Innovative: International Multi-disciplinary Journal of Applied Technology
(ISSN 2995-486X) VOLUME 02 ISSUE 09, 2024

Study and Analysis for Some Samples of Petroleum and Gasoline and Determination of Concentration of Heavy Metals in Fields South of Iraq

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Abstract:

The present study curried out on three field in south of Iraq. These field were include Al- Garraf field, Shuaiba field and Al-Rumaila. The samples were 150 samples from different station in fields. The samples 50 from Al-Garraf field, 50 samples from Al-Shuiaba field and 50samples from Al-Rumaila field.

The study include on determination of some chemical and physical properties as measurement the concentration of heavy metals as vanadium, copper and lead. Also include on measurement the other properties as density and quality of gasoline. the results were different level in heavy metals.

The research include study for one derivatives of petroleum and analysis for this derivative of petroleum and study the properties gasoline. then take the sample from many fields in south of Iraq. These fields were Garraf field, Shuaiba field and Rumaila field. the samples divided to groups every field with 50 sample of gasoline. As well as the samples after collected them and take the data that needed in this research explain the different ratios in concentration in some of heavy metals that measured in study.

Keywords: petroleum, gasoline, AAS, heavy metals.

1-introduction

Gasoline, is a mixture, of c_4 to c_{12} hydrocarbon, compounds, comprising, single or double, bonds. This petroleum fraction, distills in the temperature variety 30 to 220 c˚. it is actual dangerous, because it can effortlessly evaporate, at room temperature, and atmospheric pressure, is very

inflammable, and becomes explosive, when the volatile, gas is mix with air(1). the hydrocarbons compounds, in gasoline may be classified, as n-paraffins, iso-paraffins olifins, aromatic, mixtures and naphthenics(1),.through the storage, period and change, temperature the hydrocarbon, compounds, in gasoline may reason chemical change, through their, reactions with, oxygen in the air causing in a change, in the fuel ,quality. In addition, the oxidation, of the compounds, in gasoline itself also, causes deterioration, of its fuel quality which, effects the quality, of the fuel. as a result of oxidation of the, fuel involved, in the storage and, change temperature, the amount of gum which, is polymeric material produced, by polymerization or condensation, through oxidation, is increased, the content of olefin, is decreased. the vapor, pressure, of the low, boiling point, components, is decreased by, evaporation, the structure is change, and the octane, number decreased(2).

Gasoline is a refined, product of petroleum containing of, a mixture of hydrocarbons, additives and blending, agents. The conformation of gasoline, varies usually, depending on the crude, oil used. The, typical composition, of gasoline, hydrocarbons (%volume) is as following, 4-8% alkanes , 2-5% alkenes, 25-40% isoalkanes, 3-7% cycloalkanes, 1-4% cycloalkenes, and 20-50% total aromatics,(2).

The organic composition, of gasoline is highly variable, because a product with the desired, automotive fuel properties, can be formulated in a number of methods. The hydrocarbon, components are predominantly, in the range c5-c10, with an general carbon, number, range of c5-c12 in Iraq and c4-c12in Europe,. The range vary according, to the geographical location, of the countries (3).

Forms of gasoline the gasoline, sold petrol station comes, in three different octane, number range: normal, improve, and super (9). these three fuel types come, in a range of octane evaluations and cost different, amounts. Research, octane number (RON) and, motor octane number (MON), are two quantifiable, factors used to asses, octane number. The RON of typical, commercially available, gasoline sample varies, by category and kind of gasoline (3)

1-2 types of gasoline

- normal gasoline: in a Iraq standard, the minimum limit, of RON is 84 and the MON values are around 80(1).
- improve gasoline : the values, of RON of premium, gasoline, sample are in the range, of 90.4 to96.9 and MON values, are above 82(1).
- super gasoline: the values, of RON of super gasoline, samples, are in the range of 91.4 to 98.6 and the, MON values were about 84-86(1).

1-3 Effect of gasoline

Gasoline is a single, complex mixture, of volatile, flammable, liquid hydrocarbons derived, from petroleum, and commonly, used as, a liquid fuel, for internal ignition engines. The effect on humans, there many health, effects of gasoline components, on humans(10). these special effects depend, on the duration, and quantity of exposure, and type of gasoline, components. These effects can, be summarized, as significant, increase in tumors, of kidney ,liver and other tissues, and organs following exposure, to gasoline, provide. Human epidemiologic studies illustration important, increases in cancers, of the, kidney, stomach, brain, prostate, lung and skin, as a result, of exposure, to gasoline, and its vapors(3).

Density defined, as its mass per unit, volume. where there, are many units of mass, and volume. viscosity is a measure, of the resistance. of a fluid which is being misshapen by either shear, stress or tensile stress. Octane number, is a standard measure, of a fuels, aptitude to withstand compression, in an internal combustion, engine without detonating. The higher, the octane number, the more compression, the fuel can withstand, before detonating(8). Vapor pressure, is the partial

pressure, used the vapor of a substance, in the gaseous phase, of a closed heterogeneous, system at equilibrium, with condensed, phase (solid or liquid) of substance, present in the, system(4).

1-4 Atomic absorption spectroscopy AAS

Atomic absorption spectroscopy, (AAS) is a technique,, for determining quantities, of chemical elements,, present, in environmental,, samples by determining,, the absorbed, radiation,, by the chemical, element,, of attention. This done,, by reading,, the spectra,, produced when,, the sample, is excited, by, radiation (11).

The atoms absorb, ultraviolet or visible, light and make, transition, to higher, energy levels. Atomic, absorption methods, the amount, of energy in the form, of photons of light, that are absorbed, by sample (12).

A detector, processes the wavelengths of light, transmitted, by the sample. And compares, them to the wavelength which, originally passed, through the sample(14).

The technique make use, of absorption spectrometry, to assess, the concentration, of an analytic in a sample, it requires standards, with known analytic content, to establish the relation, between, the measured absorbance, and the analytic concentration, and relies therefore, on the beer-lambert, low (13).

Materials and methods

The samples were used for purpose (from some fields in Iraq) to understand properties and different between these samples from many station AlGarraf field and AlShuaiba field and AlRumaila field.

During measurement the viscosity using viscometer to measure fill the 6ml of sample and place the viscometer in trough of kinematic viscosity device withdraw the samples from the top of viscometer capillary tube using a pipette so that the sample collects in the collection location. Remove the pipette and let the sample flow through the capillary tube and record the time for the sample to flow through the drawn limits(5).

During measurement vapor pressure put the samples and small chamber 38ml in the cooler to achieve a temperature of 0C˚.turn on the device and put the large chamber in the bath while setting the desired temperature that the large chamber acquires. Take out both chamber and put the sample in the small chamber then close large chamber (this process is done as quickly as possible). Connect the two chamber to the device using a pressure measuring tube and turn on the shaking for 5 minutes. Record the reading after the time runs out and repeat the process for different temperature(6).

During the measuring density put the 350ml from sample in graduated cylinder then put inside the water path to gain the desired temperature . turn on the water bath and set the desired temperature put the hydrometer with appropriate density in the graduated cylinder after ensuring that heat is transferred to the model record the hydrometer reading(7).

3-Result

In the results comparing between the data that obtain from some fields in south area of Iraq. The results illustrated different data for samples measurements with using some machines.

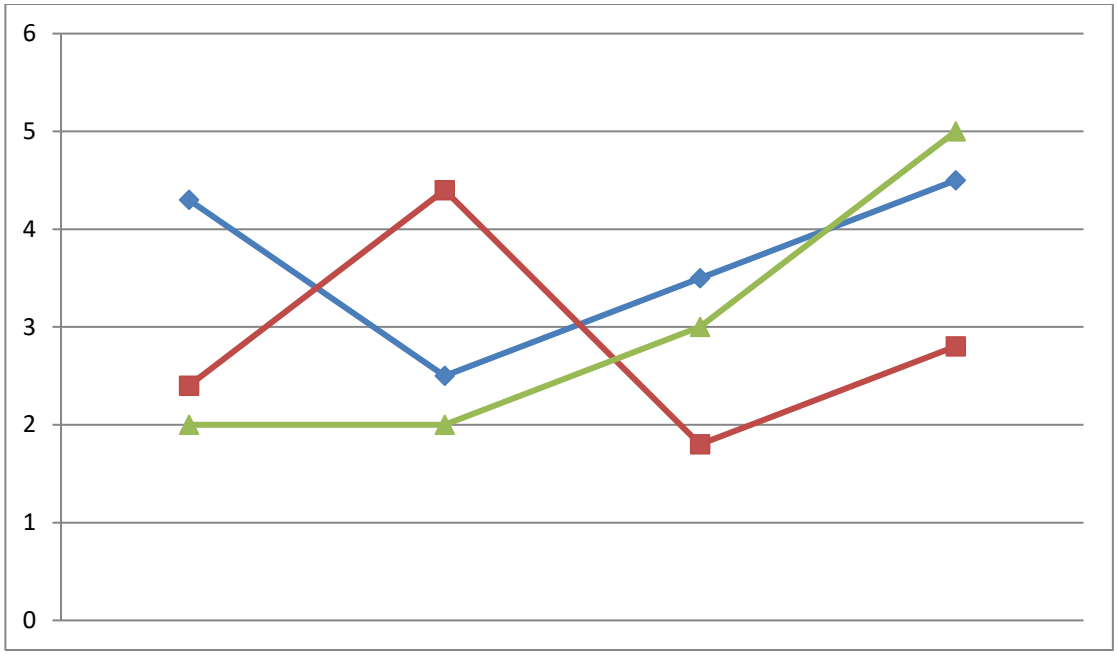

Figure (3-1) explain the different in concentration in µg/dl of lead element in three field the high value with green line in Shuaiba field oil then blue line in Garraf field and low value with red line in Rumaila field.

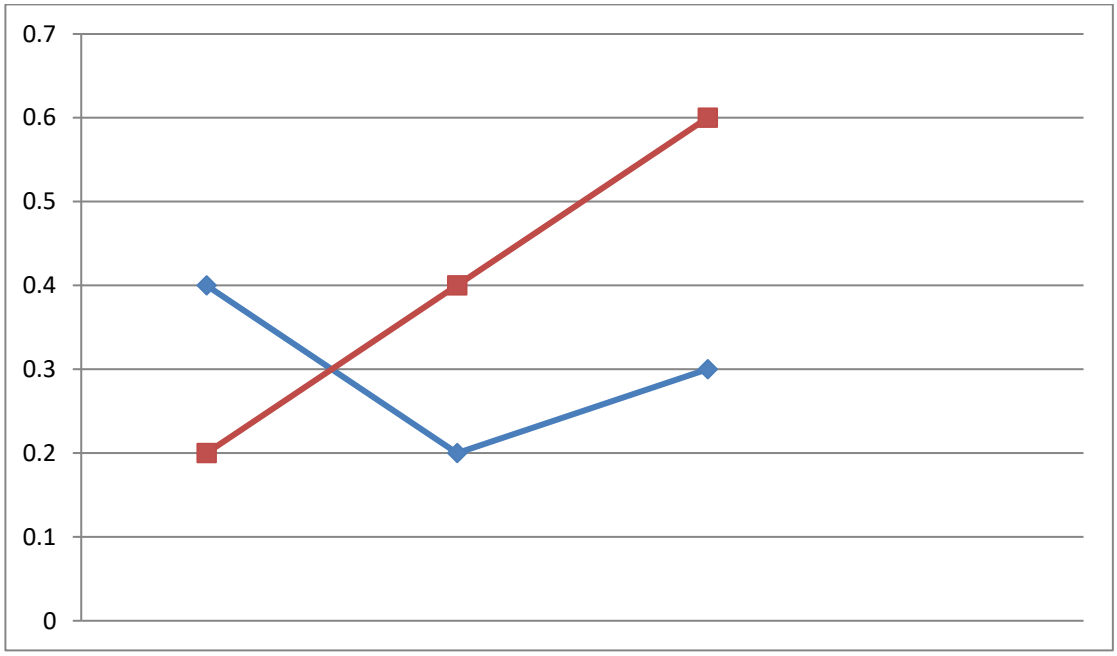

Figure (3-2) vapor pressure in gasoline improve with red line and super with blue line.

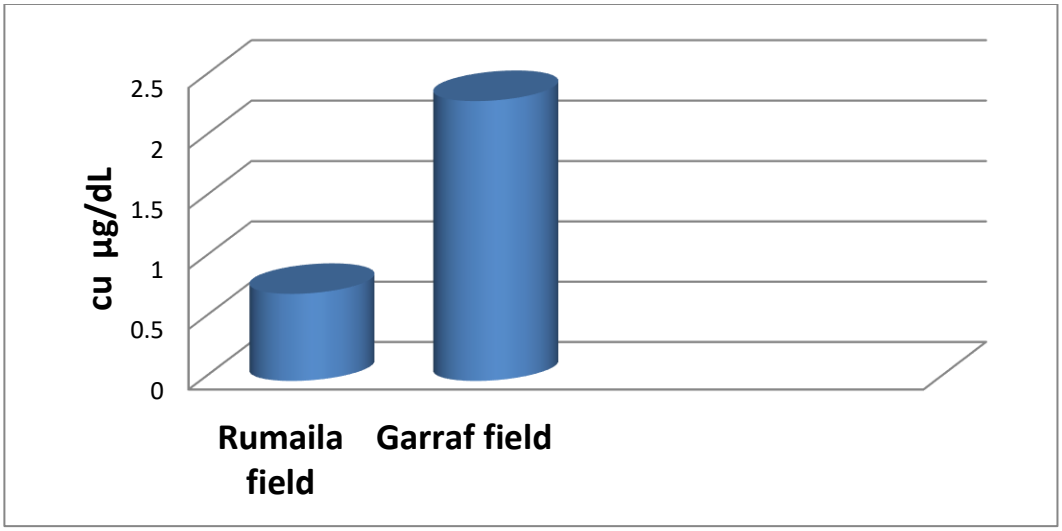

Figure (3-3) illustrated the concentration of copper metal in Garraf field high value when compared with Rumaila field in same metal.

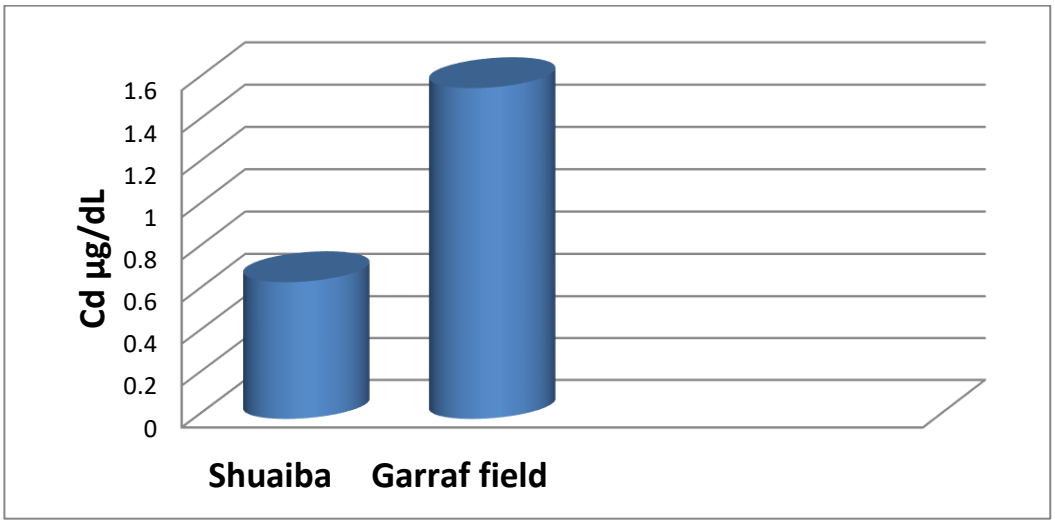

Figure (3-4) illustrated the concentration of Cd metal high value when compared with Shuaiba field

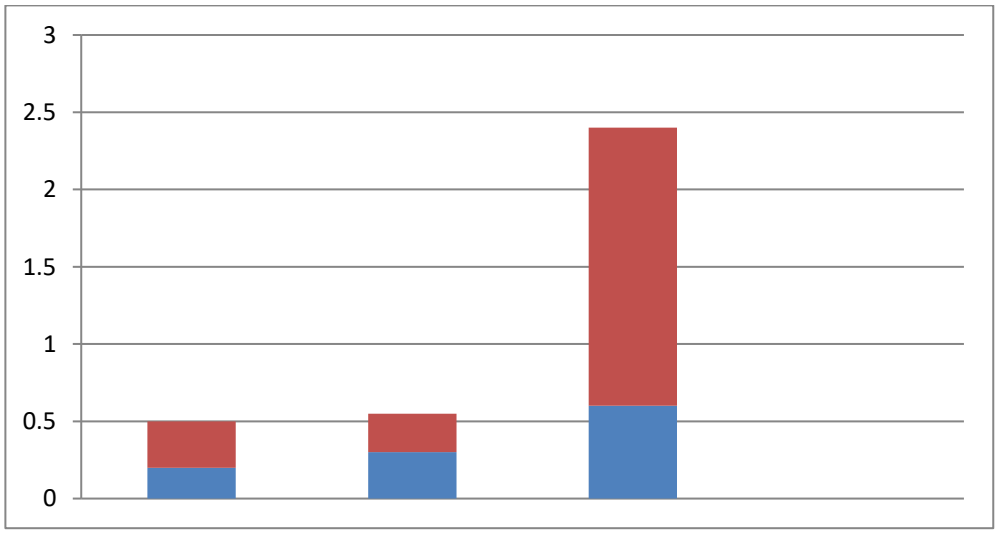

Figure (3-5) explain the concentration in µg/dl of vanadium in three field the first for Rumaila field and second level for garraf field and last level for shuaiba field.

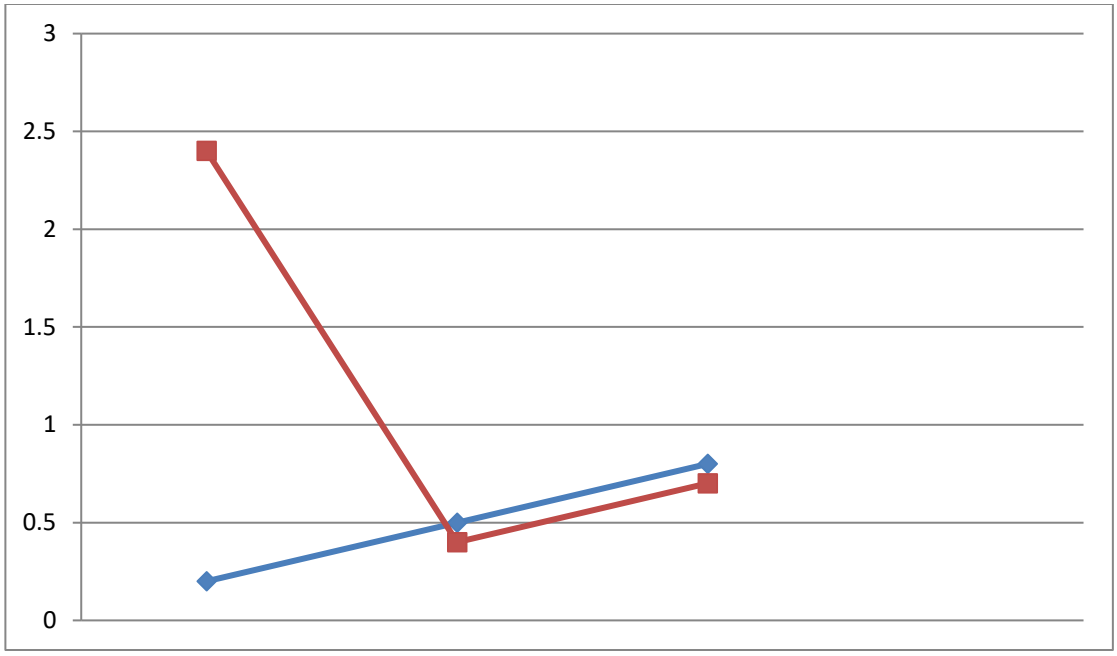

Figure (3-6) explain the effect of temperature on viscosity red line for super gasoline and blue line for normal.

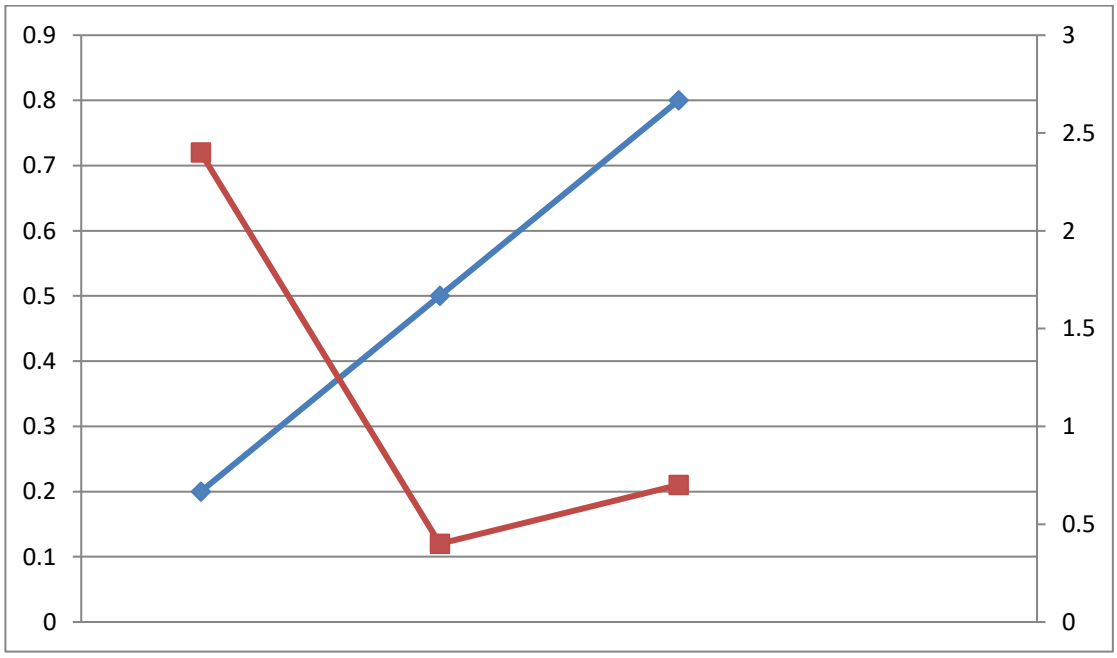

Figure (3-7) different in density blue line for super gasoline and red line for improve gasoline.

Discussion

The study working on samples collection from three station in three fields in south area of Iraq. these samples divided to three group every group was 50 samples from AlGarraf field and 50 samples from Alshuaiba field and 50samples from AlRumaila field to estimation level concentration of heavy metals in samples and evaluated the properties of gasoline as density and viscosity . The results illustrated the level of heavy metals was different in some station was high and in other was low value. The high value of heavy metal was value of vanadium metal in Al Shuaiba field and high value of lead metals in AlRumaila field. The graduation levels in concentration were different every field in this study. The study illustrated levels of density and

viscosity decreases with increasing temperature. Then levels of concentration for copper Garraf field was high value when compared with its level in Rumaila field.

Conclusion

The research illustrated some results after compared data obtaining from this study the concentration of heavy metals as lead metal was high concentration in Garraf field and its ratio less in Rumaila field and Shuaiba field. Also concentration of copper high value in Garraf field when compared with its value in Shuaiba field. As well as the density decrease with increasing temperature. The viscosity of gasoline decreases with increasing temperature. When working on data of samples explain decreases in values of density and viscosity with increasing temperature.

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