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A SIMPLE UV-VIS- SPECTROPHOTOMETRIC ASSAY STUDY ON DIFFERENT BRAND OF PARACETAMOL

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INTRODUCTION

Paracetamol, usually referred to as Acetaminophen, is a drug used to treat fever and mild to moderate discomfort. Tylenol and Panadol are examples of popular brand names.[1] The advantages of paracetamol usage for fever are unclear because, at a typical dose, it only marginally lowers body temperature; in that regard, it is inferior than ibuprofen. Acute mild migraines may be helped by paracetamol, however recurring tension headaches may only be minimally relieved.[2] However, when the pain is minimal, the aspirin/paracetamol/caffeine combination is effective and is advised as a first-line therapy for both diseases. Ibuprofen is superior to paracetamol in terms of effectiveness for post-surgical pain management. Ibuprofen and paracetamol together have more potency and are better than either medicine alone. In osteoarthritis, paracetamol only offers little and clinically negligible pain relief.[3] There is not enough support for its use in treating neuropathic pain, cancer pain, and low back pain. In patients who cannot be treated with non-steroidal anti-inflammatory medicines (NSAID), such as those with bronchial asthma, peptic ulcer disease, haemophilia, salicylate-sensitive individuals, children under the age of 12, pregnant women, or nursing mothers, it is the treatment of choice. It is suggested as the initial line of defence against osteoarthritis pain.[4] The "redox" mechanism and impacts of central (COX, serotonergic descending neuronal pathway, L-arginine/NO route, cannabinoid system) and peripheral (COX inhibition) antinociception processes are all part of the complicated mechanism of action. Despite the fact that paracetamol is a medicine with good tolerance and minimal gastrointestinal adverse effects, there are increasingly more cases of paracetamol-induced liver intoxication being reported globally each year.[5] Numerous analytical techniques, including spectrophotometry, chromatography, volumetric electrochemistry, and polarography, were described for the measurement of paracetamol in pharmaceuticals. Since paracetamol is being utilised more and more for medicinal purposes, its identification and quality control are crucial.[6] One of the methods most often employed in pharmaceutical analysis for paracetamol determination is UV-VIS spectrophotometry.[7] In this work, we utilised UV-VIS spectrophotometry for determination paracetamol. In this work we have used nine different brands of paracetamol and coded as PA, PB, PC, PD, PE, PF, PG, PH, PI. These brands were analysed by using UV-VIS spectrophotometry for determination paracetamol.

MATERIALS AND METHODS

Material: Nine brands of paracetamol, NaOH, distilled water.

Apparatus: UV-Visiblespectrophotometer (shimadzu1800), weight balance, volumetric flask.

Table 1: List of Sample Under Study.

Tablet sample	Brand name	Company	Country	Mean of tablet In (mg)	Rsd n=20
Paracetamol	PA	PA Pharma	India	510	1.54
	PB	PB Pharma	India	468	2.41
	PC	PC Pharma	India	526	1.47
	PD	PD Pharma	India	514	2.04
	PE	PE Pharma	India	569	1.65
	PF	PF Pharma	India	484	1.90
	PG	PG Pharma	India	521	2.14

PH	PH Pharma	India	554	2.91
PI	PI Pharma	India	539	2.30

Table 2: Absorbance of Different Brands of Paracetamol.

Conc. Ppm	Paracetamol								
	PA	PB	PC	PD	PE	PF	PG	PH	PI
100	0.62	0.64	0.98	0.81	0.81	0.98	0.65	0.85	0.82
50	0.28	0.34	0.57	0.42	0.5	0.62	0.42	0.42	0.51
25	0.13	0.128	0.34	0.28	0.26	0.31	0.19	0.2	0.32
12.5	0.07	0.09	0.13	0.19	0.19	0.22	0.09	0.096	0.18
6.25	0.03	0.051	0.05	0.022	0.06	0.01	0.02	0.06	0.07

Table 3: %Assay, Regression Equation and R^2 of Different Brands of Paracetamol.

Brand name	Average weight of Tablet (mg)	Absorbance	Hardness (kg)	Friability	% Assay	Regression Equation	R^2
PA	510	0.64	10	5.63	98.60%	Y= 0.0063x - 0.0175	0.9974
PB	468	0.45	6	1.97	101.15%	Y=0.0064x + 0.0015	0.99
PC	526	0.52	10	7.6	97.22%	Y== 0.0098x + 0.0358	0.982
PD	514	0.53	9	9.04	99.2%	Y=0.0077x + 0.0458	0.973
PE	569	0.56	10	2.34	102.2%	Y== 0.0077x + 0.0658	0.98
PF	484	0.55	5	0.04	99.56%	Y=0.0097x +0.0504	0.962
PG	521	0.56	5	5.74	96.85%	Y=0.0067x + 0.0146	0.971
PH	554	0.6	9	0.10	105.10%	Y=0.0085x - 0.0053	0.999
PI	539	0.55	4	1.25	103.4%	Y=0.0077x + 0.0829	0.975

Experimental Design

It had been used to measure spectroscopic using a UV visible 1800 Shimadzu double beam spectrophotometer. The liquid that was employed once more for the test was liquid.

Wavelength Selection

Paracetamol at around 100 ppm were accurately prepared in 0.1N NaOH. These solutions were scanned between 200 and 400 nm in the UV spectrum. The greatest values of the light spectrum (lambda max) have been found at 257 nm, and these wavelengths were used in the absorption spectrum measurement equipment.[8]

Standard Stock Solution

100 mg standard paracetomol were weighed and dissolved in 0.1 N NaoH transferred to the 100 ml of volumentric flask and make the volume with the same solvent. More diluted solution was prepared by simple dilution of stock solution of the above solutions.

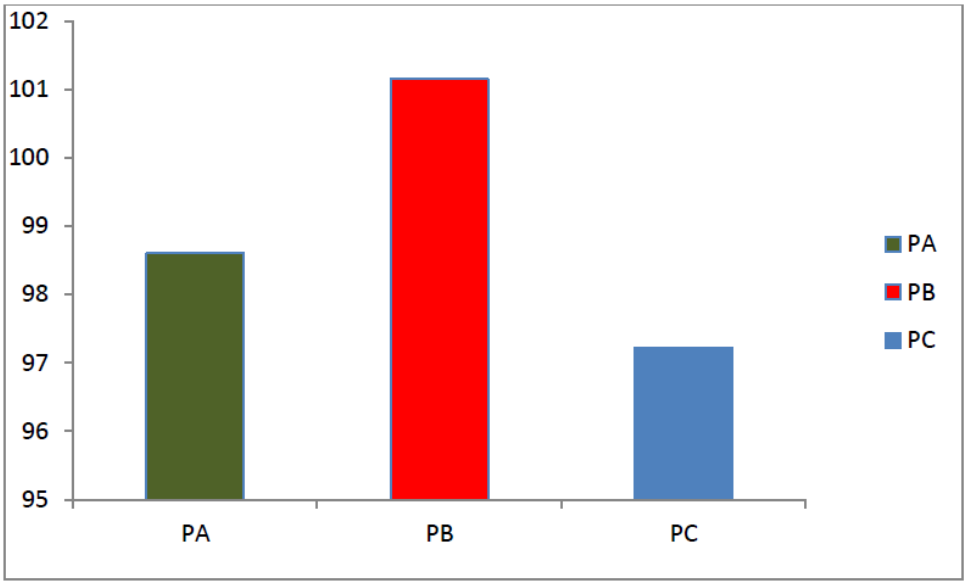
Sample Preparation

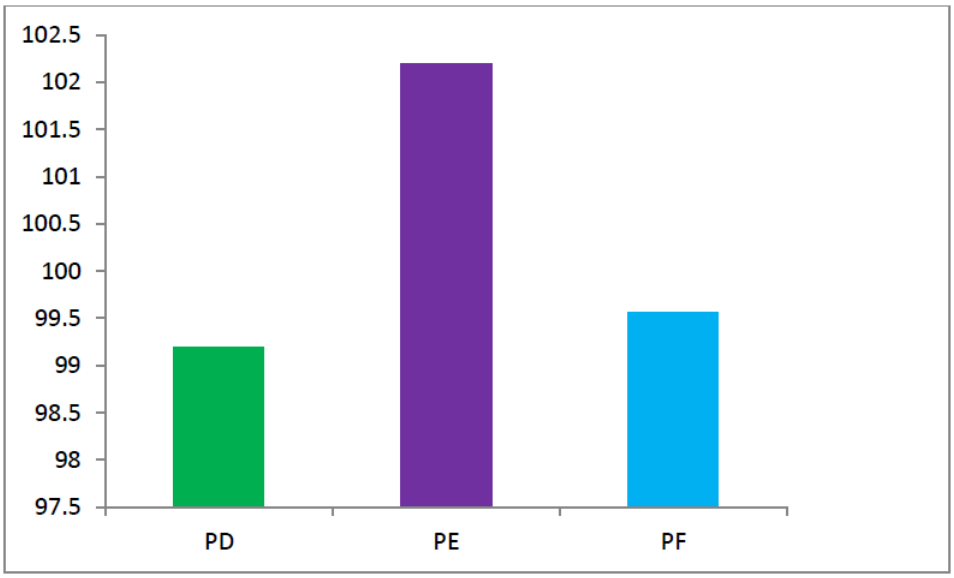
The nine separate brands of Paracetamol (PA, PB, PC, PD, PE, PF, PG, PH, PI) were purchased from several medical stores in Akkalkuwa, Dist-Nandurbar, (MS) India. Paracetamol 500mg were listed as the ingredients in each brand's tablet's batch number.

With the use of a pestle and mortar, 20 tablets of three distinct brand names from the marketed sample were evaluated and crushed equally. By measuring the test powder, 10 mg each of paracetamolwas introduced into the flasks separately, which typically hold 10 ml of water. The remedies were sample-treated for about 5 minutes, and then water was added to get the amount up to 100 ml.[9]

Procedure

Since the results were obtained from the standard and tablet solutions, the validity of the 10 mg solution in 100 ml absorbance of the specimen preparation and the fundamental amount of time to prepare in 1 cm at the wavelength of the amount of light absorbed at nearly 257 nm for paracetamol, using a spectrophotometer, had been evaluated.





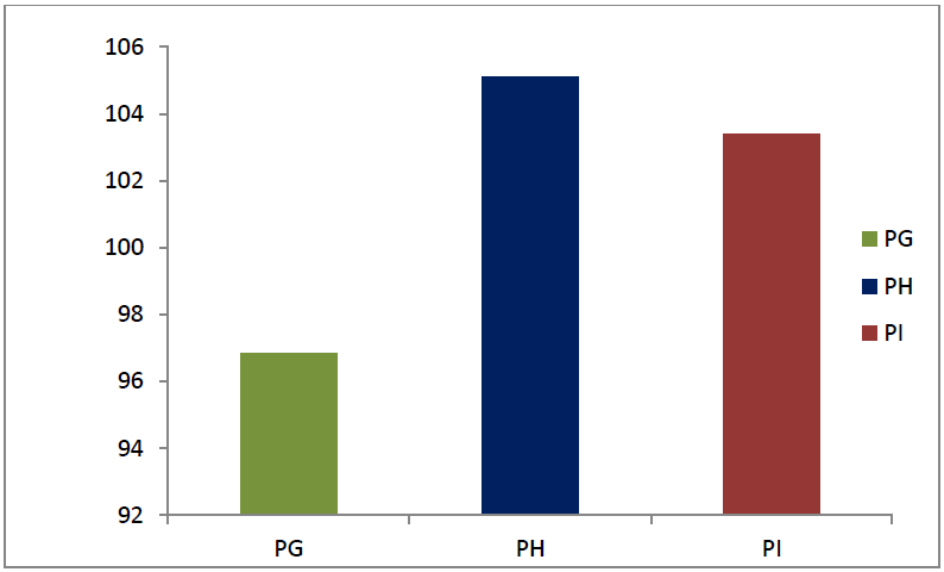
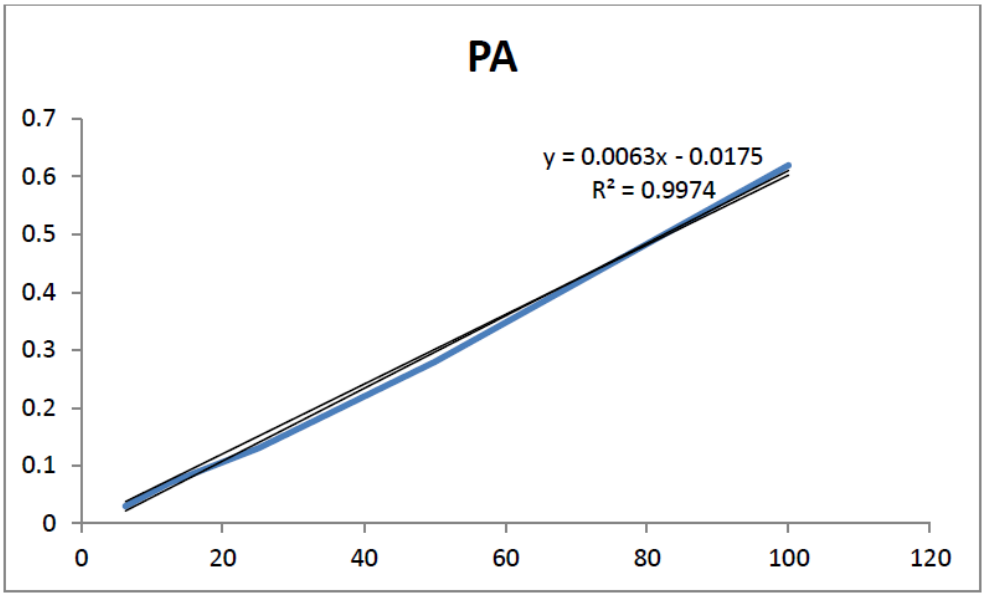
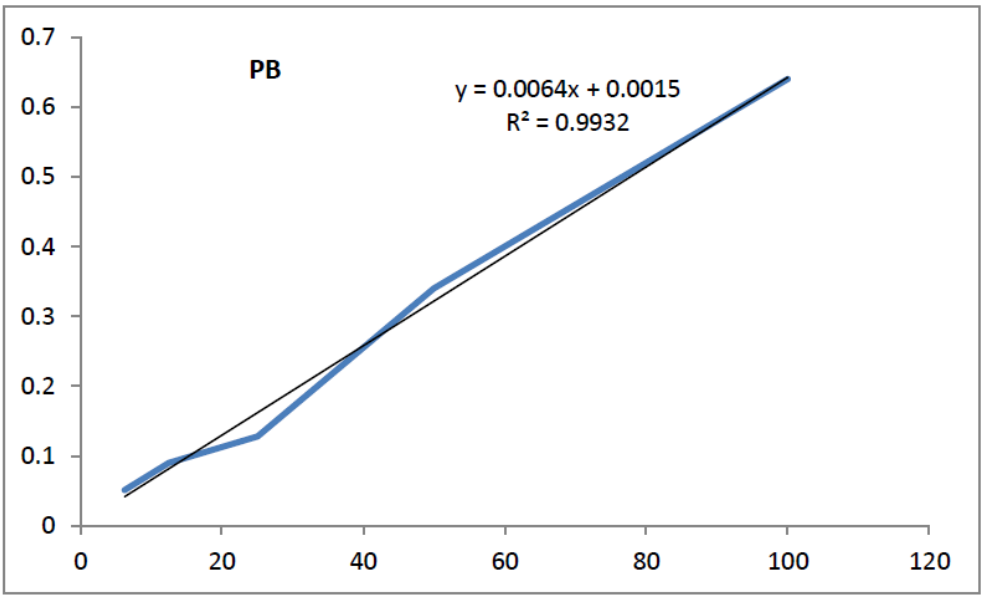


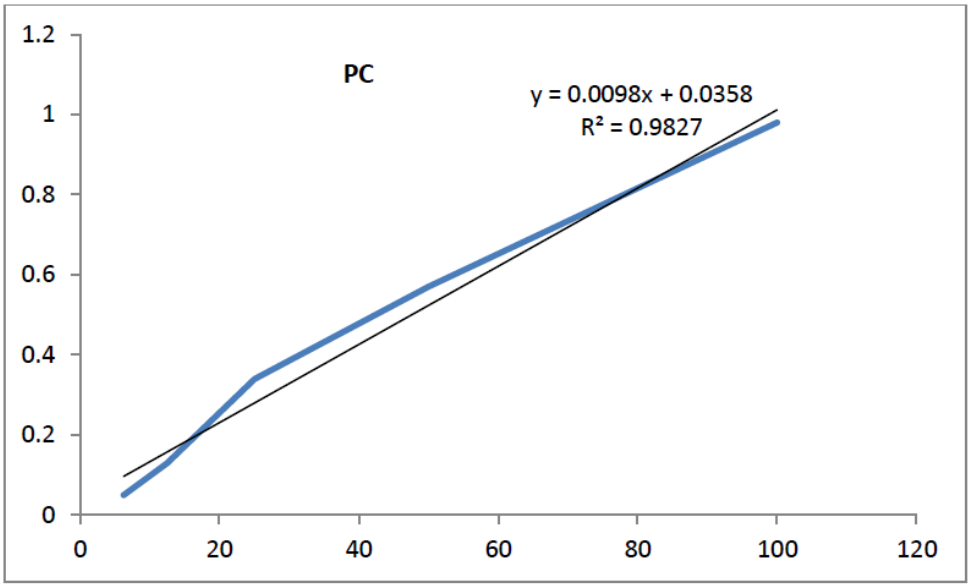
Figure 1: % Assay of Paracetamol.

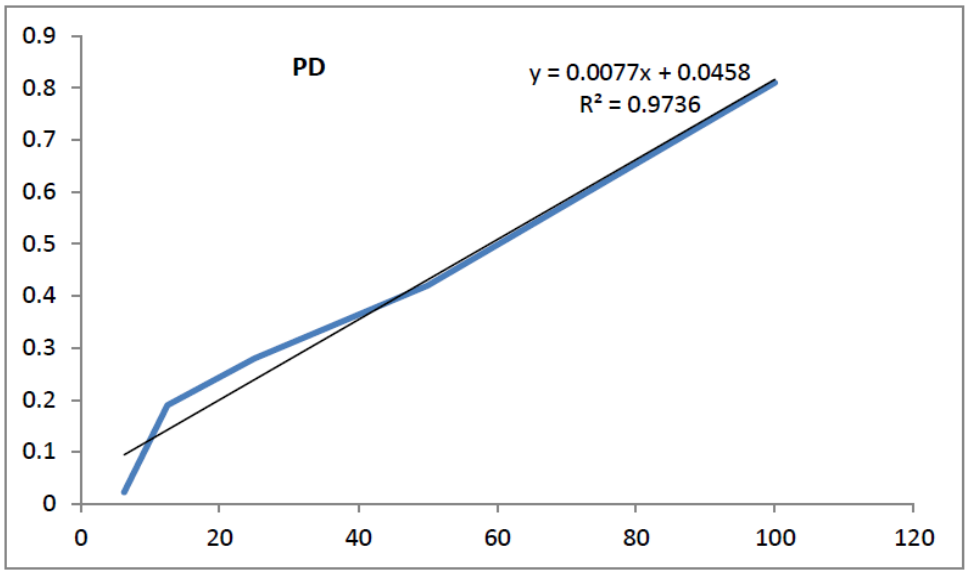
RESULTS AND DISCUSSION

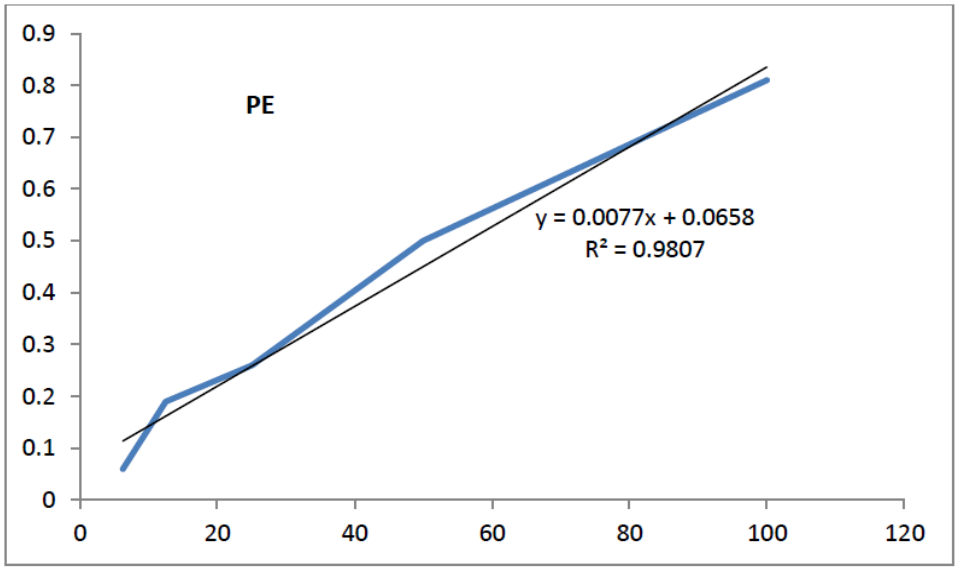
While doing study, the measurement was done using a UV spectrophotometer on each of the nine brands of paracetamol tablets. The relative standard deviation (RSD) and mean average weight of several tablet brands are shown in Table 1. The absorbance of all brands of various medications at various ppm concentrations is shown in Table 2. The percent assay, regression equation, and r2 of different labels are shown in Table 3. Our findings demonstrate that PH and PI has the highest % assay of all nine brands of paracetamol, although PG and PC showing lowest value of percentage assay about 96.85 and 97.22% respectively [Figure 1]. The method demonstrated some good linear relationships with all labels of paracetamol across a large range of 6.25-100 ppm with a correlation value of 0.999. all brands of Paracetamol labels together had a retrieval rate of >90%. The regression equation in [Table 3] has an R2 value of between 0.96 and 0.99.

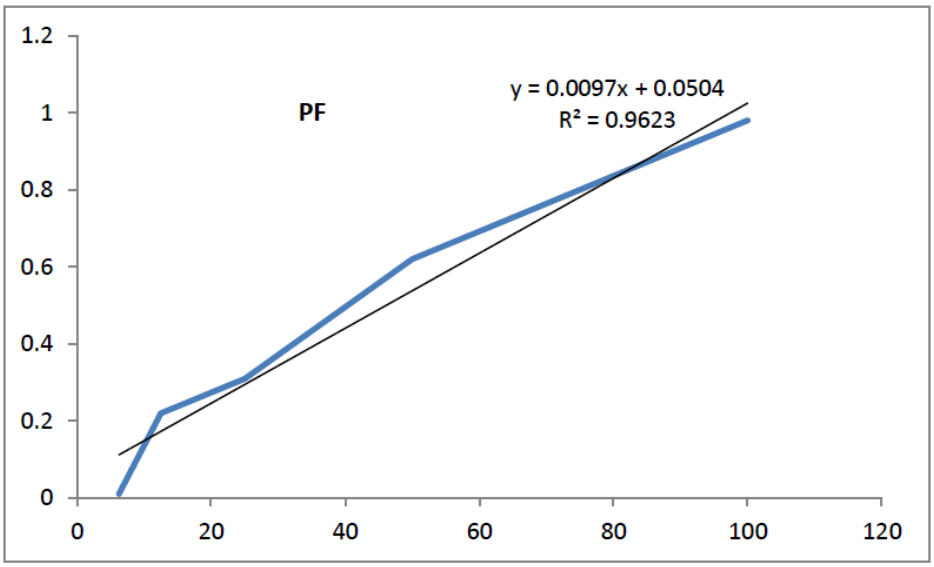


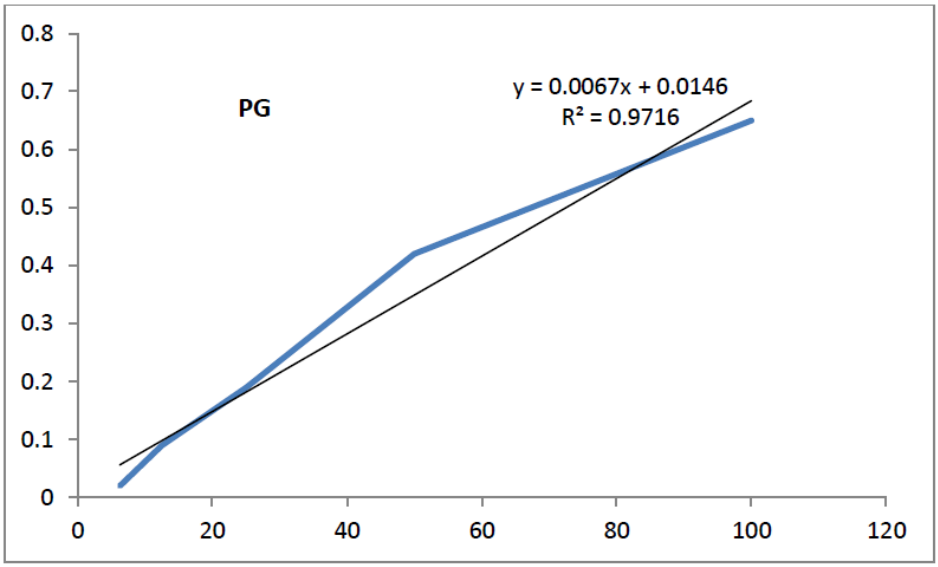


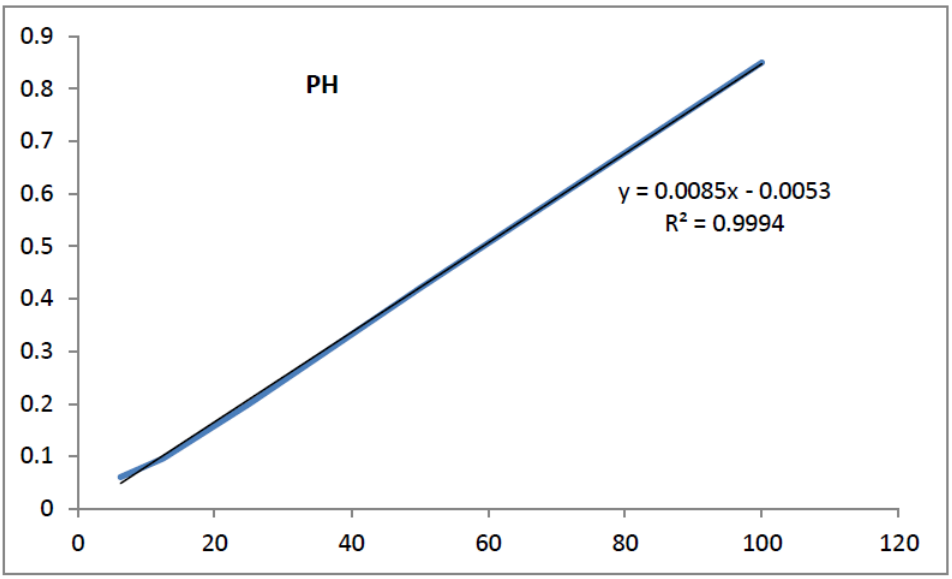

PC
y = 0.0098x + 0.0358
R² = 0.9827
1.2
1
0.8
0.6
0.4
0.2
0
0
20
40
60
80
100
120


PD
y = 0.0077x + 0.0458
R² = 0.9736
0.9
0.8
0.7
0.6
0.5
0.4
0.3
0.2
0.1
0
0
20
40
60
80
100
120


PE
y = 0.0077x + 0.0658
R² = 0.9807
0.9
0.8
0.7
0.6
0.5
0.4
0.3
0.2
0.1
0
0
20
40
60
80
100
120


PF
y = 0.0097x + 0.0504
R² = 0.9623
1.2
1
0.8
0.6
0.4
0.2
0
0
20
40
60
80
100
120


PG
y = 0.0067x + 0.0146
R² = 0.9716
0.8
0.7
0.6
0.5
0.4
0.3
0.2
0.1
0
0
20
40
60
80
100
120


PH
y = 0.0085x - 0.0053
R² = 0.9994
0.9
0.8
0.7
0.6
0.5
0.4
0.3
0.2
0.1
0
0
20
40
60
80
100
120

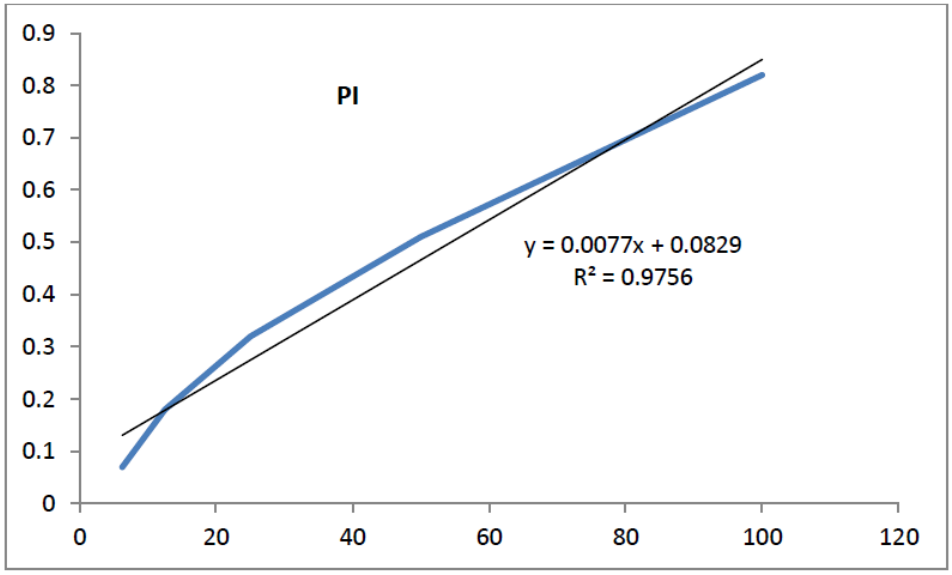


Figure 2: Linearity of all brands of paracetamol.

Selectivity and Specificity

The technique was developed through research of the excipients' component of each product's peak. It was shown to also be independent of the excipients used in preparation goods, making the method suitable for both drugs and mixtures of drugs.

Accuracy and Recovery

There is no discernible difference between the drug recovery levels. Excipients thus had no impact on the estimate [Table 3].

Range and Linearity

It displays the linear interpolation statistic of intensity analysis response, the standard deviation of the analytical variance of a linear regression, the regression line, and the best linear range (6.25-100 ppm), and it was discovered that these variables were also sequential inside the quantitative varies [Figure 2]. Outstanding linear relationships between all the drugs that were studied and the correlation coefficients were achieved in every case [Table 3].

CONCLUSION

In this work we have used nine different batches of paracetamol and coded as PA, PB, PC, PD, PE, PF, PG, PH, PI. All the nine brands of paracetamol were analysed in UV-Spectrometer. In all nine different brands of Paracetamol shows significant god result. Brand code PH, and PI shows higher % assay is about 105.10% and 103.4% respectively. Brands code PG and PC shows 96.85%, 97.22% respectively. Almost every brands shows significant R^2 values. Weight variations of all nine brands were found in the range. Available local market, give information about these products, comply with the provisions of IP standard method.

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