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Physicochemical Characteristics Of The Effluents Of The University Private Clinics Of Kinshasa Treated In Up Flow Anaerobic Sludge Blanket (UASB)

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Abstract – The uses of water at the hospital are very varied: use food, medical, technical and therapeutic;and thus various types of effluents generate. To have a first approach on the current situation of the rejection of the effluents of the CUK, it is necessary to identify the origin of the rejections and to then know the risks which they can generate. The chemical substances used in the hospitals for the activities of care and medical research are generally found in the liquid effluents. This research has like objective to characterize the physicochemical pollution of the effluents of the university private clinics of Kinshasa, to appreciate the intensity of this pollution in order to estimate its impacts on those, in order to carry out a pilot treatment by engine UASB. System UASB pilot set up gave satisfactory results. All the physicochemical parameters of the effluents underwent an improvement in occurrence the DCO which passed from 6250 mg/l to 20 mg/l and the DBO5 of 200 mg/l with 0 mg/l on figure 8. That goes in the same way with the pH, turbidity, dissolved oxygen, them MY, the Nitrate, as well as conductivity. This system in addition to the lowering of organic and mineral pollution, allows the production of the biogas, which in great scale can be used for the power supply of the generating establishment of the effluents.

Keywords – Effluent, Characteristics Physicochemical, *Upflow Anaerobic Sludge Blanket (UASB)*

I. Context

Nowadays, the innovation and the advance of science pass more and more by collaboration between the researchers of various fields of research. The problems of the ones become sometimes the occasions of the others [1]. A regular water consumption is essential to any form of life (beings human, animal, plants).Water is also used for the manufacture of products (industry, agriculture, breeding…) and it is used more and more. After use, most of water is transformed into worn water containing much polluted matter. If it is not treated before evacuation in the natural environment, it will pollute the other sources of natural water, affecting the supply drinking water [2]. In a world where the demand for fresh water increases unceasingly, and where the water resources limited undergo more and more constraints because of overexploitation, of pollution and the climatic changes, it is quite simply unthinkable to neglect opportunities which the improvement of the management of worn water offers. Consequently, the water treatment worn is very significant [3]. The problems of the rejections of effluents of the hospitals and industries become more significant Indeed, these establishments generate large volumes of liquid effluents which contain specific substances (medicamentous residues, reagents chemical, metals, disinfecting, detergent, revealing and fixing radiographic…) and are likely to disseminate pathogenic germs. These effluents are generally evacuated in the urban networks without preliminary treatment, as well as traditional domestic worn water [4].

At present, the establishments of health only are partially mobilized on environmental management. Only, or almost, solid waste is the subject of a management of flow and a follow-up until their destruction. Just like solid waste, the establishments must however control the management of their liquid rejections [5]. The hospital effluents represent a particular source of medicamentous contamination and can present a specific profile of contamination:antibiotics, anti-infectious, iodized and anti-cancer products of contrast. The hospital effluents not being treated on the spot, the pharmaceutical substances are found in worn water of the agglomeration and gain the urban STEP, then finally the surface water [6].

Reference [7], note which the hospital effluents present of the total physicochemical characteristics completely similar to the average of those of urban waste water except for the detergents which present a concentration significantly higher.

The chemical substances used in the hospitals for the activities of care and medical research are most often found in the liquid effluents. Even if the high volume of worn water generated by these establishments, ensures a significant dilution of the pollutants present, the rejection of these effluents in the network of communal cleansing or the natural environment generates a health risk human, and represents a significant contribution to the general contamination of the environment, and more particularly of the aquatic environments. The contaminants most frequently met are pathogenic micro-organisms, organ halogen metals, radioisotopes, detergents, compounds and residues of drugs [8]. The physicochemical parameters of water (hydrological factors) gather the physical properties and chemical of water. Generally, these properties influence the presence, the absence, abundance, the vital cycle, reproduction etc of the watery organizations. Among these factors, one will retain temperature, the pH, turbidity, oxygen dissolves, carbon dioxide, the ionic composition, the nitrates and ammonium, the phosphate, electric conductivity and the movement of water, the chemical request oxygenates some and the biochemical request oxygenates some as in [8]. The temperature is one of the most significant factors in the growth and the survival of the micro-organisms and was recognized like a significant variable environmental which influences the structure of populations [9]. The temperature supports the development of the bacteria, the parasites, the larvae of mosquitos and other germs microbial. The temperature of water is a parameter of comfort for the uses. It causes the dissociation of some elements such as Lead (Pb) and thereafter a deterioration of the chemical and bacteriological quality of water. This one naturally plays a significant role in the solubility of salts and especially gases, on the conductivity and in the determination of the pH [10]. PH weak rock (acid water) increase in particular the risk of presence of metals in a more toxic ionic form. PH high increase the ammonia concentrations, poisons for the fish [11].

Of then its construction, the private clinics had a unit system of evacuation very within sewer with three site of divorcement in the natural environment (rivers Funa and Kemi). This system is for the defective moment as well the bad management of the installation as of anarchistic constructions and the effluents are rejected without preliminary treatment. The sewers which evacuated technical water and valves are except use. A separatist system was founded with the installation of three septic tanks which contain technical water and valves of certain services. In spite of the presence of these pits which are besides in a state of very advanced decay, this water is badly contained. Only rain water continues to be evacuated through the old sewer, like those of some services of hospitalization. An effluent in charge of the chemical substances, organic, mineral manners and pathological germs antibio-resistants . This rejection is at the base of environmental pollution and the medical risks of the human ones. The rivers have a natural capacity of purification. But this capacity causes to consume the oxygen of the river and is not without consequences on the watery flora and fauna. When the importance of the rejection exceeds the capacity of self-purification of the river, the deterioration of the environment can be durable. The private oxygen zones by pollution result in the death of fauna and the flora or create insuperable barriers preventing the migration of fish in particular. The excessive presence of phosphates supports the phenomenon of eutrophication, i.e. the proliferation of algae which harm watery fauna, can make the bathe dangerous and disturb the production of drinking water. This research has like objective to characterize the physicochemical pollution of the effluents of the private clinics, to appreciate the intensity of this pollution in order to estimate its impacts on those.

II. Material And Methods

2.1 Material

The material of this study consists of hospital effluents of the University Private clinics of Kinshasa. Its samples homogeneous, representative and were obtained without modifying the physicochemical characteristics of water (dissolved gas, suspended matter, etc). The samples taken in the four sites of rejection put in unit were treated with the laboratory of ecotoxicology and biotechnology of the Department of Sciences of the Environment, Faculty of Science of the University of

Kinshasa by system UASB. Engine UASB out of glass assembled to the Faculty of Polytechnic of the university of Kinshasa had a volume of one liter. It was adjusted with a TSH (HRT) 13 hours by the technique of gravity.

The physicochemical characterization of the effluents took place before and after the treatment by UASB. The analyses took place at the chemical analysis laboratory of the Office Congolais of Control (OCC) apart from some parameters such as temperature, pH, electric conductivity which were taken in situ. The physicochemical parameters below were selected on the basis of assigned aim of the study:the temperature, electric conductivity, turbidity, oxygen dissolves, the pH, the Nitrates (Nitrogen), the DCO, the DBO5, them MY, TDS, SVI.

2.2 Medium of study

The University Private clinics of Kinshasa (CUK) were created by the University Lovanium. University of Kinshasa in 1957, were currently placed under the scientific authority of the Faculty of Medicine but having a clear autonomy of management and dependent, with this intention, directly Board of directors of the University of Lovanium. They have triple mission: the dispensation of the care of high quality, teaching practices medicine as well intended for the students of the Faculty of Medicine as to the pupils of schools of nurses and the other ancillary medical ones, and, finally, that of scientific research.

Built for a capacity of 1.000 beds, they currently lay out 800 beds whose 545 indeed functional divided into ten departments and the occupation of beds varies from 50 à.70%. The duration of hospitalization is of ± 3 days for maternity and ± 17 days in hospitalization. The CUK are classified in the highest level having the row of the tertiary Hospital of last reference for the country.

2.3 Methods

- The temperature, conductivity and pH are the three physicochemical parameters taken in situ using a multi parameter.
- The gravimetric method used to proportion the suspended matter (MY).
- The manometric method was for the proportioning of the Biological Demand for Oxygen (DBO5).
- Mineralisation and voluminal titration were employed to titrate the Chemical Request Oxygenates some (DCO).

III. Results And Discussion

3.1 Results

3.1.1 Macroscopic analyses of the effluents (Colouring of the samples)

Table 1 : Results of the macroscopic analyses of the effluents

Sample	Color	Aspects	Odor
E1	Yellowish	Disorder	Absent
E2	Brownish	Disorder	Present
E3	Brownish	Disorder	Present
E4	Brownish	Disorder	Present
E5	Brownish	Disorder	Present
E6	Water of rock	Clearly	Absent

These samples present three colourings [water of rock after treatment (E6), yellowish (E1) and brownish (E2, E3, E4 and E5)] according to the site of taking away. As for the aspect, it is either clear, or disorder. With regard to the odor, certain sites present some, others not.

The color of the samples differs according to the sites from taking away (Photo1). A color very slightly ochre is declined in various nuances and makes it possible to classify the samples (more clearly with darkest) of site 1 with site 4. The color of the mixed sample corresponds as for it, relatively well with the average color of the samples of all the sites of taking away. After treatment, the color exchange becomes clear.

Sample site 1 (E1) Sample site 2 (E2) Sample site 3 (E3) Sample site 4 (E4) mixed sample (E5) After treatment (E6)

Photograph 1:Various samples

3.1.2 Synthetic analyses of the physicochemical parameters

3.1.2.1 Suspended matter

Table 2.Synthetic representation of the analyses as of MY of the effluents of the University Private clinics of Kinshasa

Sample	MY (mg/l)		$\bar{X}$	S
	June (mg/l)	November (mg/l)		
E1	**478**	**89**	**283,5**	**13,9**
E2	**976**	**575**	**775,5**	**14**
E3	**250**	**150**	**200**	**7**
E4	**332**	**122**	**227**	**10**
E5	**1169**	**250**	**709,5**	**21**
E6	**11**	**25**	**18**	**2,6**
Total	**3216**	**1211**	**2213,5**	**136,7**

This table N 4, all the taken effluents showed average values raised of MY, more characteristic for E2 with a concentration of 775,5 mg/l.it is noted that E5 was charged is 1169 mg/l in June on the other hand E2 in November. As a whole, the effluents of June are charged with MY than those of November.E6 showed only one relatively acceptable low rate by the standard. The standard deviations present measurements of discrepancy between the values obtained after analysis of the parameters.

3.1.2.2 Conductivity, temperature and pH in situ and ex situ

3.1.2.2.1 Physicochemical parameters (conductivities, temperature and pH) in situ and ex situ of June

The results of the analyses of conductivities, temperature and pH in situ and ex situ of June are represented in the following figure :

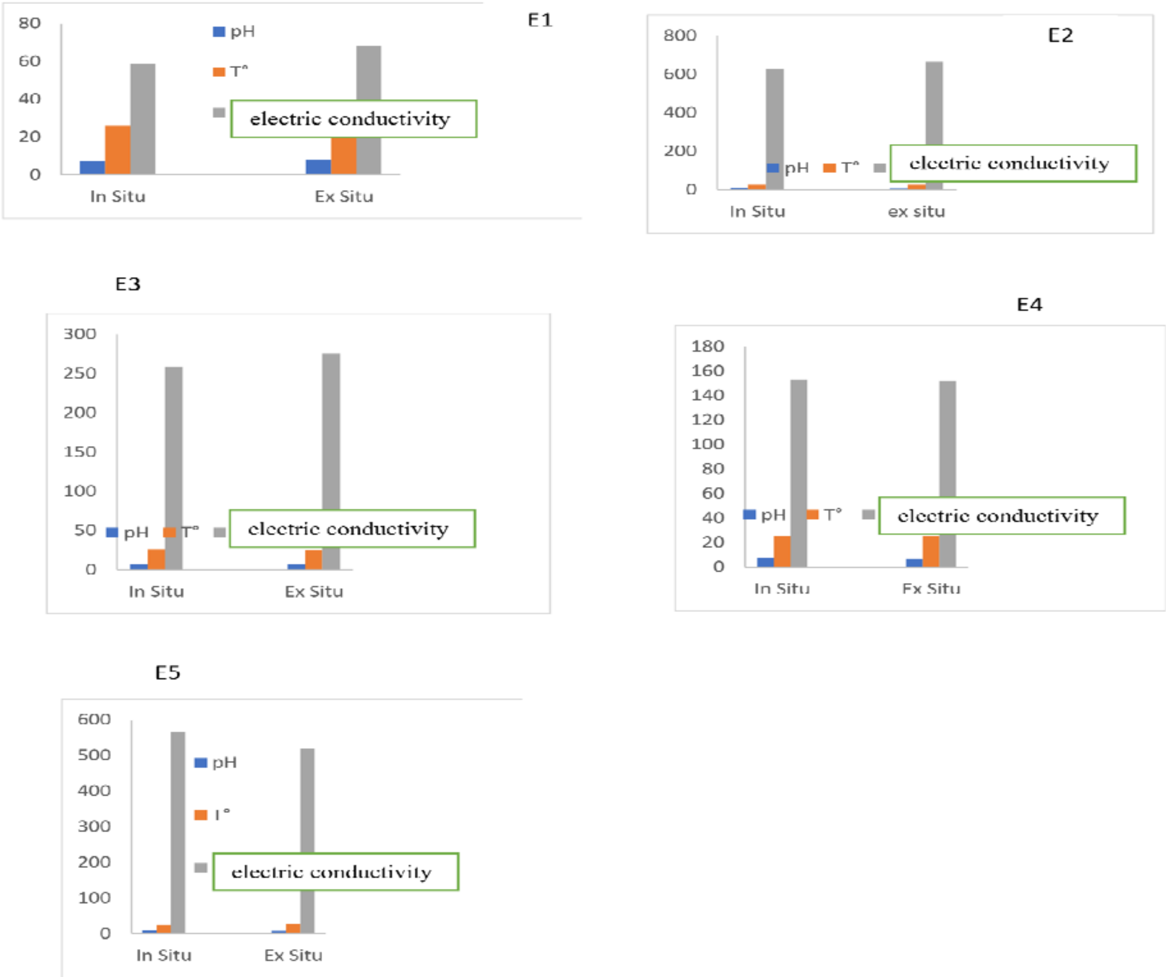

Figure 1: Conductivities, temperature and pH in situ and ex situ of June

For the samples taken in June, the lowest temperature was with 25,2 (E4, *in situ* E5 and E1, E3, E4 *ex situ*) and highest with 27,7C, these temperatures are lower than 30C like preferandum. The pH oscillates in the interval of the standard of rejection (7,1 in E4 *ex situ* and 8,4 in *in situ* E5). Electric conductivity is high on the level of E2 *in situ ex situ* and E5. After the treatment, the effluent lowered its temperature with 22,3C, its pH 8 is basic and conductivity reduced to 51. This testifies to the system effectiveness of treatment installation. In conclusion, all these physicochemical parameters of the effluents meet the standards.

3.1.2.2.2 Physicochemical parameters (conductivities, temperature and pH) in situ and ex situ of November

The results of the analyses of conductivities, temperature and pH in situ and ex situ of November are represented in the following figure:

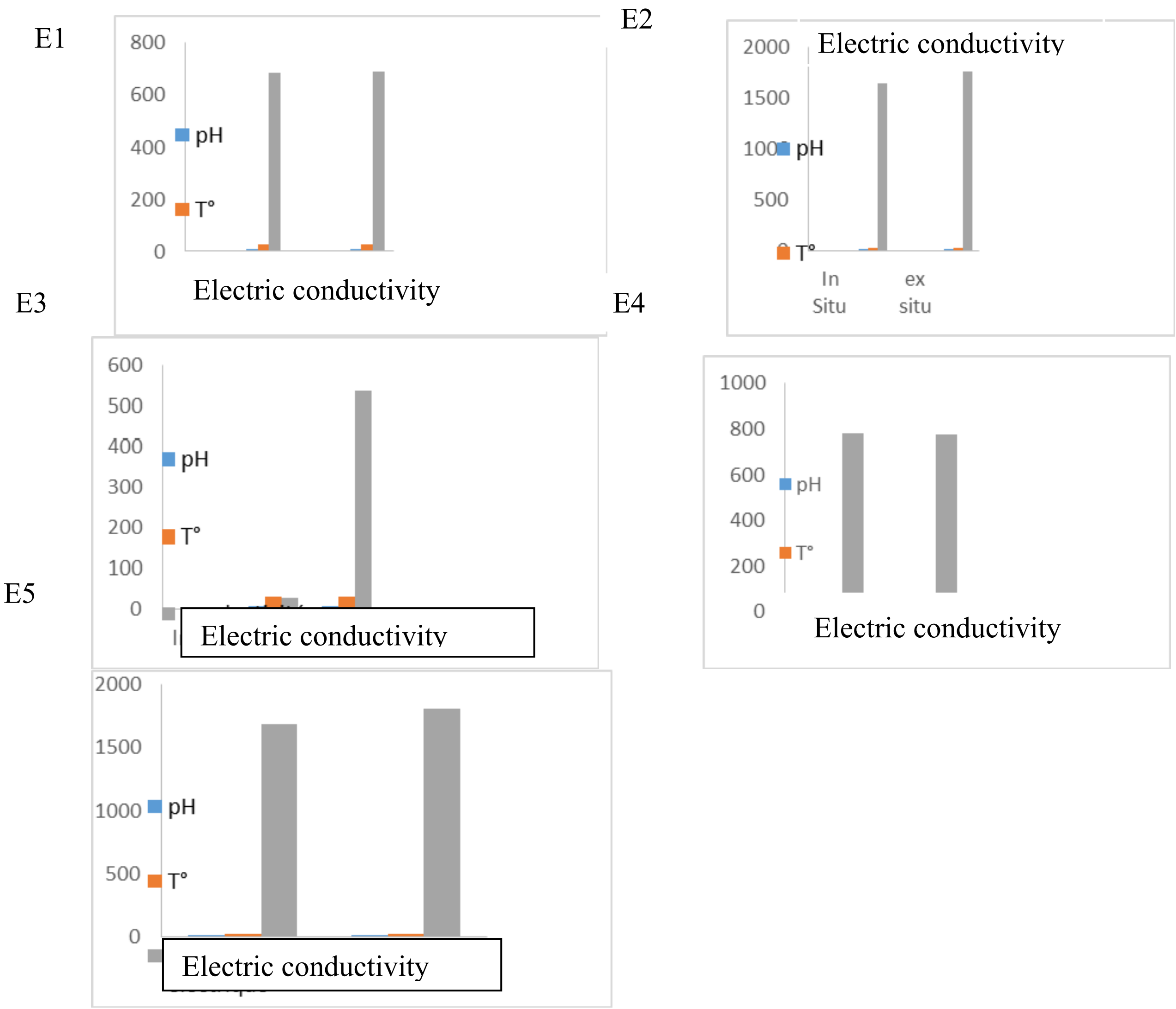

Figure 2: Physicochemical parameters in situ and ex situ of November

It comes out from this figure that, the value of electric conductivity ést appeared very high in November on the other hand the temperature and the pH remained constant.

3.1.2.2.3 Effluents treated in June and November

The results of the analyses of conductivities, temperature and pH of June and November are represented in the figure below:

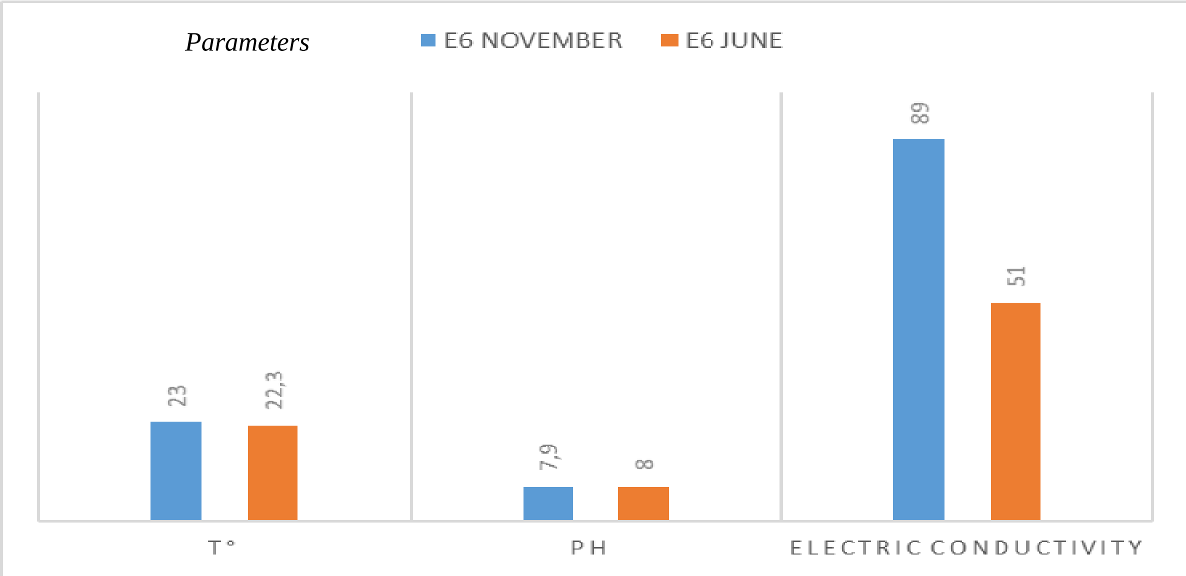

Figure 3 : Physicochemical parameters (conductivities, temperature and pH) of June and November after treatment

The comparison of these three parameters taken in situ and ex situ, the made report is that electric conductivity remains high in November whereas the temperature and the pH have only values close during these two time to taking away.

3.1.2.2.4 Effluents rough (E5 and E6) and treated June

The results of the mixed effluents before and after treatment of June are presented in the figure below:

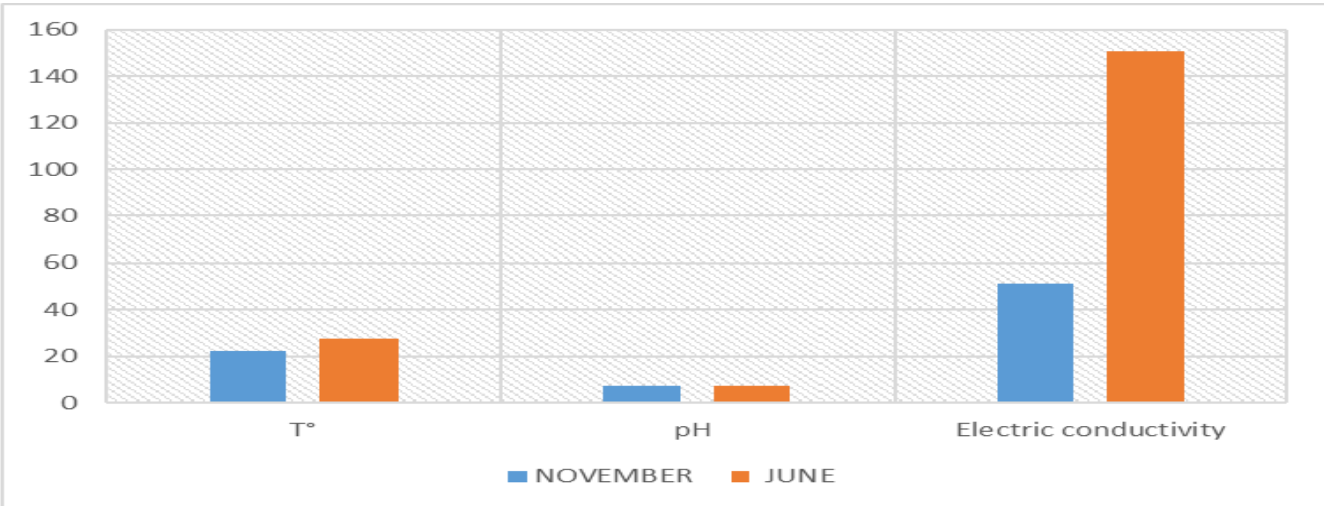

Figure 4 : Parameters of the effluents E5 and E6 June (pH, temperature and conductivities)

In this figure, conductivity and the temperature are higher before the treatment and regress after treatment on the other hand the pH makes the reverse.

3.1.2.2.5 Effluents rough (E5 and E6) and treated November

The results of the mixed effluents before and after treatment of November are presented in the figure below:

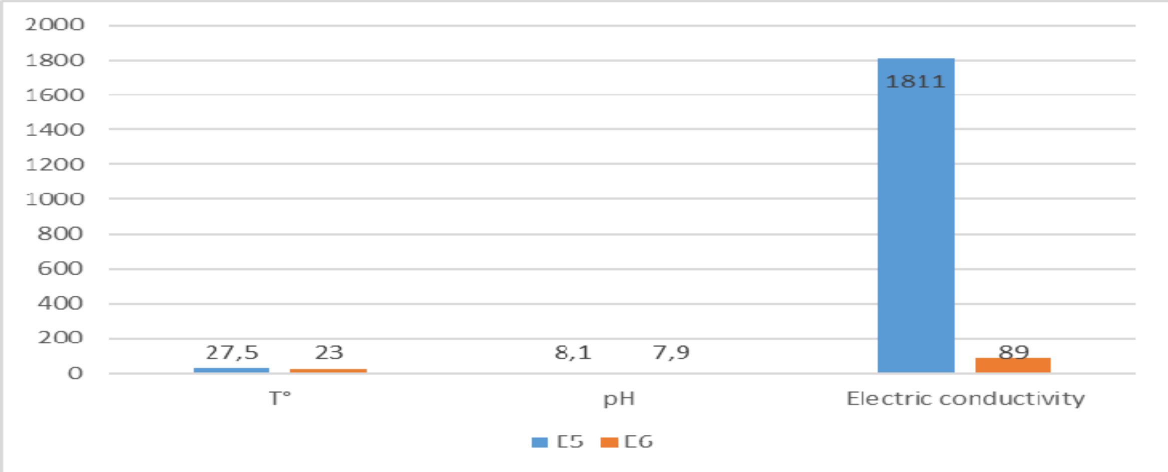

Figure 5 : Parameters of the effluents E5 and E6 November (pH, temperature and conductivities)

With the resulting one from this figure, the three parameters regressed after the passage of the effluent in device UASB.

3.1.2.3 Nitrate

The results of the dissolved Nitrate analyses are represented in the following figure:

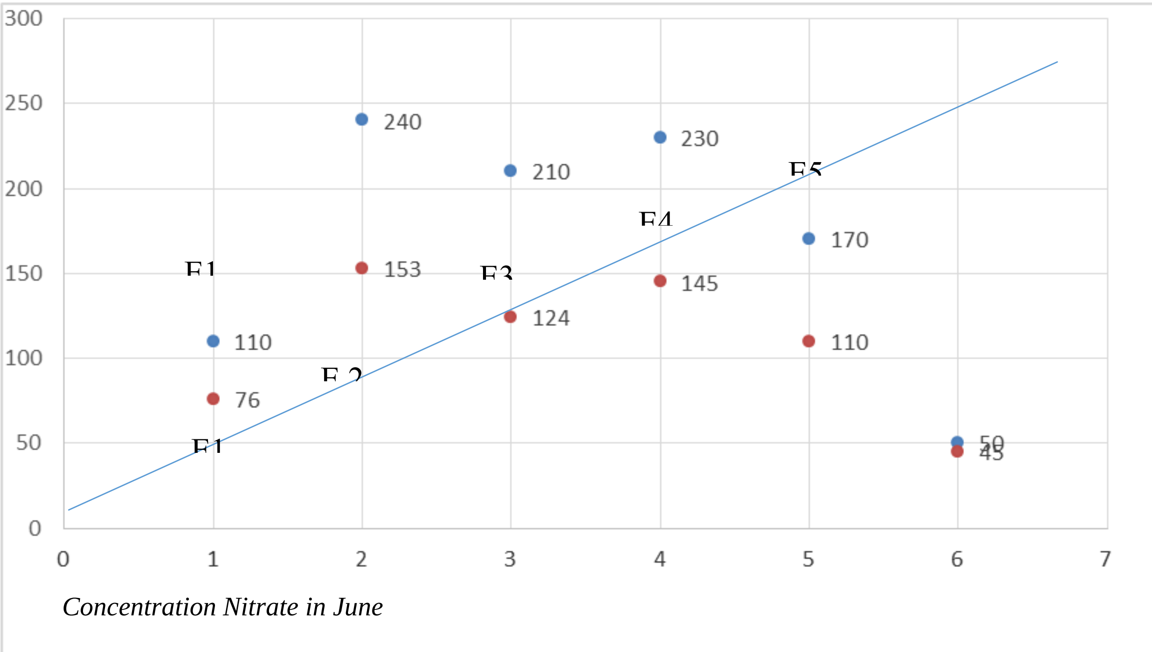

Figure 6 : Distribution of Nitrate of the effluents of the University Private clinics of Kinshasa treated in UASB

The variation of the Nitrate concentration evolves/moves according to sites of taking away. The concentration gradually increases from one site to another and that is located in the interval from 50 to 240 mg/l for 45 and June to 153 mg/l for November.

3.1.2.4 Dissolved oxygen

The analyses of dissolved oxygen gave the results of the figure below:

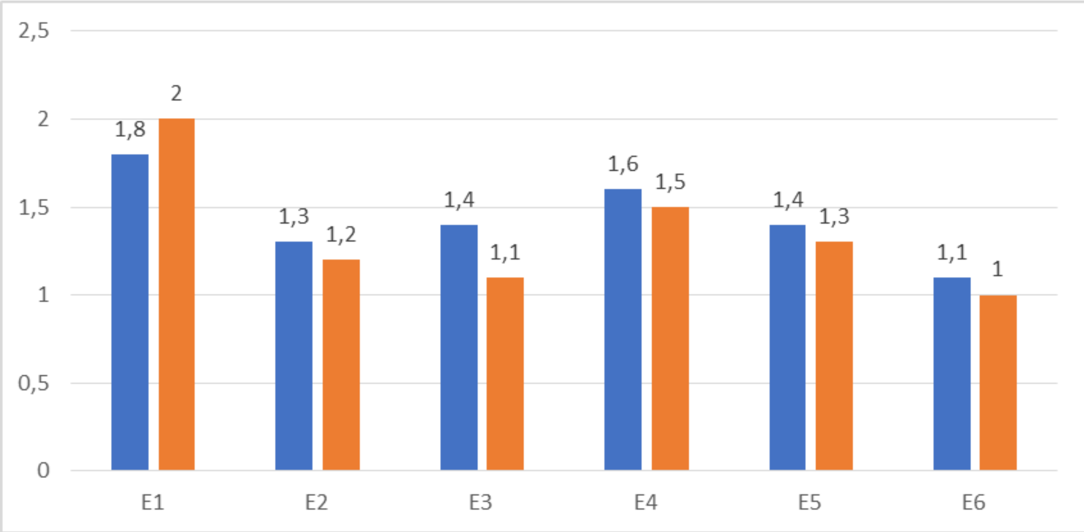

Figure 7 : Distribution of the dissolved oxygen of the effluents of the University Private clinics of Kinshasa after treatment in UASB

The presence of the organic matter in the effluents of the private clinics reduces the oxygen content. This table has the results whose oxygen content turns around 1 to 1,8 mg/l in 1,1 and June to 2,0 mg/l for November.

3.1.2.5 Turbidity

The turbidity of the effluents of the University Private clinics of Kinshasa analyzed gave the results hereafter:

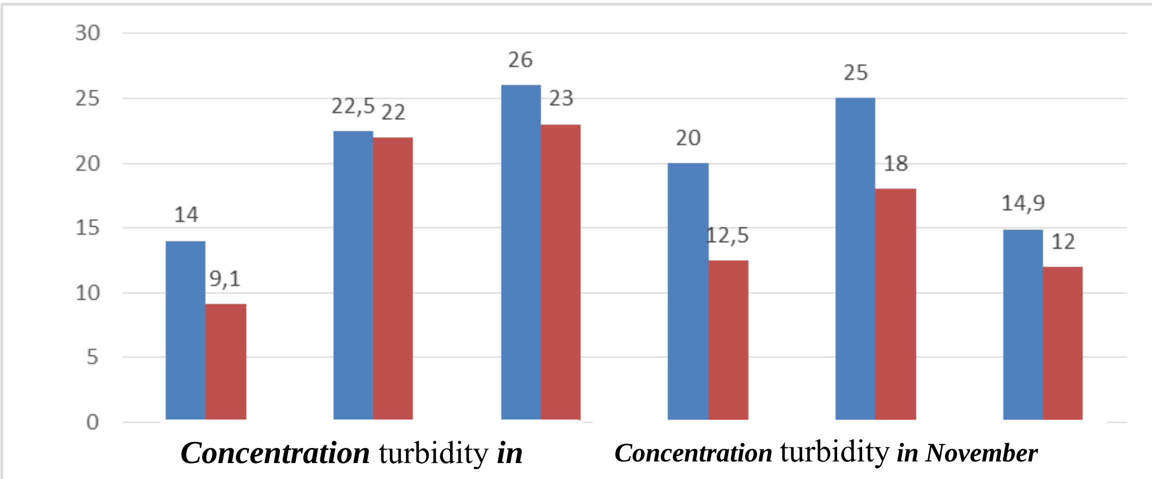

Figure 8 : Distribution of the Turbidity of the effluents of the University Private clinics of Kinshasa treated in UASB

The macroscopic elements causing the disorder of the hospital effluents are various orders. Sands, gravels, algae, mud, biofilm, the biological and chemical elements are quoted among the disconcerting agents. The turbidity of the effluents varies from 14,5 to 25,9 mg/l.

Crossing of values of turbidity and dissolved oxygen June

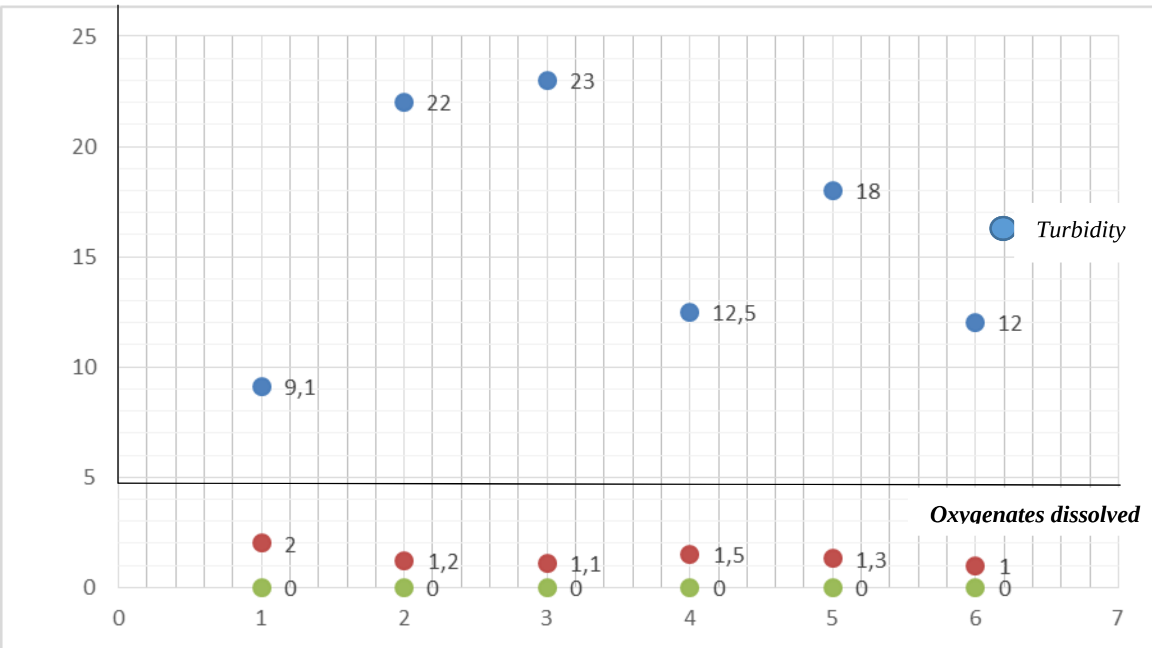

Figure 9:Crossing of values of turbidity and dissolved oxygen June

Crossing of values of turbidity and dissolved oxygen November

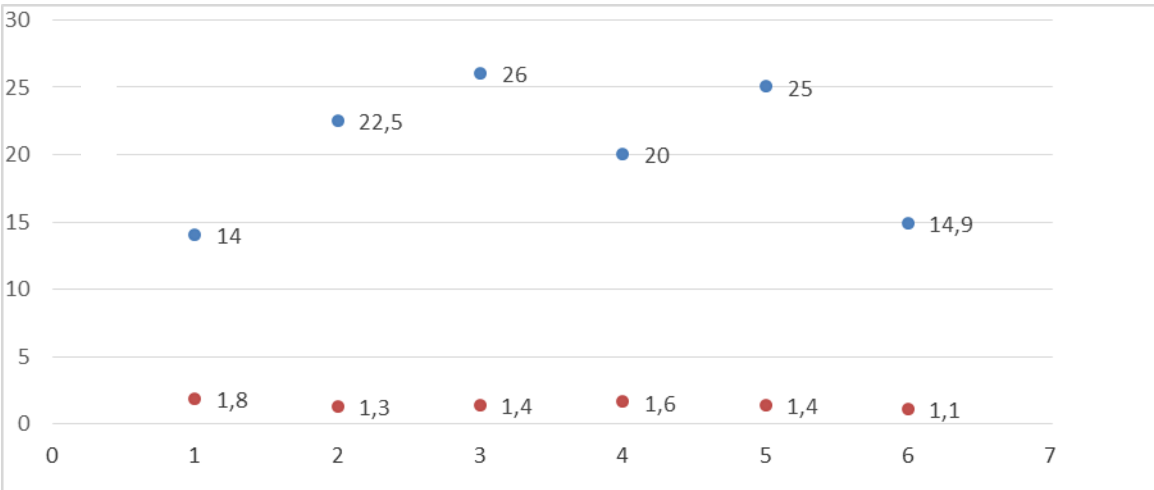

Figure 10:Crossing of values of turbidity and dissolved oxygen November

3.1.2.6 Total of the solids dissous

After analysis of total of the solids dissous, it was obtained the results whose content is represented in the histogram below:

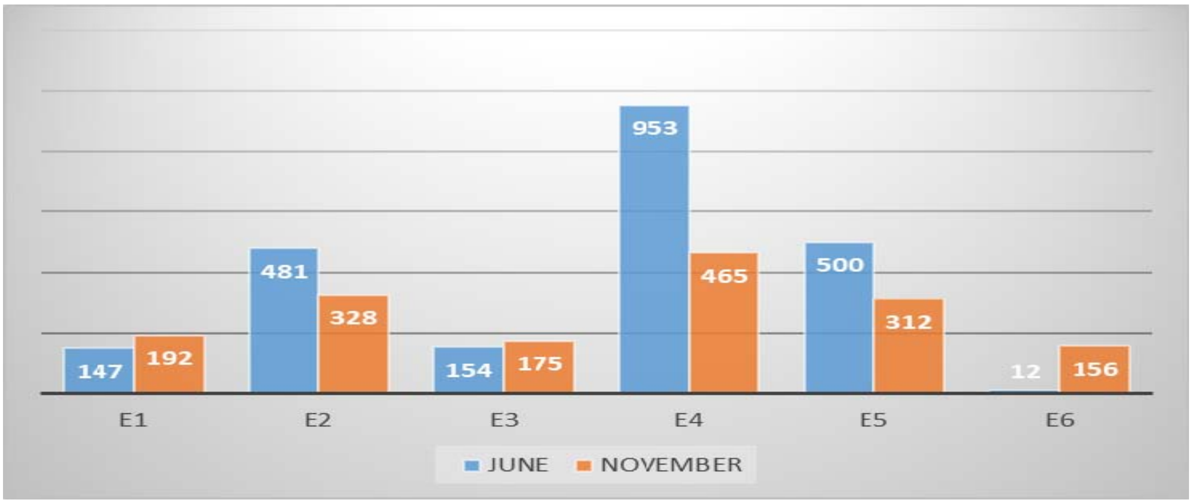

Figure 11: Distribution of the TDS of the effluents of the University Private clinics of Kinshasa treated in UASB

The rate of Total of the Dissous Solids is higher in the sample taken with site 4 with a concentration of 908 mg/l on the other hand the sample after treatment presents a TDS of 12 mg/l. This shows the system effectiveness UASB which folded back the load of the organic matter.

Total of dissolved solids and oxygen dissolved in June

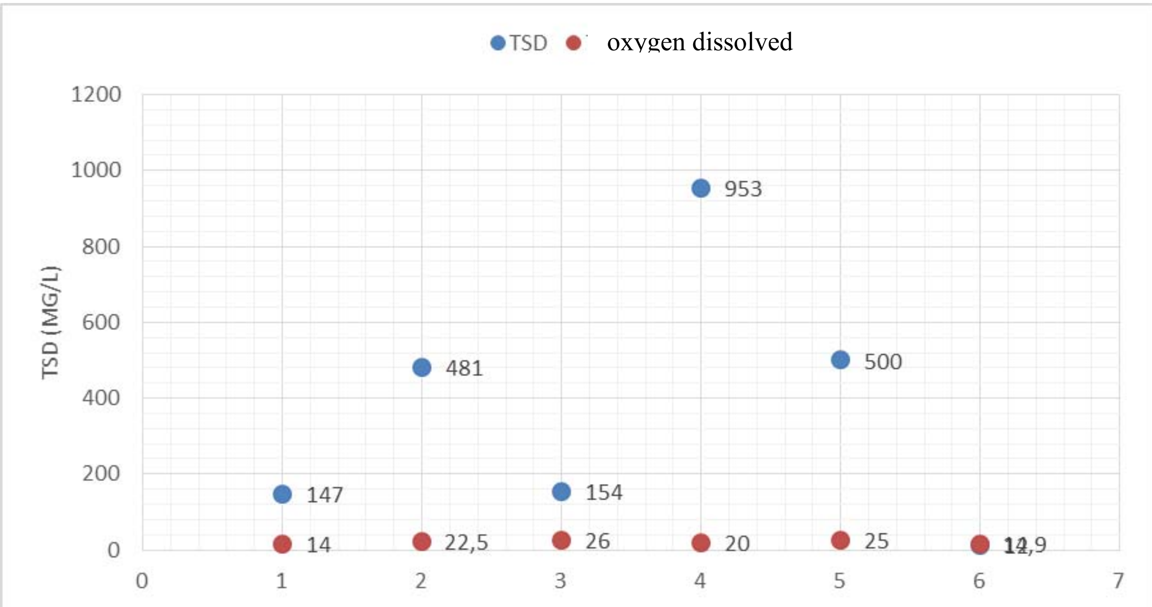

Figure 12 : Total of dissolved solids and oxygen dissolved in June

Total of dissolved solids and oxygen dissolved in November

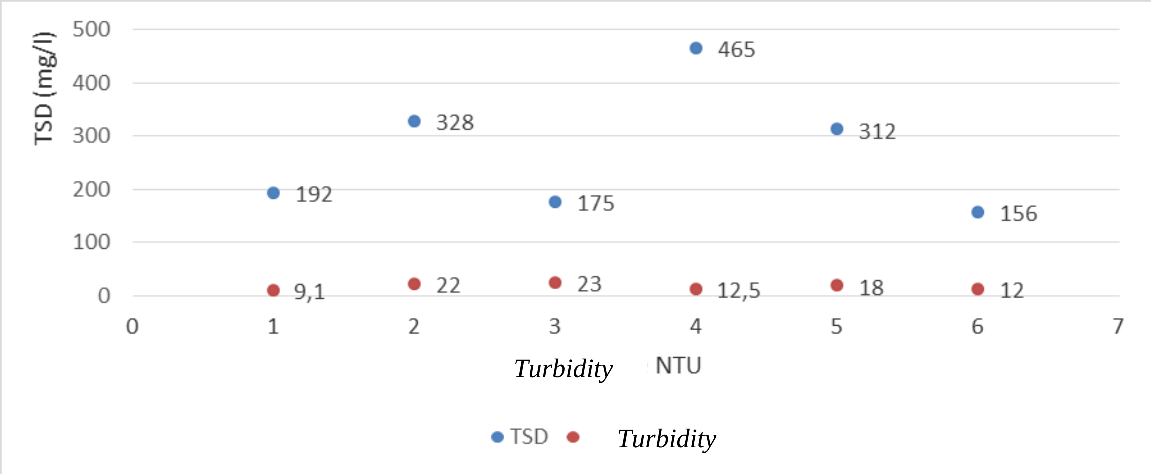

Figure 13:total of dissolved solids and oxygen dissolved in November

3.1.2.7 Chemical demand for Oxygen

Chemical parameter DCO is included in the histogram which follows:

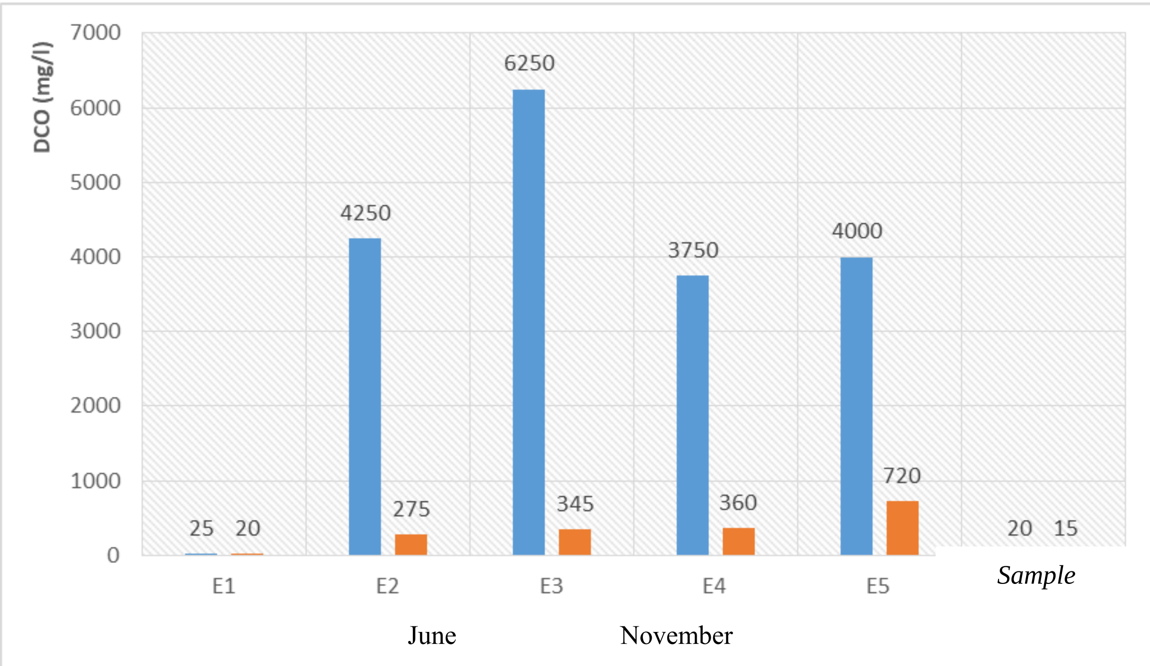

Figure 14: Representation of the DCO of the effluents of the University Private clinics of Kinshasa treated in UASB

An evaluation of the risks on pollution was carried out starting from the chemical demand for oxygen and the concentrations above effects are to be reached in the watery environment are higher than the normal.

The concentrations of the effluents taken in November and June present a peak of DCO at 6250 mg/l. This load was cut down after treatment in UASB of these effluents to reach 20 mg/l.

3.1.2.8 Biochemical demand for Oxygen

The DBO5 of the analyzed effluents are included below in the histogram:

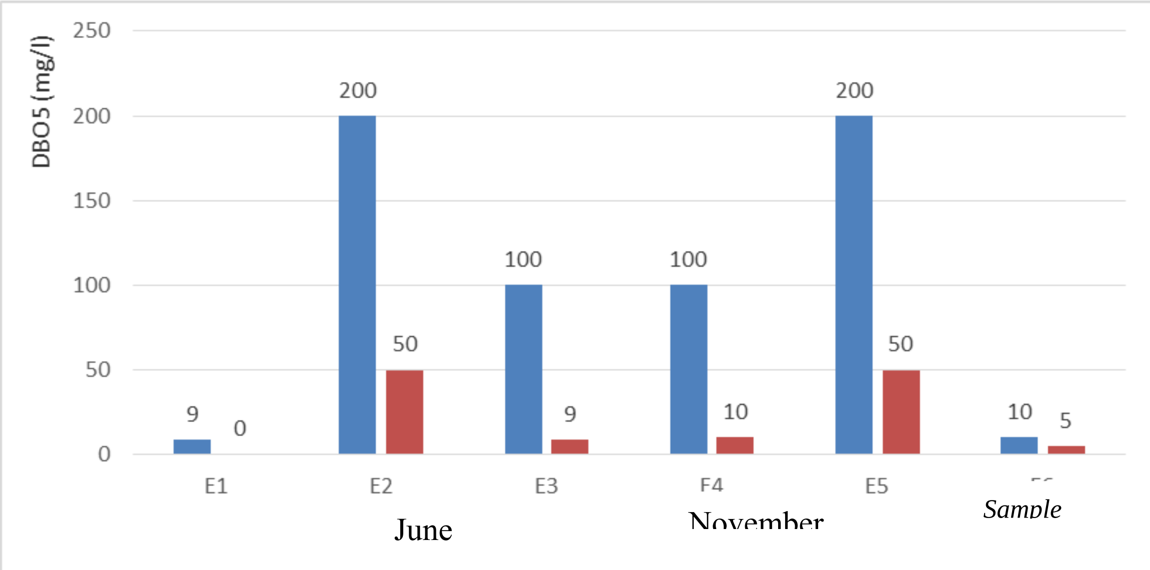

Figure 15 : Distribution of the DBO5 of the effluents of the University Private clinics of Kinshasa treated in UASB

In the effluents of the University Private clinics, the values of the DBO5 grow in a way appearing in the concentrations of June, passing from 9 mg/l DBO to site 1 to 200 mg/l DBO with site 2 and the mixed sample. And of 0 mg/l DBO to site 1 to 50 mg/l DBO with site 2 and mixed in the concentrations of November. Nevertheless, after the mixed waste processing in UASB, DBO becomes with 0 or 5mg/l DBO.

The table which follows gives the syntheses results of the analyses of the effluents of the University Private clinics of Kinshasa before and after treatment.

Table 3 : Physicochemical characteristics of the rough effluents and the effluents treated on the outlet side of die UASB

N	Parameters	June				November			
		Max	**Min**		**S**	**Max**	**Min**		**S**
1	**pH**	**8,4**	**7,1**	**7,75**	**0,8**	**8,8**	**7,2**	**8**	**0,89**
2	**Temperature (C)**	**27,7**	**25,2**	**26,45**	**1,1**	**28**	**23**	**25,5**	**1,58**
3	**Conductivity (μc)**	**664**	**51**	**357,5**	**17,5**	**1811**	**89**	**950**	**29,3**
4	**Nitrate (mg/l)**	**240**	**50**	**145**	**9,74**	**153**	**45**	**99**	**7,3**
5	**Oxygen dissolves (mg/l)**	**2**	**1,1**	**1,55**	**0,67**	**2,1**	**1,1**	**1,6**	**0,7**
6	**Turbidity (mg/l)**	**25,9**	**14,5**	**20,2**	**2,38**	**22,5**	**9,1**	**15,8**	**2,58**
7	**MY (mg/l)**	**1169**	**11**	**590**	**24**	**575**	**25**	**300**	**16,58**
8	**TDS (mg/l)**	**908**	**12**	**460**	**21,16**	**456**	**5**	**230,5**	**15**
9	**DCO (mg/l)**	**6250**	**30**	**3140**	**55,76**	**720**	**20**	**370**	**18,7**
10	**DBO5 (mg/l)**	**200**	**09**	**104,5**	**9,77**	**50**	**0**	**25**	**5**

The rough samples have the high electric conductivity of 1811 μS/cm, a basic pH of 8,8, a temperature of 28C, the content Nitrate varies between 45 to 240 mg/l, saturation out of dissolved oxygen of 2,1 mg/l, the turbidity of 25,9 mg/l, the Suspended matter (MY) of 1169 mg/l, the Total of the Solids Dissous (TDS) of 908 mg/l, the Chemical Demand for Oxygen of

6250 mg/l and the Biochemical Demand for Oxygen of 200 Mg. With the exception of conductivity where all these parameters have sudden the influence of haulage by rain water in November but also of the system effectiveness UASB which A folded back all the values of more than 90% of effectiveness. After treatment UASB, all the parameters meet the standards of the effluents of WHO.

IV. DISCUSSION

The color of the samples differs according to the sites from taking away. These differences in colors (water of rock, yellowish and brownish) could be allotted to the contribution of the differently thrown organic matter from one service with the other constituting the outlets. This difference in color was also noticed by [12], in the hospital effluents with Vaulx-in-Velin (France). On the macroscopic level, these effluents presented either a clear aspect, or disorder, with nauseous odors during the taking away. Reference [13], the rejections of the establishments of care represent a particular situation because of the number of the treated patients, the quantity and the diversity of the drugs used in particular of anti-cancer, anesthetic, antibiotics, the products of diagnosis, contrast or the radioactive products. Device UASB set up made it possible to clear up effluent [14]. The devices of water treatment worn became factories of depollution, compact, covered, deodorized and automated. They implement treatments increasingly powerful, able to eliminate at the same time carbonaceous, nitrogenized and phosphorated pollution.

The pH measured at the laboratory (*ex situ*) correspond relative to those measured on ground (*in situ* with the private clinics). This equivalence shows that there was not a great evolution of the samples of pH between the ground of taking away and the laboratory. They lie between 7,1 and 8,2 and approach the average of the domestic effluents [15]. Reference [16] affirmed that a pH of 7,5 the optimal level with the level with the loops of distribution then decreasing slightly until a pH of 7,0 supplying the engine. That also reduces the caustic soda consumption and ensures a reliable operation at the level of the engine with methane. pH acids of a rock (acid water) increase in particular the risk of presence of metals in a more toxic ionic form.

Electric conductivity (EC) informs about the quantity of dissolved ionic species in the effluents and makes it possible to evaluate their mineralisation [17]. For these samples, conductivity varies between 51ìS / cm E6 and 664µS/cm E2 *ex situ* for June and 89µS/cm E6 to 1811ìS / cm E5 *ex situ* for those of November. It is relatively weak and lower than the average values of rejection of the effluents for the first and higher than the standard for 2nd as shows it work as in [4]. That translated that these samples have an ionic load (mineral and/or organic) as significant as the other samples. These values approach the results as in [12] which had raised between 670 to 1000 µS/cm in the hospital effluents. System UASB proved its effectiveness on these minerals translated in the form of electric conductivity by folding back 1811ìS / cm E5 de November with 51ìS / cm E6 de June. Mineralisation is a function of the micro-organisms which withdraws these minerals the oligoelements necessary for their survival.

The Nitrates come from biological waste, their strong concentrations in the effluents predict a fecal pollution [18]. The Nitrites come from the transformation of the nitrogenized compounds, the matter organic and fecal by *the Nitrosomonas* bacteria and *Nitrobacters* transform Nitrite into Nitrate. One observes a variation of Nitrates of 50mg/l E6 de November with 240mg/l E2 de June. The treated effluent shows a considerable fall of Nitrates because of its use by the micro-organisms and NH_4 formation.

Dissolved oxygen is of considerable importance for the watery organizations. The oxygen content of the samples of the University Private clinics of Kinshasa turns around 1 to 2,1 mg/l. The private oxygen zones by pollution result in the death of fauna and the flora or create insuperable barriers preventing the migration of fish in particular. The rivers have a natural capacity of purification; but this capacity causes to consume the oxygen of the river and is not without consequences on the flora and watery fauna. When the importance of the rejection exceeds the capacity of self-purification of a water, the deterioration of the environment can be durable [19] ; it is the case at the time which there is eutrophication. This factor of dilution cannot be the answer dissimulating the reality of the problems: toxic products for the man and the environment are used and rejected, the hospital should be connected to a station of purification according to its clean constrained [20]. System UASB functions in anaerobe, dissolved oxygen is eliminated by certain optional micro-organisms being in the digester.

In the developed countries, one passed from a bacteriological pollution to an industrial pollution, and today, with a chemical pollution as in [4]. This last installation of new challenges to the medical professions, because it is difficult to evaluate and envisage. A concentration of 1908 mg/l of the E4 sample with a TSD of 12 mg/l obtained sample after treatment (E6) June or from 456 to 5 mg/l, the system effectiveness UASB in the folding back of the organic matter was 98,7% in June and

98,9% in November (the average being of 98,9%). Reason for which a device of purification must be designed to purify worn water and to thus limit the contribution in excess of matter organic and mineral pollutants in the natural environment as in [13].

The mineral compounds in natural water find their origins in the exchanges which occur between water and the atmosphere. On the other hand they come from the metabolism of the components of the watery biomass [21]. The macroscopic elements causing the disorder of the hospital effluents are various orders. Sands, gravels, algae, mud, biofilm, the biological and chemical elements are quoted among the disconcerting agents. The turbidity of the effluents varied between 14,5 to 25,9 mg/l. Reference [13], thanks to progress of the physicochemical analysis, the presence of traces of medicaments substances and their derivatives or metabolites were largely established on a worldwide scale in particular in surface and underground waters, in waste water, muds of the stations of purification used in agricultural spreading and in the grounds.

In addition, the analyses carried out on the DCO (Chemical Demand for Oxygen) and of the DBO5 (Biochemical Demand for Oxygen during 5 days) show rates raised during the time from June contrary to November. [12], stresses that "worn water coming from the hospitals is characterized by a DCO within the limits from 150 to 800 mg/l.

The DBO_5 characterizes an organic pollution of an effluent. The values of the DBO_5 grow in an evolutionary way in each site or sample with the first busy taking away of 0mg/l E6 de November with 200 mg/l DBO_5 of E2 and E5 de June. The high values of the DBO_5 represent a strong proliferation of the organic pollution of these effluents [22]. Nevertheless, after mixed waste processing in UASB, the dropped DBO_5 with 5mg/l. [13], thinks that the rejections of the medical establishments should be easier to prevent and to treat on the site to fold back its polluting load. So the reductions of these parameters by means of treatment by UASB, which gives the satisfactory results, go in the direction of the idea as in [16], who stipulates that the use of a process UASB in a station of purification aims at the reduction of the very high organic loads poured by the hospitals in the sewerage system.

V. Conclusion

System UASB pilot set up gave satisfactory results. All the physicochemical parameters of the effluents underwent an improvement in occurrence the DCO which passed from 6250 mg/l to 20 mg/l and the DBO_5 of 200 mg/l with 0 mg/l on figure 8. That goes in the same way with the pH, turbidity, dissolved oxygen, them MY, the Nitrate, as well as conductivity. The use of a process UASB in the hospital liquid waste processing of the University Private clinics of Kinshasa can reduce very high organic loads poured by the Private clinics. For a biological treatment of worn water, the system (engine UASB) is powerful then that it treats a certain load of pollution and ensures a rejection in conformity with the standards. It is extremely essential owing to the fact that it ensures a good contact between the entering substrate and masses it muds in the system, and maintains a mud mass significant in the system in the form of granules.

System UASB has the advantage compact, of being covered, deodorized, automated. It implements treatments increasingly powerful, able to eliminate at the same time carbonaceous pollution, nitrogen and phosphorus. Our system UASB proved to be effective before even the granulation. This system in addition to the lowering of organic and mineral pollution, allows the production of the biogas, which in great scale can be used for the power supply of the generating establishment of the effluents. And perhaps recommended for the hospital liquid waste processing of Kinshasa.

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