ASSESSMENTOF TOTAL HYDROCARBON LEVELS IN DIFFERENT OIL-POLLUTED AQUATIC REGIONS – COASTAL REGION

V D N Kumar Abbaraju[*], B S A Andrews[1], Sreeram, V[2], Lakshmi B[3],

& Avinash Rai Kola*[1]

[*,1]Departmentof Environmental Science, GITAM Deemed to be University, Visakhapatnam

[1]Departmentof Chemistry, GITAM Deemed to be University, Visakhapatnam

AG & SG Siddhartha Degree Collge of Arts & Science, Dept.of chemistry, Vuyyuru; INDIA, AP

ABSTRACT

The Presence of Total Hydro Carbon(THC) levels in different surface waters, rocks, and minerals, as well as the remains of plants and animals in oil-polluted wetlands situated in various regions of Coastal Andhra Pradesh, INDIA, are considered in this present work. From this work, results demonstrated the elevated THC mean levels in water (19.3 $\pm$ 2.2mg/l), sediment (284.32 $\pm$ 38.32µg/g), Snails (398.12 $\pm$ 45.24µg/g) and Fish (194.31 $\pm$ 28.06486µg/g). These results revealed that the environment is polluted. The values of THC present in the water stream areas were beyond 9.8mg/l. There was a clear-cut seasonal variation observed in dry seasons which is $P < 0.01$ this is mainly due to more activities related to oil. In water levels of total hydrocarbon are enforced substantially as $r = 0.816$ by using levels of total hydrocarbon content in sediment which is also $P < 0.01$. From obtained results, the authors concluded that if the THC is presented continuously in various areas, it impacts many organisms, shown by important correlations noted as $P<0.01$ of total hydrocarbons among different species and surroundings. Maximum levels of THC present in sediments and surface water of these areas suggested that the quality of aquatic life unfavourably influences the activity of biological species.

Keywords:THC, Sediment, dry season, organisms

*Corresponding author
VDNKUMAR ABBARAJU
E-mail:vabbaraj@gitam.edu

Introduction

Among the chemicals that are more appropriate as contaminants, those that have occurred environment, hydrocarbons from petrol are of distinct significance. As per the information from various scientistsper year,6-10 million barrels of crude oilenter into the aquatic

environment[1].Samuel Paul [2] described that the Content of Total hydrocarbons in fresh surface waters,along with sediments of communities in Oyigbo, present Rivers State, is measured by Gas Chromatography equipped with a flame ionization detector (GCFID). Total hydrocarbon content which is obtained by various regions in the surface water is Umuagbai (8.529±1.208 mg/L), Komkom (9.212±1.009 mg/L), Izuoma (6.701±1.670 mg/L), and Egberu (7.034±0.778 mg/L). The obtained results revealed that high strength generally to the sediment sample is noticed commonly in sediments and surface waters in community samples collected from Komkom. The authors recommend that the use of water and even fish consumptionin this river could be limited. The actions of anthropogenic within the study area were fixed.Clinton, H. I.[3]studied various oil-polluted mangrove wetlands containing the levels of total hydrocarbon content present in surface water, sediments, and biotain the mangrove area polluted with the oil. The results revealed that mean levels in the water are 23.6±4.3mg/litre. 10mg/litre is the total hydrocarbon content present in water in wellhead stations. The defective expansion of organisms in marine life may depend onthe quantity and quality of primary production of distinctive microorganisms, including mollusks, crustaceans, fish, and phytoplankton which may acquire neither a rotten smell nor flavour, causing a decrease in marketability as well as acceptance as food[4,5].Resultant effects are changes in the required characteristics of a portable water[6]. Nigeria's most intensive oil examination, exploitation, and cleansing occurs[7].Their nutrition values compare favourably with domestic livestock and fish[8].Some authors conclude that petroleum hydrocarbon is mixed with water and passes to the underlying sediments[9, 10, 11]. The present research provides information about the status of total hydrocarbonson the study area's surface waters, sediments, and biota.

Present Studyarea

The selected areas in this work consist of various mangrove wetlands with a high range of Stream water reaching the nearest river and creeklet that may combinewith thelower coastal region. These creeks were expressed with inflow as very high sea water and fresh water as very low in put by different run offs of waste water from domestic areas, neighboring agricultural lands, and giant forest areas, and intenseexploration of oilandvarious activities ofexploitation.For these total of fiveareas from where the sample has been collected stationsare identified and finalized which is indicated in *Fig.1*.

Figure1. Sampling Region

The first station is an areawhich is chosen and this may not consists of any industrial siteother than fishing done by local people, and periwinkle picking, with different colours. The second station was an area chosen which is acting as a development of the main creek/sin which this work station was located. In and around this large number of farmlands are situated. In these areas, farmers are growing the roots of cassava on mangrove mudflats. The third station is chosen as the crude oil production facility. The fourth station was chosen along a maritime route to large work boats, outboard and in board engine boats. The fifth station was an area chosen that is a more disordered work area in which both oil as well as gas blow out by oil well head. By the observation by the authors in this work area maximum mangrove treesare destroyed. Authors observed that there is an excessive run off of surface water by adjourning both the agricultural lands and regions of the forest.

Materials and Methods

Both the test samples of water and sediments were collected using the process described in the[12]. At the same time,the periwinkle's mean length of 3.5±0.5cm and the mud skippers' mean length of 3.5± 0.5cm are collected according to the method of analysis described in [5,13],respectively.For this work, every sample is collected three times from each station once in two months. Later, the collected sediment samples are subjected to air drying for about ninety-five hours, during which periwinkle and fish samples are subjected to cooling. The cooled pieces were later splashed, and

the shells separated the total obtained tissues of the muscle of the periwinkles. Took apart from the tissues of the muscle. Finally, the samples are dried using aluminium foil by heating at a temperature of 50^{o}C in a time interval of 48 hours to fixed weight.This heat treatment process can preserve the tissue for extended periods and reproduces the mechanism they undergo before the utilization [5].

In this work, the authors used a mortar made with Teflon material tissues that are grounded well. The Sediment samples were mashed and later evaluated by a 1 µm sieve for measurement/assessment of total hydrocarbon. 10.00gm of each of the sieved samplesare later extracted using toluene as 30.00ml. A Stuart flask thoroughly shakes the filtered samples within the time interval of 600 seconds. Extracts obtained are subjected to filtration by a 50.0ml standard flask using toluene. Hydrocarbon from the waste water samples was extracted using 30.00ml of toluene three consecutive times, and finally, it was made up to a 100.00ml standard flask.

With the help of a spectrophotometer, the filtrate absorbances were measured and found at a wavelength of 420nm. The strength is computed by calibration graph using a dry weight basis. Throughout this experiment, accurate blanks are passed through out the work. From the various observations authors are subjected the analysis by using variance, means etc., and the level of significance is maintained in between 94% and 98%.

Results and Discussion

The overall content identified in total hydrocarbon to all is varied in the sampling period together with the places represented in table 1; Figs. 2 and 3. Strengths to overall media is varied as $P<0.05$, thus surface water > mudskipper > sediment > periwinkle, while that of the stations are represented in Fig. 4. The changes occurred due to the various seasons were identified as season with dry conditions are greater to that of wet season represented in the Fig. 5. In the months of this study from June 2001-November 2002 the total levels of THC are higher to that of the value $P<0.01$ in the periwinkle tissues than in the other media results are shown in the Fig. 4. The monthly trend of all the metal levels in all the media are within described months May=Nov > March=Jan > September=July>November which is represented in the Fig.3.

STNsoft hisstudy	**Surface waters(mg/l)**	**Sediments (µg/g)**	**Periwinkle tissues(µg/g)**	**Stripped murrel (µg/g)**	**STNsTOTAL MEAN**
A	3.06 ±0.99^{c}	121.30 ± 16.85^{e}	130.59± 8.26^{c}	119.49 ±13.69^{e}	89.12 ±50.59^{e}
B	5.49 ±2.06^{c}	189.50±14.12^{d}	189.30±26.11^{c}	200.69±29.44^{cd}	149.02 ±89.12^{d}
C	39.76±3.79^{a}	499.10±66.12^{ab}	650.40±19.79^{ab}	392.19 ± 39.42^{a}	399.07 ±149.36^{b}
D	22.16±5.35^{b}	460.11±56.70^{c}	530.09±65.63^{ab}	270.40 ± 52.39^{c}	322.59±100.70^{c}
E	46.17±8.86^{a}	660.41 ±89.21^{a}	612.09±79.40^{ab}	399.55 ± 25.75^{a}	449.36 ±156.39^{a}
TOTAL MEAN	19.3±2.20^{d}	284.32±38.32^{b}	398.12±45.24^{a}	194.31±2806486^{c}	----

Table 1.Total hydrocarbon content mean values of four groups from the study area by Comparison with other related studies

Within column (Stations), total mean (aquatic region), mean ± SEM by various super scripts were permanently quite different as P<0.01
Stations total mean ±SEMbyvarious superscript are permanentlyquite different at P<0.01

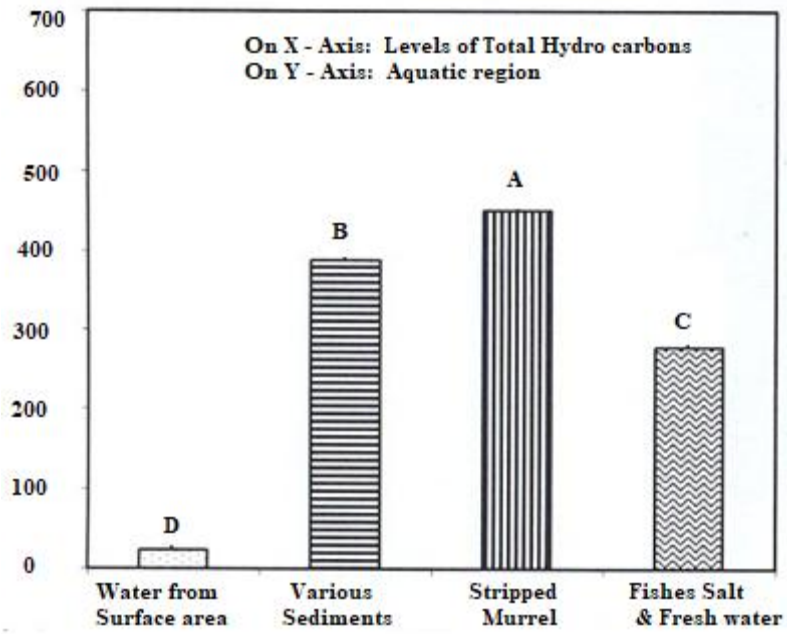

Figure 2. Mean levels of Total hydrocarbons in the surface water is mg/l,
Mean levels of Total hydrocarbons in the Sediment and stripped Murrel, fishesis µg/g,
A,B, C and Dare significantlydifferent(P<0.01)

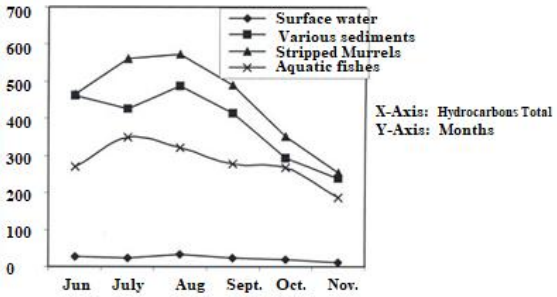

Figure 3. Total hydrocarbons variations as Monthly in the Sediments (µg/g) and surface water (mg/l)stripped Murrels (µg/g)andAquatic fish muscles(µg/g)

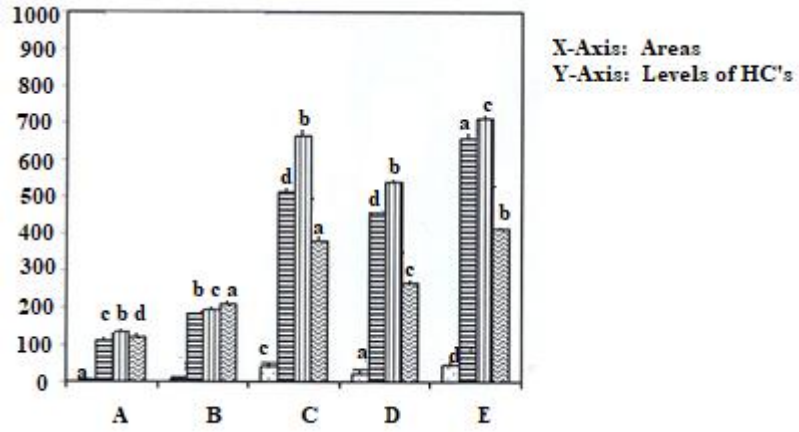

Figure 4. Variation of different areas for Total hydrocarbons inthe surface water (mg/l), Sediment (µg/g), Stripped Murrels (µg/g) and Aquatic fishes(µg/g).

A,B,C,D and Eare significantlydifferent(P<0.01)

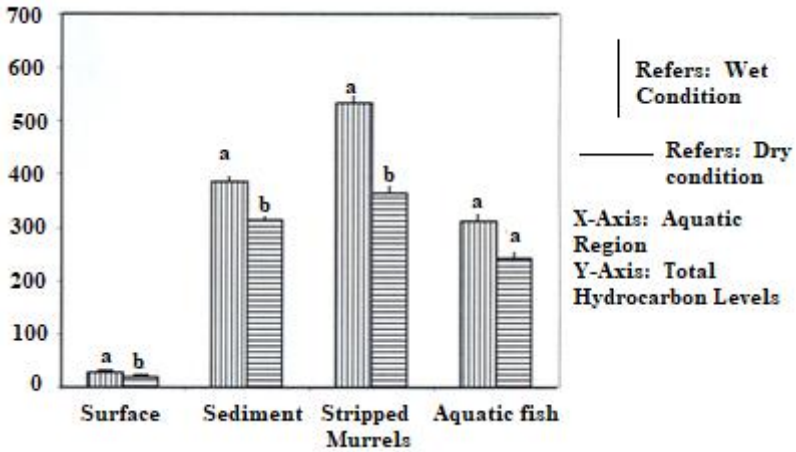

Figure 5. Changes in theSeason for total Hydrocarbons in surface water (mg/l), Sediment (µg/g), stripped Murrells(µg/g) and Aquatic fish (µg/g).

A,B, C and Dare significantlydifferent(P<0.01)

Analysis of linear relationship in the levels of total hydrocarbons among the biota of Stripped Murrels, Aquatic fish and their study area-surface water and Sediment are all significant as $P<0.01_{0.46}$.Various bioaccumulation and factors of correlation are as shown in Table2 .and Fig.6, Fig.7.

Organism	Exposuremedia	K_b	r
Stripped Murrels	Surfacewater	10.71	0.86
Aquatic fish	Surfacewater	6.01	0.82
Stripped Murrels	Sediment	0.09	0.88
Aquatic fish	Sediment	0.50	0.79

Table2. CorrelationcoefficientsandBioaccumulation factorsoftheStripped MurrellsandAquatic fishinsurfacewaterandSediment

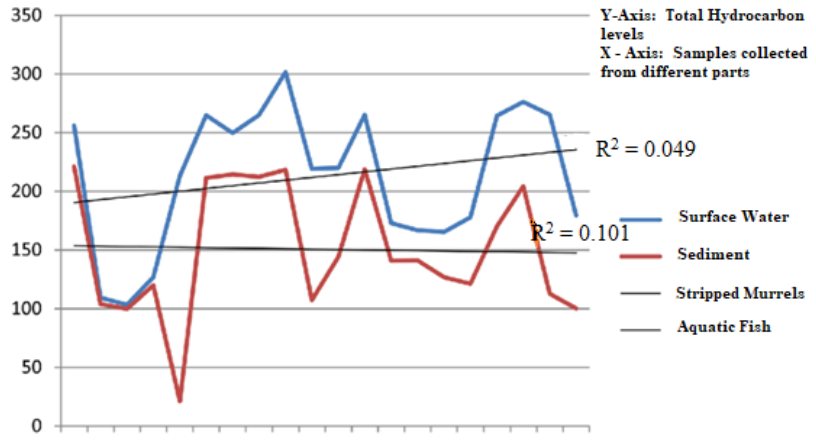

Fig 6: Total Hydrocarbon content of various samples

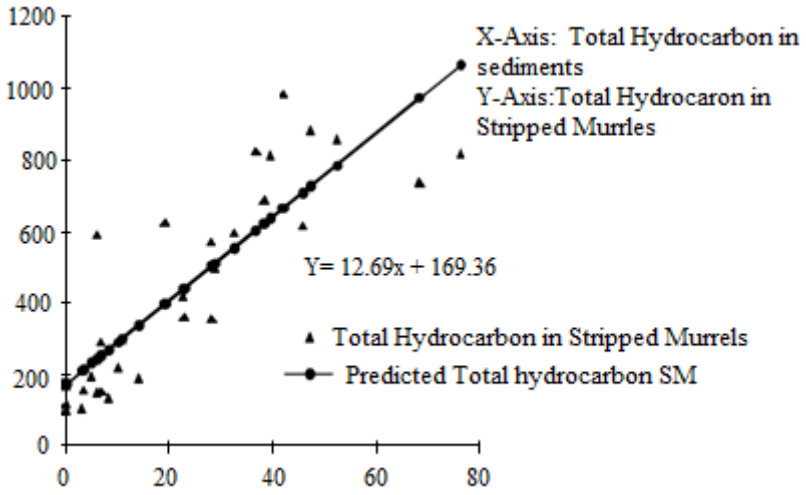

Figure 7. Relationship of the THC levels between the Sediment and Surface water

Conclusion

In general practice, very high levels of total hydrocarbon strengths are identifiedin various regions, consisting of oil than those without oil formations. The contamination level of total hydrocarbon minimizes very significantlyless than to that of 0.01among various regions. In addition to this, various physical, chemical and biological entitles are well known to degradation of petroleum hydrocarbon in the water which may undoubtedly contributes to general decrease in hydrocarbon levels. The levels of total hydrocarbon in dry seasons are more than to that of the rainy season. Finally, the regression analysis reveals that the plants, bacteria and fungi accumulated total hydrocarbon from their surroundings.

From the regression equation authors are concluded that the increase levels of total hydrocarbons in different water bodies consists of 10.2 and 4.9units of total hydrocarbon to stripped Murrells and Aquatic life especially to fishes. By the overtone both organisms though the stripped Murrells are very good accumulators as well as index to different effluents of various pollutants and additional unwanted material in the water bodies.

Latter, the load obtained from the sediment of THC in the observed months as well as locations are consistently high to that of surface water may reveals that it is a very good identity for various pollutants in and around water bodies even though the sources of pollution is separated. The presence of oil which is assessed in sample locations; those may generally gathers the organic matter.

The oiling of mangrove systems may also lead to either decay of leafs loss nor complete damaging of various characteristic true mangroves seedlings in over whelmed regions as it is found in the region E. Due to the high mean surface water along with load of sediment for total hydrocarbon from the different places like C & E concluded that respiration activity, feeding of various organisms are affected very badly. The accountable variation level for THC by seafood is 0.001µg/g. Value in the present areas reveals that area is normally contaminated by petroleumhydrocarbon. The regular devouring of seafood by the suggested area may pose a public health hazard. From the results obtained the selected region by authors denotes that the pattern of variation of THC which is identified in the regions surface water, sediments as well as in aquatic life are anthropogenic origin. The low levels in the reference station A and at least station B suggest that these were the strengths usually present in this area and source of anthropogenic should have added for aquatic life burden of total hydrocarbon content in the environment. As per the authors, non-oil formation regions, maximum levels are noted in rainy season to that of dry season.

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