Evaluation of Qualitative and Quantitative Phytochemical Constituents in *Saccharum officinarum* L. Exposed to Roadside Traffic-Derived Ambient Air Pollution

ABSTRACT

Saccharum officinarum L. is a useful crop and a member of the Poaceae family that yields sugar molecules with a high concentration. The present study focused on the analysis of qualitative and quantitative phytochemical substances. For the comparative analysis of the crop, we have selected traffic road and non-traffic road sites (control). The qualitative phytochemical substances showed the analysis of protein, carbohydrate, iodine, phenol, tannin, flavonoids, saponin, glycosides, steroid, terpene, and alkaloid, quantitative phytochemical substances of (total phenolic content total mean value 0.03644 > 0.03240 and total flavonoid content total mean value 0.04772 > 0.03952). The quality of qualitative and quantitative phytochemical substances in crops growing near traffic roads was reduced. The negative effects of traffic-related air pollution on crop vegetation are clearly shown in this record. Crop vegetation varies between traffic roads and control sites based on analysis of qualitative and quantitative phytochemical substance data.

Keywords: *Saccharum officinarum* L., Qualitative, Quantitative, phytochemical substances

1. Introduction

Among the most pressing environmental issues is air pollution. As a result of all this traffic, air pollution is now a serious health risk. This kind of transportation air pollution is notoriously difficult to control because it is nature-based, unlike other environmental issues. In high-traffic regions, it harms and kills people, animals, and plants. Roadside crops and trees greatly improve air filtration, which helps to reduce environmental contamination. [1]

More evidence is pointing to the presence of pollution in both aquatic and terrestrial ecosystems caused by newly discovered tiny pollutants, such as air pollution. People and their belongings are transported mostly through traffic. Consumption of polluted air can pose health risks to humans because it can bioaccumulate in food chains. Air pollution studies in the past mostly concentrated on water bodies, but newer studies reveal widespread contamination of land areas, particularly agricultural areas. Despite the abundance of literature on air pollution, this is the first comprehensive study that we are aware of to examine agricultural contamination in terms of its causes, consequences, and mitigation strategies. In addition to shedding light on the impacts, the pollution updates our knowledge of how plants absorb it and how it affects higher animals and humans. We also suggest ways to go about studying environmental contamination in terrestrial ecosystems in the future.[2] To fully investigate the transport area of the examined specific organs leaves, the study was expanded by including an aspect of various environmental situations. A widely distributed deciduous tree in moderate mild and cold climates of the

northern hemisphere is the silver birch, *Betula pendula* L. It is a typical element of many forest communities, including parks and urban forests. Silver birch is considered a pioneering plant in research due to its limited habitat requirements to air pollution transport, as determined by the level of selected total phenolic, and flavonoid content in the leaves.[3] Traffic and industrial areas that are classed as a Mediterranean host-spot pollution region. Pomegranate trees were severely subjected to various industrial airborne contaminants comprising biochemical changes that investigated total phenolic and flavonoid contents. This report showed a variance in total phenolic and flavonoid content, showing that they are completely dependent upon stress, polluted and non-polluted areas.[4] Traffic air pollution can easily move and be absorbed by leaves through stomata, creating major negative effects.[5] Pollution from vehicle emissions skyrocketed alongside the growth of the motor industry alongside the population boom. Vegetation along highways and roadside areas is the primary target of these vehicle emissions. The impact of vehicle emissions on plants is quickly summarized in this review. Contrarily, it was also mentioned that roadside plants could potentially mitigate the negative impacts of vehicle emissions. It was also hypothesized that plants could serve as bioindicators of air pollution in certain ways. One major issue is the lack of research on the effects of vehicular pollutants on roadside plants and, more specifically, crops. Specifically, there has been a call for additional investigation into the role of nanocarbon particle pollutants. The importance of finding long-term answers to these growing worries was emphasized. The pomegranate *Punica granatum* L. fruit peel was obtained from two sites with variable air quality near the industrial area. The first site exhibited the polluted site, which is located in the oasis next to the industrial area. The second site referred to the Control site, which was 37 km away from the industrial area. Plants are a rich source of different phytochemicals.[6-7] The total phenolic and flavonoid content of pomegranate fruit peel methanol extract was identified and measured.[8] The report revealed that the peel extract included a variety of phytochemical components, including total phenolic and flavonoid levels, which were identified and quantified. The total phenolic and flavonoid content of the peel recovered from the contaminated location was greater than that of the control site.[9] Nowadays, traffic air pollution, dust, or Particulate Matter (PM), is one of the primary issues affecting human health and crops, owing mostly to the rapid development of industrial activity and road traffic.[10] The main focus of this study is to find out the concentration of traffic air pollution that may be dangerous to human health by screening the phytochemical composition of extracts of polluted and unpolluted *Nerium oleander* L. from the Meknes region of Morocco. Additionally, the report contains factual information. Studies have shown that the quantity of total flavonoids in the two extracts from the polluted and unpolluted *N. oleander* L. plants varies.[11] Anthropogenic pollution can influence the air, and plants in a variety of ways. Using bioindicators, or substances produced in living things like plants, to monitor pollution, may be a valuable method for environmental monitoring. This study looked into the bioindicators of residential and industrial regions in Sadat City, Egypt. By analyzing *Bougainvillea glabra* L. (paper flower) leaves using spectrophotometry, phenolic and flavonoid compounds were determined to be present. Flavonoids, which are phenolic chemicals, were

found substantially more abundant in the industrial zone than in the residential zone in leaves. This study reveals that pollution has a significant impact on total phenolic, and flavonoid compound levels in *B. glabra* L. plants, demonstrating the impact of pollution on environmental health while also paving the way for using plants as bioindicators.[12] *Portulaca oleracea* L. underwent quantitative phytochemical analysis for several key characteristics, including alkaloids, flavonoids, tannins, proteins, and saponins. We took leaf samples from two locations: a garden, which was unpolluted, and a roadside area that was subject to air pollution from vehicle tailpipes. Nutrient stress, water stress, and high-temperature stress were also experienced by leaf samples collected from contaminated sites. The leaf sample has high percentage values of nutritional component protein as well as phytochemical compounds such as alkaloids, flavonoids, tannins, and saponins. Samples taken from polluted sites had significantly higher percentage values than those from garden sites. Results demonstrate that *P. oleracea* L. may grow in wastelands subjected to fertilizer, water, traffic, and air stress, while simultaneously exhibiting reasonably high phytoconstituent levels under these conditions.[13] Examining the effects of different levels of exposure to road dust on the phytochemical composition of a sample of the traditional African plant *Barleria dinteri* L. In the locations samples of *B. dinteri* L. were taken from two different locations one next to a dusty road the test sample and another further away the control sample. The total phenolic, tannin, flavonoid, and saponin contents were also quantitatively analyzed using spectrophotometry in the sample extracts. The phytochemical contents of the extracts from the control and test samples varied significantly, according to the qualitative analytical results. Leaf extracts from the experimental sample had greater concentrations of total tannin, total flavonoid, total phenolic, and total saponin than the control sample, according to quantitative analysis. Similar to how total tannins were greater in the control sample, total phenolic and flavonoid levels were higher in the root test sample. Although a large quantitative influence in the phytochemicals was shown, the results show that exposure to road dust pollution has a moderate effect on the quality of the phytochemicals held by the samples of plants' leaves and roots. The study's results imply that road dust pollution causes Barleria dinteri to accumulate more phytochemicals, particularly in its leaves.[14] This study's objective is to examine the effect of different environmental conditions on the phytochemical contents of two species of trees planted in the Asir area of Saudi Arabia *Ficus carica* L. and *Schinus molle* L. The phytochemical components were tested in plant extracts taken from the plant's aerial sections. The phytochemical levels were higher in the plant extracts from the two plants cultivated in the contaminated area compared to the non-polluted site extracts.[15]
The main objective is the analysis of qualitative and quantitative phytochemical substances of *Saccharum officinarum* L. under traffic and non-traffic road conditions (control).

2. Material and Method

2.1 *Study area*

Hapur is located in Uttar Pradesh northwest. Hapur experiences cold winters and hot summers because of its humid climate, which is influenced by the monsoon and extends from latitude 28.730579 to longitude 77.775879.[16]

2.2 *Collection of crop sample*

Crop sample locations were selected at Morepur on NH-235, with one site designated for traffic and one for non-traffic. A control site was located 1000 meters away. This study made use of the crop species *Solanum tuberosum* L. The crop sample was certified and taxonomically recognized by the Department of Botany at the C.C.S. University in Meerut, Uttar Pradesh, India. The number of the sample is Bot/PB/261.

2.3 *Considering at sampling location, the air quality index*

A set of gas monitoring instruments from Aeroqual, the Series 500 (S500) (Hapur district, NH-235), were used to measure the amounts of CO, NO, NO2, SO2, O3, and UV at the various sample locations. Every from 7 morning to 3 evening hours, the air quality at each location was recorded for a long time.

2.4 *Preparation of Solvent extraction*

Using the Soxhlet process, the powdered leaves were extracted. Separate batches of 250 milliliters of different solvents were used to extract 20 grams of plant powder that had been uniformly distributed in a thimble. The solvent that was used was methanol. The extraction process is finished after 24 hours, or when the colour of the solvent in the siphon tube of the extractor disappears. The next step was to distil the extract of its solvent by heating it in a beaker over a hot plate set to 30–40ºC. The leaf extract was cooled to 4ºC so it could be used for phytochemical analysis.

3. Analysis of Phytochemical Substances

3.1 *Qualitative analysis*

The existence of bioactive chemicals in the extract was investigated using the following conventional methods.[17-19]

3.1.1 *Test for proteins*

3.1.1.1 *Millon's test*

The presence of protein was confirmed when a white precipitate, which turned red upon gentle heating, was produced by mixing 2 ml of leaf extract with Millon's reagent.[17-19]

3.1.1.2 *Ninhydrin test*

A violet hue was produced when 2 milliliters of a 0.2% solution of Ninhydrin was heated with the leaves extract, indicating the presence of proteins.[17-19]

3.1.2 *Test for carbohydrates*

3.1.2.1 *Fehling's test*

Two milliliters of Fehling A and Fehling B reagents, each in an equal volume, were combined with the leaves extract and heated slowly until the mixture was boiling. When reducing sugars were present, a brick-red precipitate would form at the tube's base.[17-19]

3.1.2.2 *Benedict's test*

The presence of carbohydrates was confirmed by the formation of a reddish-brown precipitate after boiling a mixture of 2 milliliters of Benedict's reagent with the leaf extract.[17-19]

3.1.2.3 *Molisch's test*

After thoroughly shaking, the mixture of leaf extract and 2 milliliters of Molisch's reagent was prepared. The next step was to carefully pour 2 milliliters of concentrated H_2SO_4 down the tube's side. A violet ring that formed at the interphase was a telltale sign that carbohydrates were present.[17-19]

3.1.3 *Iodine test*

Two milliliters of iodine solution were combined with the leaf extract. When the carbohydrate was present, the colour turned a deep blue or purple.[17-19]

3.1.4 *Test for phenols and tannins*

The mixture included 2 milliliters of a 2% solution of $FeCl_3$ and the leaf extract. The presence of tannins and phenols was indicated by a blue-green or even black.[17-19]

3.1.5 *Test for flavonoids*

3.1.5.1 *Shinoda test*

A small amount of magnesium ribbon pieces and leaf extract were combined, and then concentrated hydrochloric acid was added drop by drop. After a few minutes, a pinkish-red hue emerged, signifying the existence of flavonoids.[17-19]

3.1.5.2 *Alkaline reagent test*

To prepare the leaves to extract, 2 milliliters of a 2% NaOH solution were added. When a few drops of diluted acid were added, the strong yellow colour that had been created became colourless, indicating the presence of flavonoids.[17-19]

3.1.6 *Test for saponins*

After vigorously shaking 5 milliliters of distilled water into a test tube containing leaf extract, the mixture was allowed to settle. We assumed that saponins were present because stable foam formed.[17-19]

3.1.7 *Test for glycosides*

3.1.7.1 *Liebermann's test*

Two milliliters of chloroform and two milliliters of acetic acid were combined with the leaf extract. The concoction was rock-cooled using ice. The addition of H_2SO_4 was done with great care. The presence of the steroidal nucleus, which is the glycine part of the glycoside, was shown by a change in colour from violet to blue to green.[17-19]

3.1.7.2 *Salkowski's test*

Two milliliters of chloroform were combined with the leaf extract. Then, 2 milliliters of concentrated H_2SO_4 were added with caution and mixed slowly. The presence of the steroidal ring, or glycoside, is indicated by a reddish-brown colour.[17-19]

3.1.7.3 *Keller-kilani test*

A mixture of 2 milliliters of glacial acetic acid, which contained 1-2 drops of a 2% solution of $FeCl_3$, and the leaves extract, was added. Another test tube was used to add 2 milliliters of concentrated H_2SO_4 to the mixture. If cardiac glycosides were present, a brown ring would form at interphase.[17-19]

3.1.8 *Test for steroid*

Concentrated H_2SO_4 was applied in a side-by-side fashion to 2 milliliters of chloroform that had already been combined with crude extract. When steroids were present, the lower chloroform layer turned crimson. In a separate experiment, 2 milliliters of chloroform were mixed with the crude extract. Thereafter, 2 milliliters of concentrated H_2SO_4 and acetic acid were added to the concoction. The presence of steroids was confirmed by the development of a greenish.[17-19]

3.1.9 *Test for terpenoids*

The leaf extract was dissolved in 2 milliliters of chloroform and subsequently dried. This was heated for about two minutes after two milliliters of concentrated H_2SO_4 were added to it. A greyish hue was produced by the presence of terpenoids.[17-19]

3.1.10 *Test for alkaloids*

A mixture of 2 milliliters of 1% hydrochloric acid and leaf extract was slowly heated. The combination was then supplemented with Mayer's and Wagner's reagents. The presence of alkaloids was determined by the turbidity of the precipitate that was produced.[17-19]

3.2 *Quantitative analysis*

The quantitative phytochemical analysis was determined by the method.[20]

3.2.1 *Total phenolic content*

The phenol concentration in the water-based extract was assessed using a modified Folin-Ciocalteu reagent method. 1 millilitre of plant extract was mixed with 2.5 milliliters of 10% Folin-Ciocalteu reagent and 2 milliliters of a 2% solution of Na2CO3. A 15-minute incubation period was given to the resultant combination at room temperature. At 765 nm, the sample's absorbance was recorded. As a reference, gallic acid (1 mg/ml) was utilized. We ran each test three times to ensure accuracy. The results were presented as gallic acid equivalent (mg/g of extracted substance), which were developed from the standard curve.

3.2.2 *Total flavonoid content*

To find out how many flavonoids were in it, we tweaked the aluminium chloride colourimetric approach. A mixture of 1 millilitre of plant extract sample, 3 milliliters of methanol, 0.2 milliliters of 10% aluminium chloride, 0.2 milliliters of 1M potassium acetate, and 5.6 milliliters of distilled water was prepared and allowed to stand at room temperature for half an hour. We tested the absorbance at 420 nm. As a reference, quercetin (1 mg/ml) was utilized. The amount of flavonoids in the isolated product was measured using the standard curve and was expressed as mg/g of quercetin equivalent.[20]

4. Statistical Analysis

To analyze the plant samples, a t-test was employed. The values of 0.02, and 0.04 were determined to have the least significant difference according to the established technique.[21]

5. Results

5.1 *Assessment of the air quality for the sampling sites*

Figures **1** and **2** display the most elevated levels of UV, SO2, O3, and NO2, and the most reduced levels of CO, compared to the control sites and the main traffic route, respectively. The concentrations of air pollutants were found to be higher on traffic roads compared to the control sites. There was a statistically significant difference between the control and traffic road sites, with total air quality index values ranging from (131.28 < 276.12).

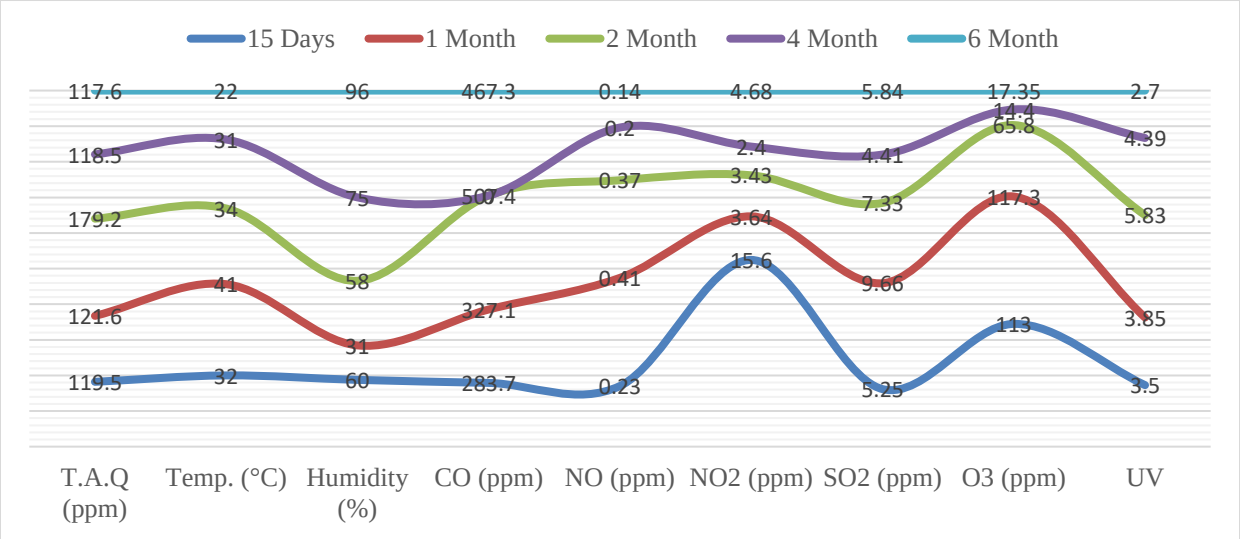


Fig. 1: Various gas concentrations at the control site

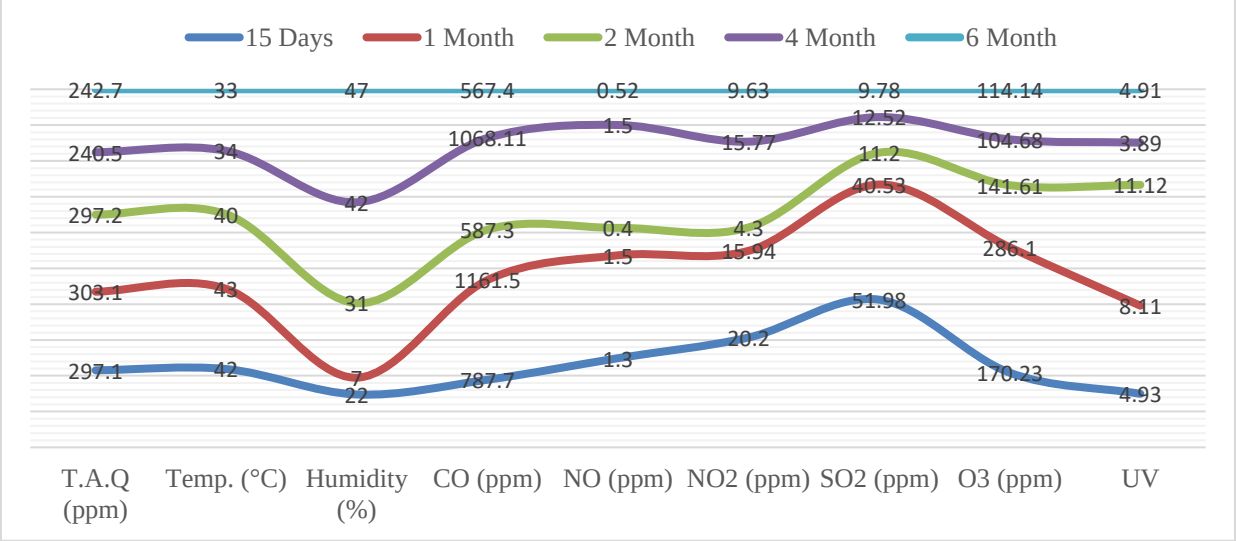


Fig. 2: Various gas concentrations at the traffic road site

5.2 *Qualitative analysis*

Tables 1 and 2 show that all across the observation period, we showed that the qualitative analysis (protein, carbohydrate, iodine, phenol, tannin, flavonoids, saponin, glycosides, steroid, terpene, and alkaloid) the quality of qualitative phytochemical substances is seen to be lesser in the crop growing on the roadside, control site the quality of qualitative phytochemical substances is seen to be good in the crop growing away from the road.

Table. 1: The qualitative substances in the Control site

Qualitative Substances	15 Days	1 Month	2 Month	4 Month	6 Month
Protein	+	+	+	+	+
Carbohydrate	+	+	+	+	+
Iodine	-	+	+	+	+
Phenol	+	+	+	+	+
Tannin	-	+	+	+	+
Flavonoids	+	+	+	+	+
Saponin	-	+	+	+	+
Glycosides	+	+	+	+	+
Steroid	+	+	+	+	+
Terpene	+	+	+	+	+
Alkaloid	+	+	+	+	+

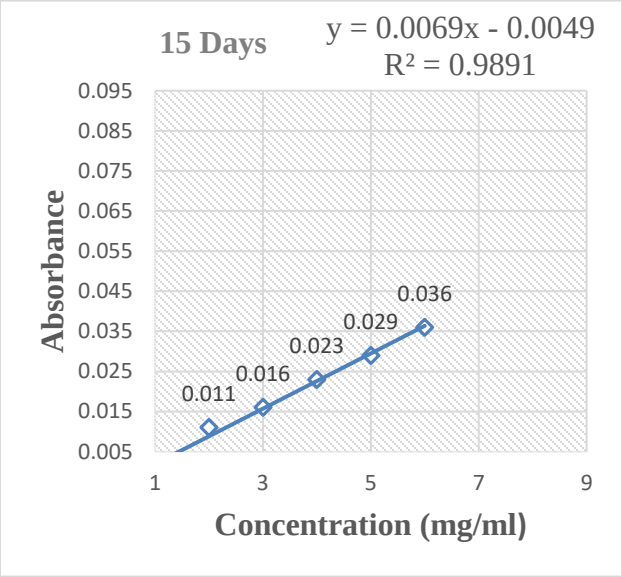
Table. 2: The qualitative substances in the traffic road site

Qualitative Substances	15 Days	1 Month	2 Month	4 Month	6 Month
Protein	-	-	+	+	+
Carbohydrate	+	+	-	+	+
Iodine	-	-	+	-	-
Phenol	-	-	+	-	+
Tannin	-	+	-	-	-
Flavonoids	-	-	+	-	+
Saponin	-	+	+	+	-
Glycosides	+	-	+	+	+
Steroid	+	-	-	+	-
Terpene	+	-	+	+	-
Alkaloid	-		-	+	-

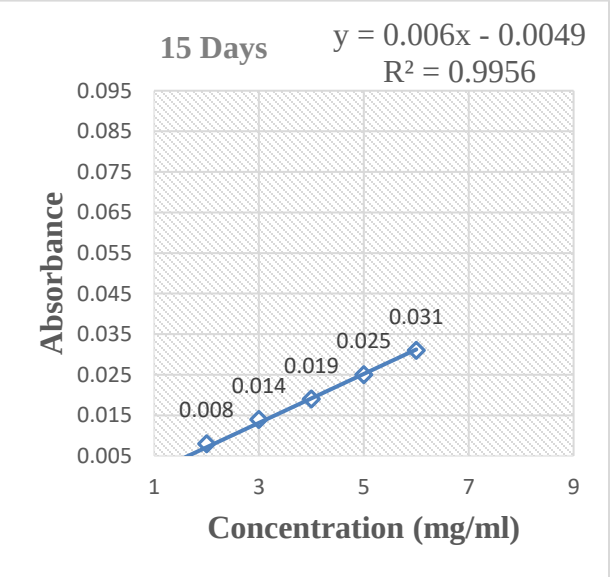
5.3 *Quantitative analysis*

5.3.1 *Total phenolic content*

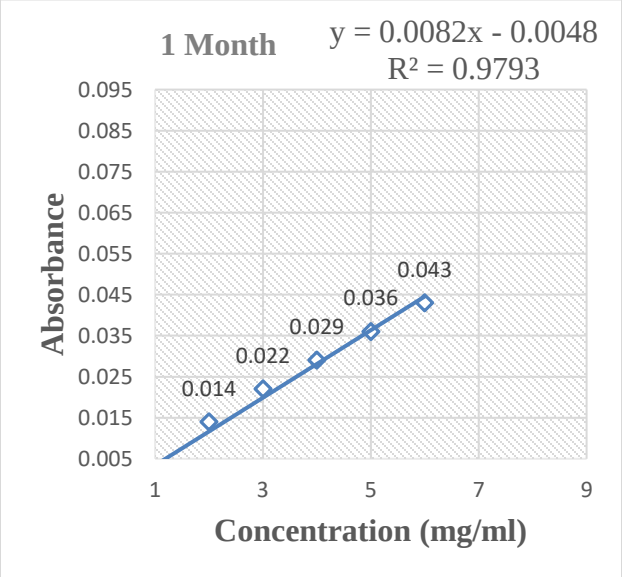
Figures 3 and 4 demonstrate that during the duration of the study, we demonstrated that the control sites had higher levels of total phenolic content values and that crops grown adjacent to traffic roads had lower levels of these quantitative phytochemical components. Evidence suggests that these traits were present in the control groups' leaves but absent from the groups' traffic road locations. The results show that the control and traffic road sites had significantly different total phenolic content values, with a mean value of 0.03644 > 0.03240. There was a statistically significant difference (Variance < 0.02) between the control and traffic road site data.



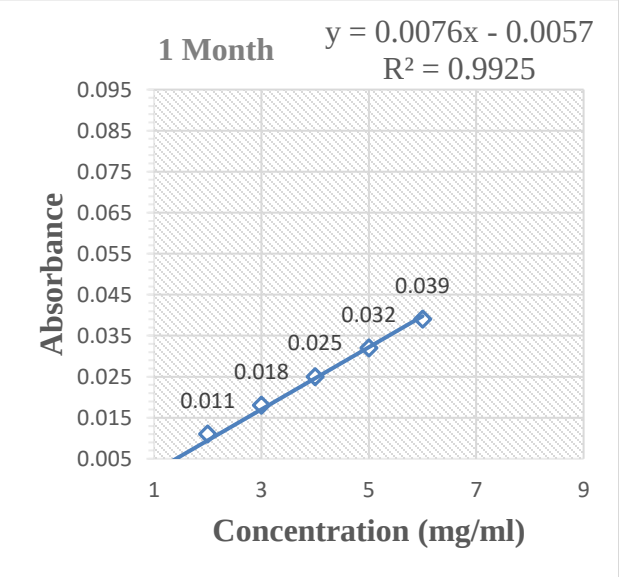
A - C.S 15 Days



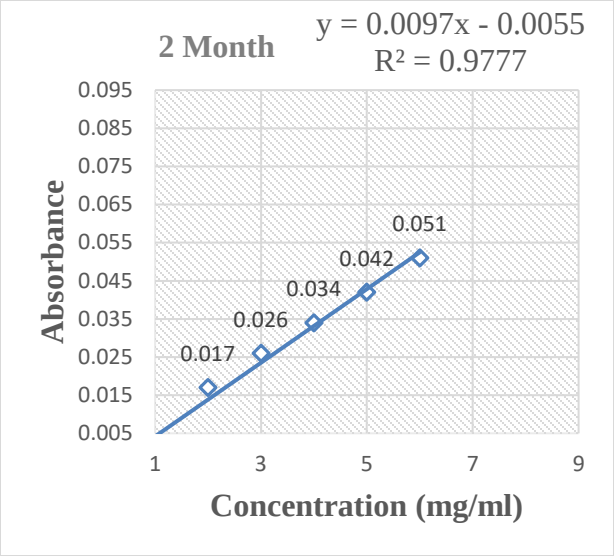
B - T.R. S 15 Day



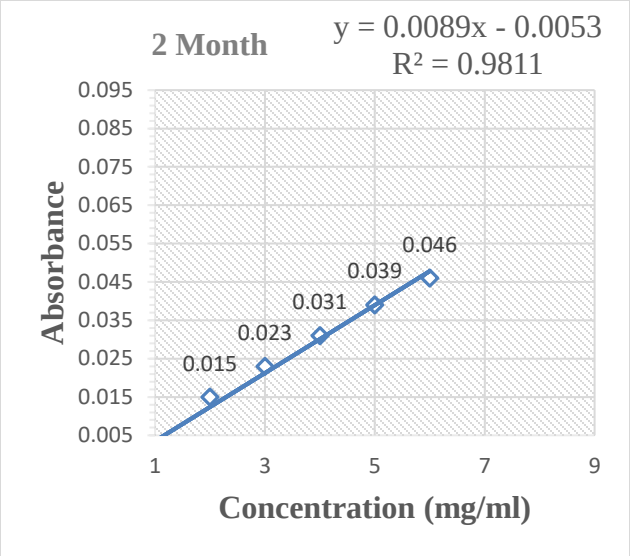
C - C.S 1 Month



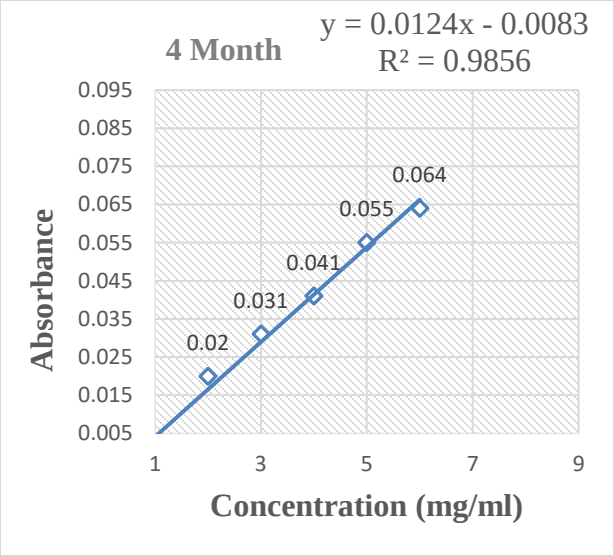
D - T.R. S 1 Month



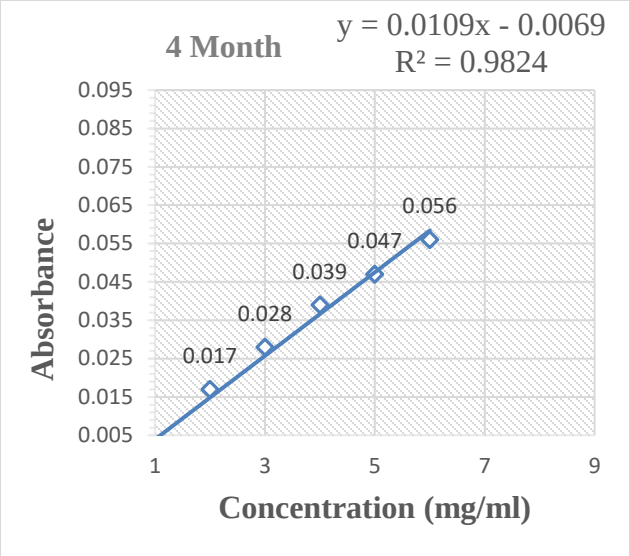
E - C.S 2 Month



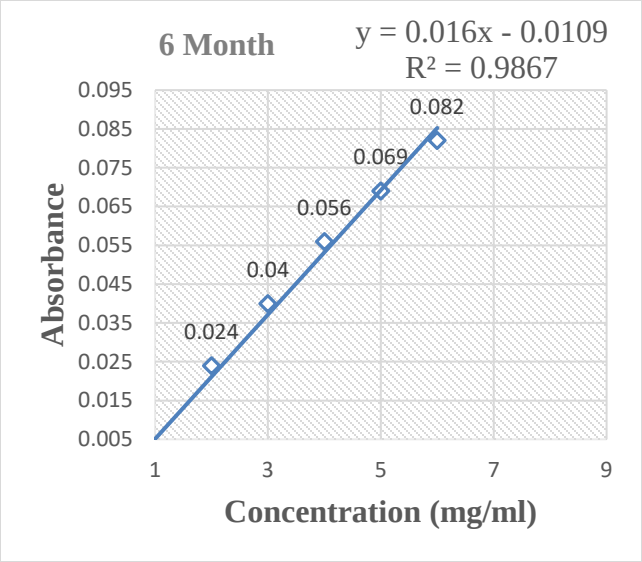
F - T.R.S 2 Month



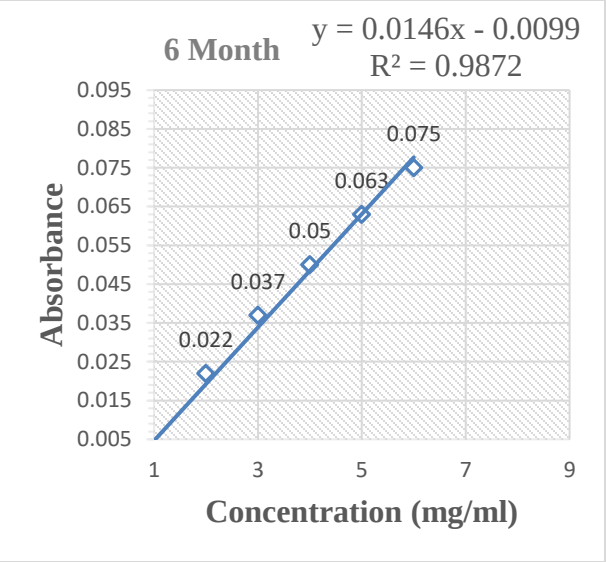
G - C.S 4 Month



H - T.R.S 4 Month



I - C.S 6 Month

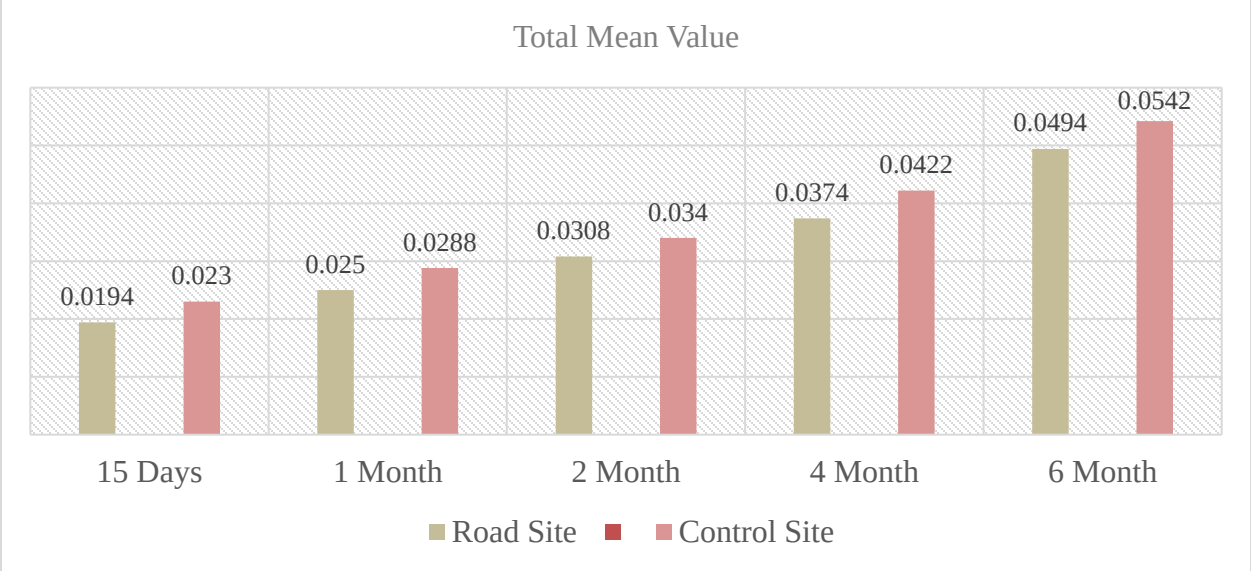


J - T.R.S 6 Month

C.S – Control Site

T.R.S – Traffic Road Site

Fig. 3: The calculated total phenolic content in the control and traffic road sites standard curve at various intervals

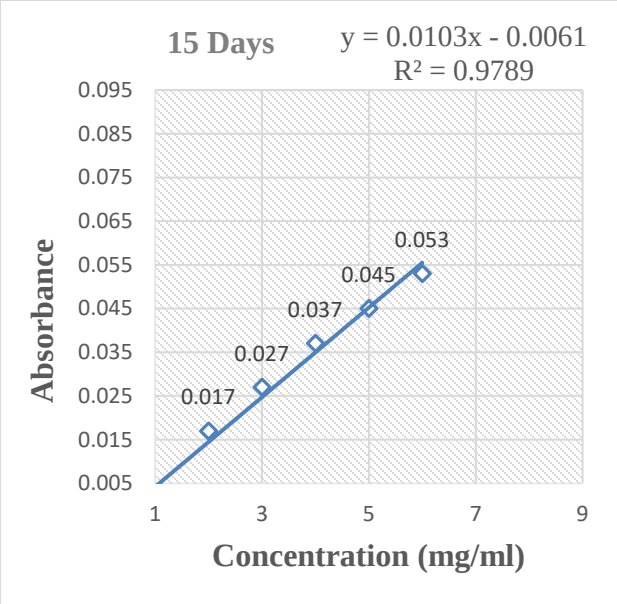


Significant at: Variance = 0.02 (Variance < 0.05 is considered significant).

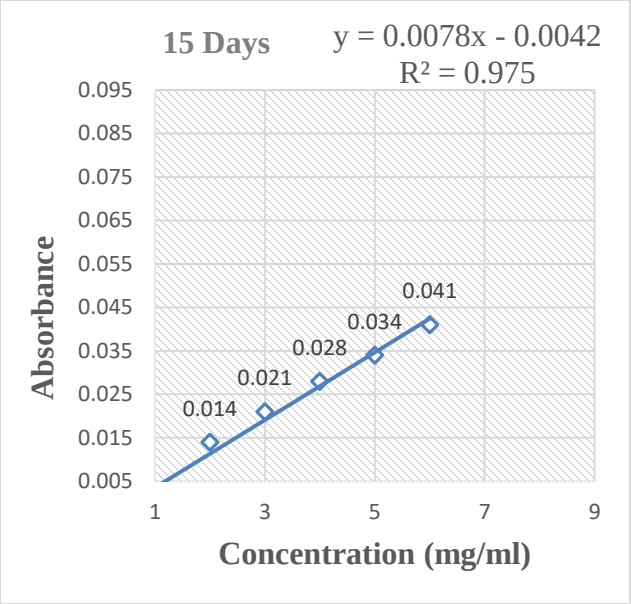
Fig. 4: The calculated total mean values at the level of total phenolic content in traffic and control sites

5.3.2 *Total flavonoid content*

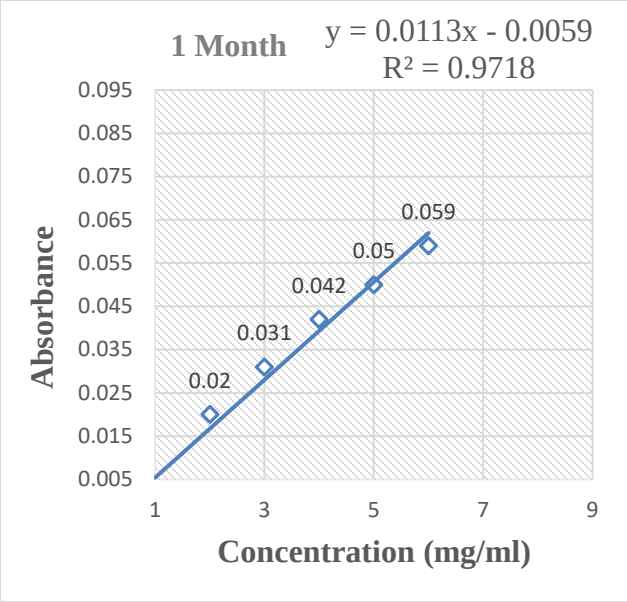
Figures 5 and 6 demonstrate that throughout the study, we demonstrated that the harvest grown adjacent to the road had lower levels of quantitative phytochemical substances with total flavonoid content values compared to the control sites. Evidence suggests that these traits were present in the control group leaves but absent from the group traffic road locations. Evidence suggests that these traits were present in the control groups' leaves but absent from the groups' traffic road locations. The results show that the control and traffic road sites had significantly different total flavonoid content values, with a mean value of (0.04772 > 0.03952). There was a statistically significant difference (Variance < 0.04) between the control and traffic road site data.



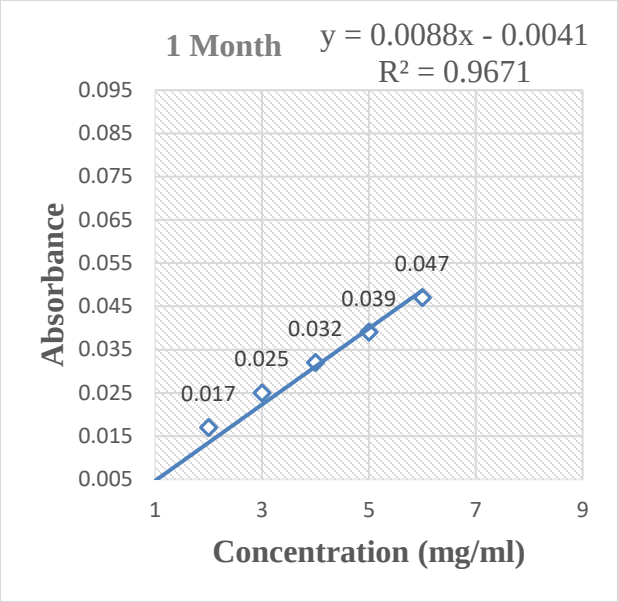
A - C.S 15 Days



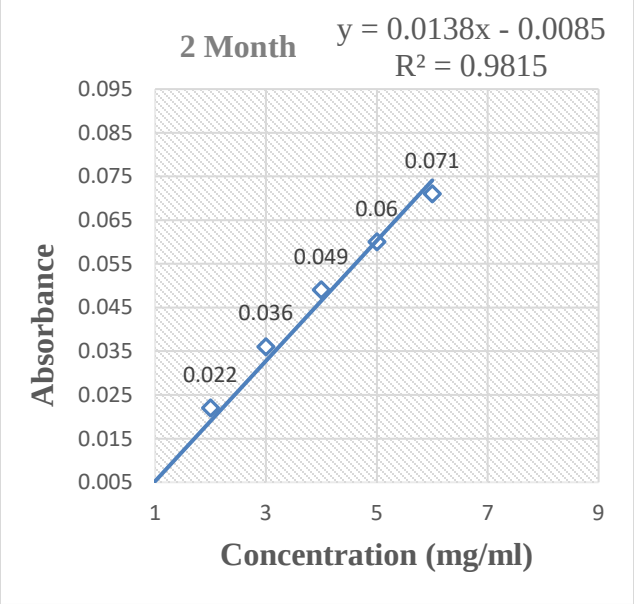
B - T.R. S 15 Day



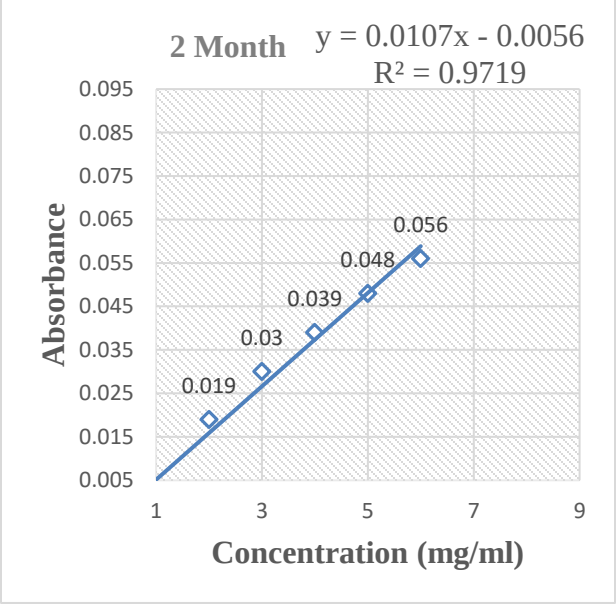
C - C.S 1 Month



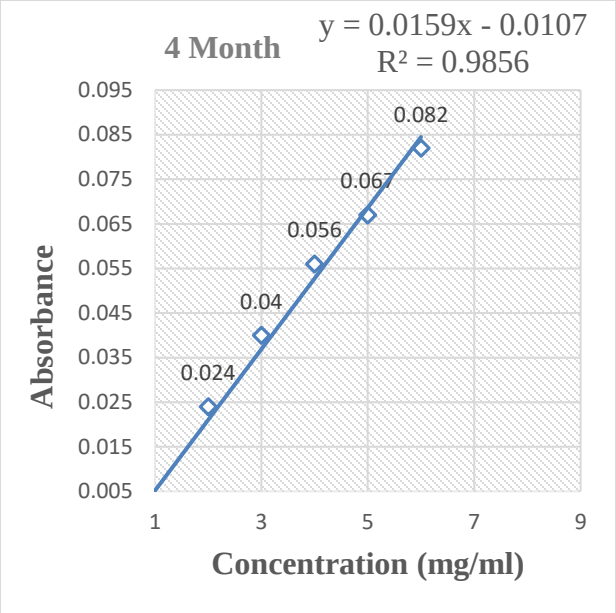
D - T.R. S 1 Month



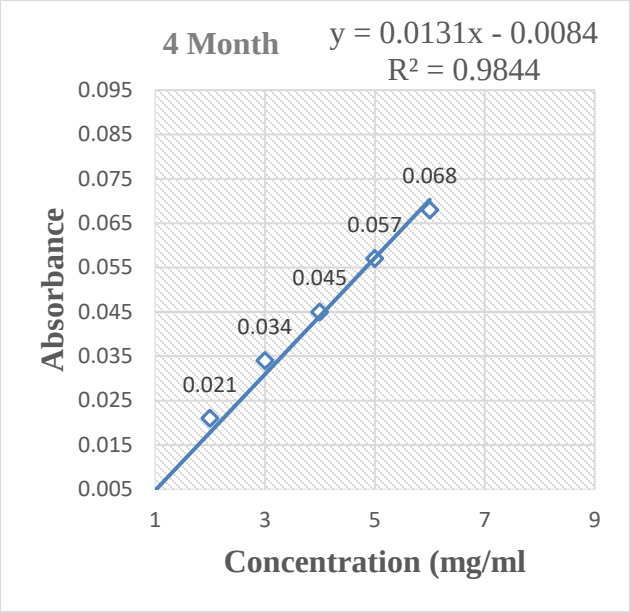
E - C.S 2 Month



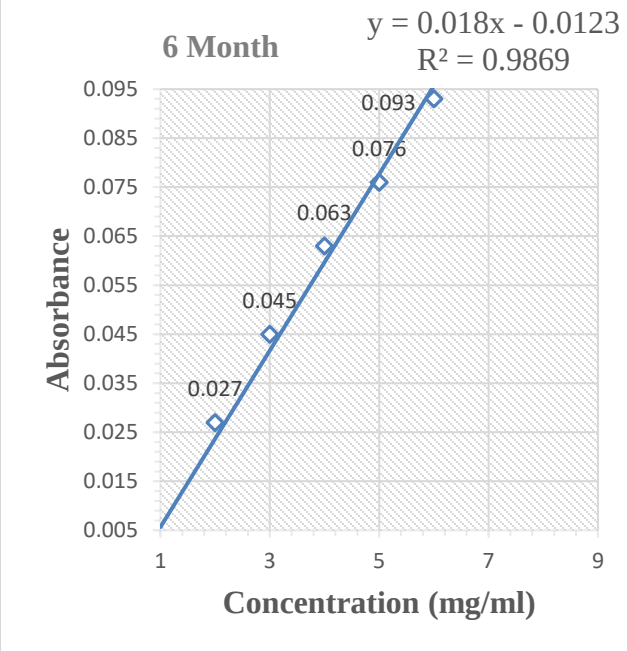
F - T.R.S 2 Month



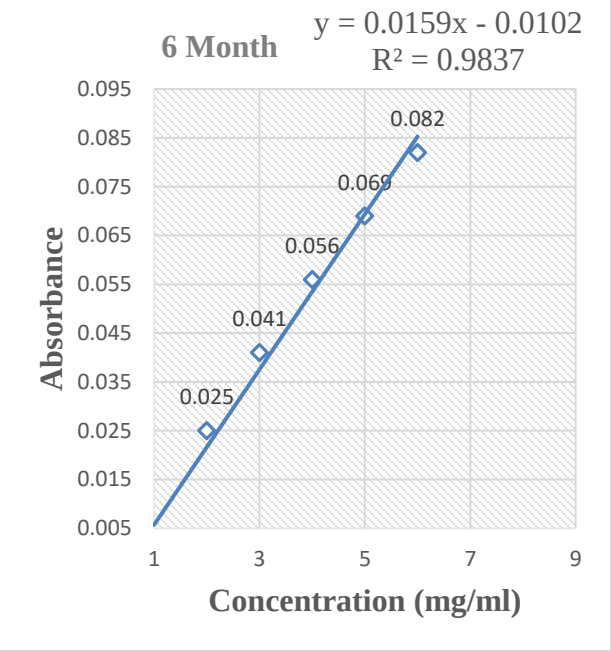
G - C.S 4 Month



H - T.R.S 4 Month



I - C.S 6 Month

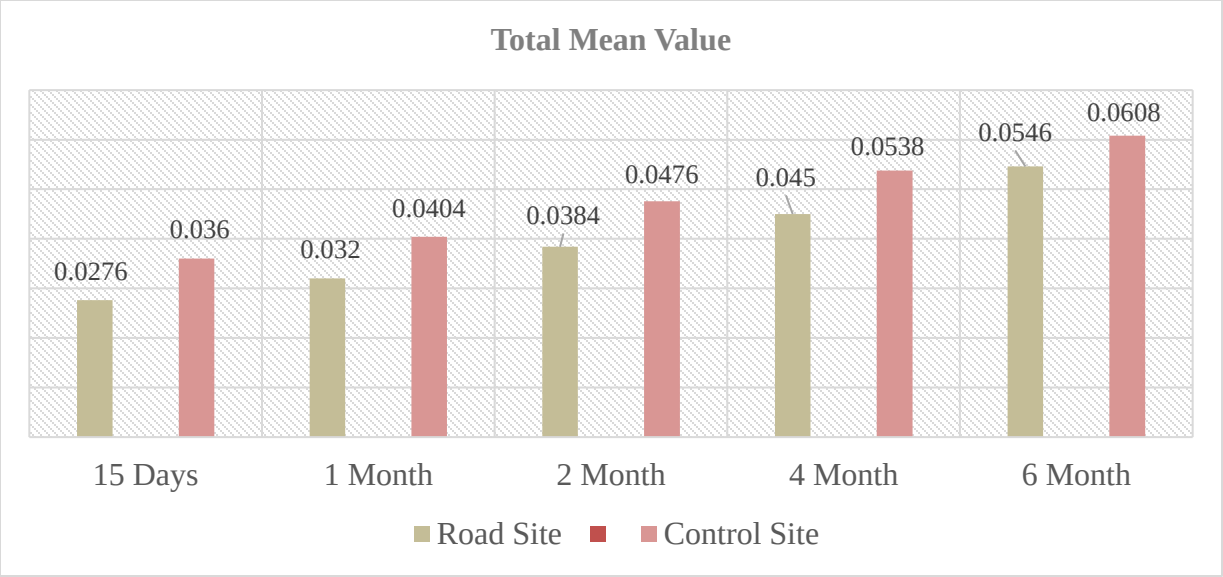


J - T.R.S 6 Month

C.S – Control Site

T.R.S – Traffic Road Site

Fig. 5: The calculated total flavonoid content in the control and traffic road sites standard curve at various intervals



Significant at: Variance = 0.04 (Variance < 0.05 is considered significant).

Fig. 6: The calculated total mean values at the level of total phenolic content in traffic and control sites

6. Discussion

Particular sample locations air quality compared to the control, with greater quantities of CO, NO, NO_2, SO_2, O_3, and UV found at traffic route sites. Because of the alarming rise in traffic-related air pollution, we found that the quality of the quantitative and qualitative phytochemical compounds produced by *S. officinarum* L. changed significantly due to these pollutants. At the control and traffic road sites, there was a statistically significant difference in the total mean value air quality index (131.28 < 276.12). The record showed that the qualitative substances analysis (protein, carbohydrate, iodine, phenol, tannin, flavonoids, saponin, glycosides, steroid, terpene, and alkaloid) the quality of qualitative phytochemical substances is seen to be negative in the crop growing on the roadside, control site the quality of qualitative phytochemical substances is seen to be positive in the crop growing away from the road. We showed quantitative substances that the total mean value of total phenolic content (0.03644 > 0.03240) and the total mean value of total flavonoid content (0.04772 > 0.03952) between the control and traffic road sites. The control and traffic road site data were statistically significant the total phenolic content (Variance < 0.02) and total flavonoid content (Variance < 0.04).[22] The phenolic content of the leaf extracts of *Moringa* and *Ocimum* was found to be substantially higher (P<0.001) in the methanolic extract compared to the floral extract. In comparison to *Moringa* flower extract, the phenolic content of *Ocimum* flowers was 60.18 percent higher. While we found a 26.01% rise in phenolic content in *Ocimum* leaves compared to their flower extract, we found a 111% increase in phenolic content in Moringa leaves. Both *M. oleifera* L.

and *O. tenuiflorum* L. have high total phenolic content in their leaves, at 2.28 and 2.18 mg/mL, respectively, and in their floral extracts, at 1.08 and 1.73 mg/mL, respectively.[23] The total flavonoid concentration was found to be significantly higher in the methanolic leaf and floral extracts of *M. oleifera* L. and *O. tenuiflorum* L. ($P<0.001$). In comparison to *Moringa*, whose total flavonoid content was 4.44 mg/mL, *Ocimum* leaf and flower content was 4.47 mg/mL and 4.54 mg/mL, respectively. In comparison to the leaf extract, the flavonoid content of the *Ocimum* flower was 1.56% higher, whereas the flavonoid content of the *M. oleifera* L. leaf extract was 0.68% higher. *The Ocimum* plant extract has a higher total flavonoid concentration than the Moringa plant extract, according to our results.[23] Two varieties of *E. angustifolia* L. were compared for their total phenol and flavonoid content in this study. The Fariman version had more phenolic components and flavonoids in the methanolic extracts than the Mashhad variant, according to the results. Plant secondary metabolite levels, particularly phenolic compounds, are affected by many factors, one of which is climate. Plants grown in the DI Khan district were the subject of the present investigation on their total flavonoid and phenolic content. Using a gallic acid standard curve ($R2 = 0.9896$), the current research revealed that the total phenolic contents varied between 47±1.24 and 215±1.24 mg GAE/100 g, with *Citrullus lanatus* L. and *Fragaria vesca* L. exhibiting the greatest values. Using the standard curve of catechin ($R2 = 0.9762$), the highest flavonoid concentrations were seen in *C. lanatus* L. and *F. vesca* L., whereas the total flavonoid content varied from 15±0.81 to 73±0.81 mg CE/100 g. *Cucumis melo* L. had the fewest total flavonoids and phenolic compounds.[24] According to these findings, the plants with the highest amounts of phenolic and flavonoid compounds are *C. lanatus* L., *Vitis vinifera* L., and *F. vesca* L.[24] To assess their antioxidant activity, phenolic content, and flavonoid content, researchers in Kosovo examined a variety of samples derived from various plants and from various regions of the country, as well as fourteen samples of honey imported from other countries.[25] Different types of honey differed in their total phenolic content. *Acacia* honey had the lowest content at 25.76 ± 10.16 mg GAE/100 g, followed by chestnut honey at 35.77 ± 8.26 mg GAE/100 g, meadow honey at 46.48 ± 16.59 mg GAE/100 g, and mixed honey at 46.33 ± 18.95 mg GAE/100 g. Honey samples from forests had the highest content at 84.17 ± 30.40 mg GAE/100 g.[26] The honey samples derived from forests had the highest concentration of flavonoids (7.51 ± 3.75 mg CE/100 g), whereas the honey samples from *Acacia*, meadow, mixed, pinus, lime, and chestnut had the lowest amounts (1.11 ± 0.62 mg CE/100 g), 3.00 ± 1.52 mg CE/100 g, 3.44 ± 2.78 mg CE/100 g, 4.71 ± 0.49 mg CE/100 g, 5.18 ± 0.14 mg CE/100 g, and 5.24 ± 1.59 mg CE/100 g, respectively). When comparing honey samples, the total flavonoid content in monofloral honey was lower (1.11 ± 0.62-5.24 ± 1.59 mg CE/100 g), whereas the acacia honey samples showed the lowest correlation.[26]

7. Conclusion

Several types of vehicle traffic congestion contribute to traffic air pollution, which has negative effects, as shown by this study's results. The traffic air pollution caused by vehicles is now a major health risk; this study also revealed that crops are negatively impacted by some gases (CO,

NO, NO_2, SO_2, O_3, and UV), and the overall air quality is quite poor. The observation period shows that the is seen to be lesser in the crop growing on the roadside, and control site the quality of qualitative and quantitative phytochemical substances is seen to be good in the crop growing away from the road.

8. Future Perspectives

There is also a record of qualitative and quantitative data information in this research. To better understand the effects of emissions on various plant species, as well as to determine the exact nature of those effects, this data would be invaluable. When calculating the potential for environmental contamination, this might be useful. The leaves of *S. officinarum* L. are nutritious and good fodder for livestock. Which are dependent on the quality. Crops grown near roadsides are damaged by air pollution. To avoid this traffic air pollution, use electric vehicles and plantations on both sides of the road. Crops should be cultivated on more distance than traffic roads.

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