis Oscillatoria Pseudanabaena Lyngbya	Oscillatoria Pseudanabaena Lyngbya	-
April	Microcystis Oscillatoria Pseudanabaena Lyngbya Anabaena	Microcystis Oscillatoria Pseudanabaena	-
May	Microcystis Oscillatoria Pseudanabaena Lyngbya Anabaena	Oscillatoria Pseudanabaena Lyngbya	-

June	**Microcystis** **Synechocystis** Oscillatoria Pseudanabaena Lyngbya	**Synechocystis** Oscillatoria Pseudanabaena	-
July	**Microcystis** **Synechocystis** Oscillatoria Pseudanabaena Lyngbya	**Synechocystis** Oscillatoria Pseudanabaena Lyngbya	**Synechocystis** Oscillatoria
August	**Microcystis** **Synechocystis** Oscillatoria Pseudanabaena Lyngbya	**Microcystis** **Synechocystis** Oscillatoria Lyngbya	**Synechocystis** Oscillatoria Lyngbya
September	**Microcystis** Oscillatoria	**Microcystis** Oscillatoria	**Microcystis** Oscillatoria
October	**Microcystis** Oscillatoria Pseudanabaena Lyngbya	**Microcystis** Oscillatoria Lyngbya	**Microcystis** Oscillatoria
November	**Microcystis** **Synechocystis** Oscillatoria Pseudanabaena Lyngbya	**Microcystis** **Synechocystis** Oscillatoria Pseudanabaena	**Microcystis** **Synechocystis** Oscillatoria

III. 2. 2. Distribution of the averages of the monthly densities of every kind of Cyanobacteria raisedin the dam Cheffia:



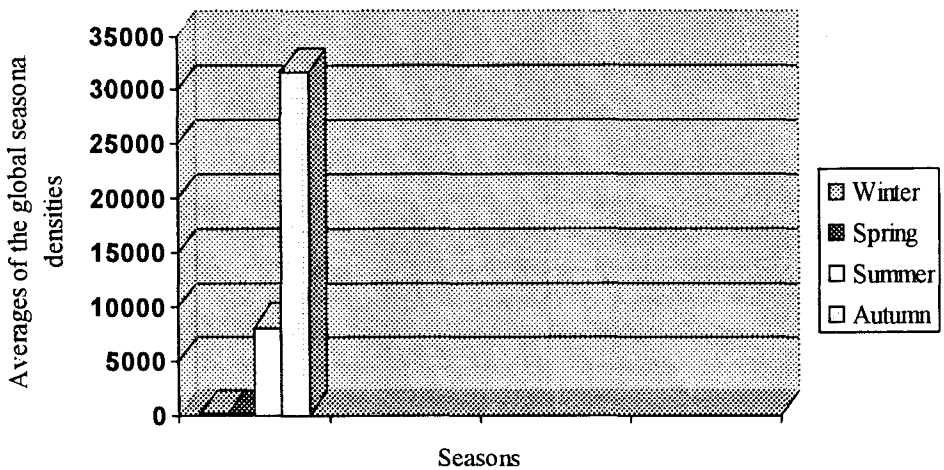
Picture 1: Rate of the main kinds of calculated toxic Cyanobacteria harvested in the dam Cheffia (in December, 1999 in November, 2000).

Through result (Picture 1), one notices that the kind Microcystis and Oscillatoria is dominant. They represent respectively 68 and 29 % of all the kinds composing Cyanobacteria's populating of the dam Cheffia. The four kinds which stay or: Synechocystis, Pseudanabaena, Lyngbya and Anabaena are present in weak densities, in them four they do not exceed 3 % of the global density of Cyanobacteria harvested in the dam Cheffia.

III. 2. 4. Seasonal generic evolution of the toxic Cyanobacteria in the dam of Cheffia:

The calculation of the averages of the global seasonal densities of the Cyanobacteria in the dam of Cheffia shows that the strongest densities are respectively observed in autumn (31608 Ind. / l) and in summer (7997 Ind. / l). While in winter and in spring, the global seasonal densities are very weak (05 and 08 Ind. / l).

The picture 2, gives us a graphic outline of this distribution.



Picture 2: distribution of the averages of the global seasonal densities of Cyanobacteria at the level of the dam Cheffia

(from December, 1999 till November, 2000).

III.6. Analysis of the Correlation between the monthly fluctuations in the physico-chemical parameters and average of the global monthly densities of toxic Cyanobacteria:

The analysis of the correlation of the monthly fluctuations in these parameters with the averages of the global monthly densities of Cyanobacteria is summarized in the following table:

	Temperature (°c)		pH		oxygen dissolved (mg/l)		Nitrates (mg/l)		Orthophos-Phates (mg/l)		Turbid (NTL	
	r	P	r	P	r	r	P	P	r	P	r	
A.G.M.D. (Ind. / l) .	0.485	0.110	0.313	0 ,322	-0.533	0.074	0.775	0,003	0.802	0,002	0.974	0

Table 2: relative Correlations between some physico-chemical parameters and averages of the global monthly densities of toxic Cyanobacteria of the dam Cheffia (in December, 1999 - November, 2000).

r = coefficient of correlation.
P = threshold of probability.

Through the table 2, The turbidité in him(it,her) the highest coefficient of correlation (0.94), followed respectively by orthophosphates (0.802), nitrates (0.775), oxygen dissolved with (-0.533), the temperature (0.485), and finally the pH (0.31). So, the months during which we observe a growth of toxic Cyanobacteria, whether it is in kinds or in density, coincide with the summer season and the autumn. While the other seasons (winter and spring) present densities relatively lesser but not unimportant. What underlines their faculties of adaptation.

III.7. Evaluation of the efficiency of the treatment of waters on toxic Cyanobacteria, at the level of the station of treatment Chaiba:

To estimate the efficiency of the treatments of waters at the level of Chaiba's station, we compared the averages of the monthly densities of total toxic Cyanobacteria calculated, before and after treatment.

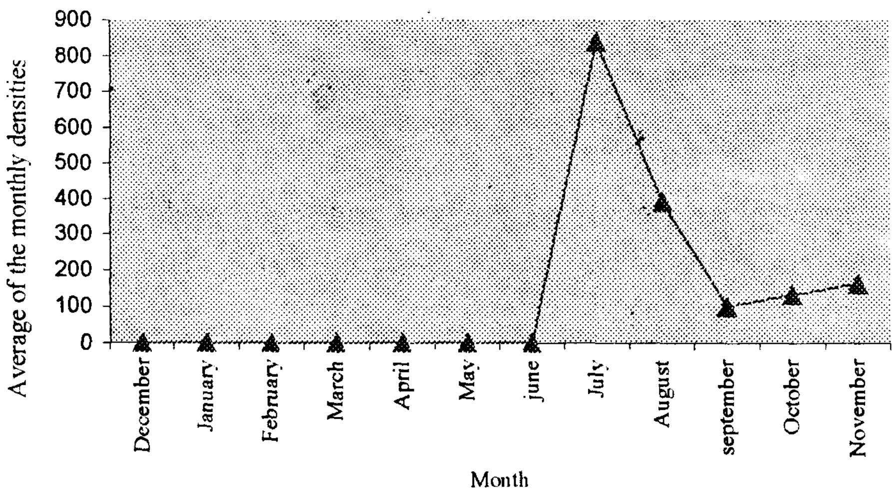
The table 3, concerning the generic analysis of samples taken monthly did not reveal the presence of toxic Cyanobacteria for period from December, 1999 till June, 2000. On the other hand, from July, until November, we determined relative densities of toxic Cyanobacteria, essentially the kinds Microcystis and Oscillatoria. These densities seem to evolve proportionally in those determined to the same periods and they before treatment.

The explanation of this result can be of, the treatment not to be effective any more beyond a toxic density of Cyanobacteria, do not superior to 100 individuals by liter. The figure 3, gives us a graphic outline onto this distribution. While the table 3 puts in evidence the highly significant effect of

At present, new methods and new instruments of purge are tested more effective and are available on walking.

Table 3: average of the monthly densities of toxic Cyanobacteria before and after treatment at the level of the station of treatment Chaiba. (From December, 1999 till November, 2001).

Month	Station of treatment Chaiba	
	Site 5 (before treatment)	Site 6 (after treatment)
	Averages monthly densities (Number of individual / liter)	Averages monthly densities (Number of individual / liter)
December	8	0
January	0	0
February	0	0
March	12	0
April	32	0
May	32	0
June	96	0
July	2480	840
August	932	392
September	1084	100
October	1812	132
November	1736	164



Picture 3: graphic representation of the average of the monthly densities of toxic Cyanobacteria after treatment at the level of the station of treatment Chaiba (from December, 1999 till November, 2001).

IV. Discussion:

Cyanophycées groups together approximately 120 kinds and more than 1500 sorts of Cyanobacteria, but only 22 kinds including 40 sorts are at the origin of toxic rashes. The most studied cyanotoxins is neurotoxins which act on the nervous system, paralyzing the respiratory muscles and hépatotoxines (microcystins and nodularins) which damage the liver where the blood accumulates there. (Brock, 1973; Bourrelly, 1991; Thebault and Lesne, 1995; Carmichael, 1997; Vezie and al ., 1998).

The proliferations of toxic Cyanobacteria are not a new phenomenon. According to Hennion (1999), the first reliable report of a proliferation of toxic Cyanobacteria dates the twelfth century and when one imputes them the death of numerous animals, cattle notably. However, numerous researchers (Repavich and al ., 1990; Thebault and Lesne, 1995, Vezie and al .,1997) Underline, that it does not there take place to be too alarmist, because through the results of their works they agree to consider that 40 % of the proliferations of blooms to Cyanobacteria in fresh water present no danger. This liking of the fact, that the considered blooms contains no toxic sort.

Nevertheless, Mc barron and May, 1966; Hammer, 1968; Lindholm and al ., 1989; Sivonen, 1990; Lawton and Codd, 1991; Phillips and al .,1991, recommend a particular surveillance and a treatment suited at the level of the stations of treatments, especially if the analysis of the flowers of water (blooms) reveals the presence of toxic Cyanobacteria. So, the samples of blooms should be analyzed in a laboratory before an area of fresh water is declared fit for consumption. It goes from the health of the consumers there but also the fauna dulcicole.

Through the exits on ground to take the samples of blooms whether it is at the level of the dam Cheffia or of the station of Chaiba's treatment, we raised(found) from display device that roam them, the wind and the rain scatter cells in the water, decreasing the area of blooms.

The results obtained at the level of the dam Cheffia allowed us to put in evidence:

· The presence of blooms toxins and it for the first time. These being blooms, rashes containing toxic Cyanobacteria.

· The kind Microcystis and Oscillatoria represents the quasi-totality of toxic Cyanobacteria.

· The frequency of blooms toxins (neurotoxins and hépatotoxins) relatively raised in autumn and to a lesser degree in summer.

· The presence of toxic Cyanobacteria in blooms harvested in the dam Cheffia, is correlated:

- In the seasons summer and especially of autumn (which register the highest densities).
- In a moderate temperature (15-30°C).
- In a reduced transparency of the water (strong turbidité).
- In a relative decrease of the dissolved oxygen.
- In a rise of nitrates and orthophosphates.

The parameters enumerated above thus seem to be favorable to the appearance of rashes (blooms) where one note the proliferation of toxic Cyanobacteria.

Our results show that Cyanobacteria proliferates in the seasons summer and autumn in the dam Cheffia. However one raises an absence of toxic Cyanobacteria for December, January and February which one can explained only by unfavourable environmental conditions.

These results suit to those found by numerous authors, notably Carmichael, 1992 and Adam, 2000; who notice that in waters of surface of the moderate countries, cyanophycées is practically absent in winter (they cross the winter in sediments), but know about the warm periods of the developments being able to be explosive. So, Codd and al .,1989; Sivonen and al. 1990 Annonyme 1995 has. Explain that if the blue algae reach densities raised, in surface it is thanks to the admixture of waters which make go back up nutrients accumulated at the bottom which get back to the superior coats.

So, we consider that the generic progress of Cyanobacteria, depend on the capacity of every kind to adapt itself to the various environmental conditions. What explains the differences which can apparaîtrent in the Cyanobacteria's temporal dynamics under various latitudes and regions of the world.

Our observations allowed us as well to notice that the kinds, Microcystis and Oscillatoria is the most adapted to develop mainly in conditions where they are favored with regard to the other micro-organisms. Besides, Pinckney and al ., 1997 estimate, that Cyanobacteria which are the most spread during months summer, should have a big contribution to the enrichment of the biomass of the phytoplankton.

Our results revèlent that the growth of Cyanophycées is favored by a high temperature of the water, the period of sunshine, a quiet time, a high pH and a percentage of saturation in oxygen; the abundance of minerals and phosphor in the environment seems to favor their growth. The authors Maggie, 1982; Joset, 1983; Skulberg and al ., 1984; Paerl, 1988; Arrignon, 1991; Sivonen and al ., 1995; Thebault and Lesne, 1995; Codd and al ., 1997; Paerl, 1997; Sellner, 1997; Wasmund, 1997; Champiat and al ., 1998 and Hennion, 1999; notice that Cyanobacteria is characterized by a massive growth in a water with temperature included among 15°C and 30°C, in the basic pH (between 8 and 11), having a weak depth and especially containing important concentrations in nitrates (3.805 mg / l) and orthophosphates (optimal rate of 0.0124 mg / l).

The presence of these last nutriments with strong concentrations in waters of surface can be explained only by an unverifiable draining resulting from urban and agricultural activities.

As regards the decline of the concentration of the oxygen dissolved in the water of the dam and which corresponds to the periods of proliferation of toxic Cyanobacteria, the explanation can be due to the fact that during the day the mass phytoplanctonique blue thanks to the photosynthesis, the product of advantage of oxygen which it consumes for its own breath, during the night on the other hand, this phytoplankton consumes the oxygen without producing it by the photosynthesis which is in the stop during the night.

The flotation of Cyanobacteria on the surface of the water is explained according to (Klemer, 1990; Annonyme, 1995a; Annonyme, 1995b) by the fact that Cyanobacteria should evolve so as to control their buoyancy, which, allows them to move towards the optimal place in search of nourishing elements and of the light. Indeed, these authors consider that the factors the most important for the survival but also for the proliferation of Cyanobacteria are the light and the presence of the nitrogen and the phosphor. Also, than they point out, that the availability of elements trophiques quickly varies according to the moment of day, the seasons, climates and admixture of the water. What could explain Cyanobacteria's cyclic appearance in surface alternating with a period when on the contrary they would be allowed adsorber by the bottom in the form of sediment.

On the determination of the density, we consider that Cyanobacteria's proliferation any kinds confused in the dam could be present in concentrations, even more important. The evaluation of the density by the conventional technique is rather subjective. Indeed, there is only Cyanobacteria which appear to our sight in the form of emergence of blooms floating on the surface of the water, a more important concentration of these cells could be in suspension for various depthes in the water and it, shielded from the glances. What makes, that the estimation of the density will indeed be below the real density of Cyanobacteria present at the level of the dam Cheffia.

An annoying consequence bound to the presence of a strong concentration of Cyanobacteria in surface is to make screen for the penetration of the light in depth. What so represents a factor limiting on one hand, for the alive chlorophyllous beings in depth and on the other hand, a factor limiting for the dependent beings to live on a strong presence of the dissolved oxygen. That is why, we adhere to the conclusions of Annonyme 1995a, which considers toxic Cyanobacteria as being bio indicators of the slow death of a lake.

The threat of potential one poisoning of a whole population is to be afraid of advantage if one considers, besides a high density of Cyanobacteria, that toxin which are generally held in the alive cells, can be freed in the environment during the natural lyse of senesence or following treatments algicides, as the copper sulphate which makes burst cells. In that case, Keijola and al ., 1988; Himberg and al ., 1989 and Lambert and al ., 1996, bring back that cyanotoxines is quite soluble in the water and that most part of them are resistant in the noxious action of the temperature.

At the level of the station of treatment, we revealed the presence of toxic Cyanobacteria in waters having sudden the treatment, what denotes of the ineffectiveness of the used(employed) treatments. If no accident due to toxic Cyanobacteria was revealed until now in this region, it is parce-qu ' no link between the presence of toxic Cyanobacteria and the death of animals was established. A study is necessary to be able to assert that there is correlation between both phenomena. According to Carmichael, 1997, the impact of toxin of toxic Cyanobacteria is enough important for considering these dangerous bodies for the human health, that they develop in lakes, dams or even on the coast of beaches.

So, we consider that the processes of conventional, including treatments floculation, sédimentation, filtration and chloration are not effective for the elimination of the microcystines which are very stable molecules. According to, Himberg and al ., 1989 and Lambert and al ., 1996, the Only one, the filtration on activated charcoal allows the elimination of toxin and the ozonation degrades them by oxidation. However, the same authors hold that of small quantities of microcystines can persist in the activated charcoal.

To close this discussion, we consider that the best means to avoid the poisonings and the inconveniences bound(connected) to the proliferations of the toxic procaryotes is to avoid their forming(training). We propose, notably a reduction of the additions of elements nourishing as nitrates and phosphates in agriculture (waters of streaming pouring in the source of water).

It is necessary to know also that the ozonation degrades free toxin by oxidation and the cuprique treatment kills toxic Cyanobacteria (Lambert and al ., 1996). Without forgetting that the man can also poison himself indirectly by the consumption of fishes and the other products contaminated dulcicoles which is a shape of more insidious but indirect poisoning.

V. Conclusion:

Cyanobacteria is photosynthetic Procaryotes which appear under the shape of isolated cells, in heap or arranged in strands. These micro-organisms populate a big variety of aquatic circles: the common fresh water (rivers, torrents), stagnant waters (ponds, lakes), waste water and littoral waters.

Them growths is favored by certain physico-chemical parameters of the aquatic environment and by particular environmental conditions. Cyanobacteria's profusion (or bloom) are then characterized by visible dense formings(trainings) in him(her,it) and 339; it bare: it is about a colored foam or about a fine oily film which moves on the surface of the water.

The massive development of Cyanobacteria, is a more and more frequent phenomenon worldwide. Several studies led in Europe indicate that 40 in 75 % of blooms possess toxic properties (neurotoxin, hépatotoxins and dermatotoxins).

The appearance of the flowers of water pulls important nuisances. They engender a production of considerable organic matter conferring on the water an unpleasant taste and a smell. They also provoke the sealing of filters along the fields of treatment. What pulls an increase of the cost of the production of drinking water. Furthermore, Cyanobacteria produces of numerous métabolites alarming: toxin which are recognized responsible for poisonings of animals and for confusions to the human populations. Most of the cases of human poisonings and animals of breeding relate to blooms in environment dulçaquicole, rarely in littoral environment.
Cases of morbidity caused by Cyanobacteria's toxin were associated to the consumption of water of public distribution when this water resulted from a superficial resource or had passed in transit by reservoirs with opened sky.

Our study put in evidence the presence of toxic Cyanobacteria as well as upstream and downstream to the dam and even after treatment of waters. The proliferation of these microphone algae is positively correlated in a water the temperature of which is understood between 16 and 30 °C, the pH of which is understood between 8 and 10 and with rather important concentrations in nitrogen and in phosphor, but also with a rather strong luminous intensity and a weak depth. Among Cyanobacteria developing in waters of the dam Cheffia, the most frequent kinds are Microcystis and Oscillatoria.
It is difficult to us at the moment to determine limit values of exhibition to this toxin guaranteeing the safety for the human health (promotion of tumor, effects of the chronic and pointed poisoning). Nevertheless the blooms of toxic Cyanobacteria, because of the production of toxin, establishes a new subject of sanitary concern.

So, efforts for the prevention and the management of this risk should be regularly begun notably in the regions which depend on resources in water of surface fates in the consumption in drinking water, as well as on the sites of bathing.

In perspective, a study which consists in determining the density of toxic Cyanobacteria in surface and to various depthes in the same site of taking could be interesting in realized. Being this in the evident purpose to compare them so as to understand what can modulate these densities according to the depth of the areas of water.

As regards the dosage and the evaluation of the impact of the ingestion of toxin, till the current hour, the only official method stays the " test mouse " (one injects an extract of alga into several mice and one observes the mortality or the reactions of these animals). This averagely reliable, little quantitative expensive test, requires the custom of animals. The chemists who study microcystines finalized methods of extraction to proceed to the analysis either by chromatographie in liquid phase with high pressure, or by the another test based on the property of the microcystines to inhibit phosphatases enzymes.

In perspective of application in biotechnology the results of this work having allowed to determine the factors favorable to the development of Cyanobacteria can serve for finalizing optimal cultural circles. Cyanobacteria is a potential source of production of a big quantity of organic matter susceptible to satisfy the food demand of planctophages, with the aim of a production large-scale halieutique. As well as Cyanobacteria the genome of which is simple can be used as matrix (host of cloning) in the synthesis of essential proteins in the pharmaceutical industry. Allow the reproduction of symbiosis to certain cereal crops the growth of which is strongly bound to the assimilation of the nitrogen. Finally the therapeutic properties of muds thermales are largely due to Cyanophycées's presence.

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