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(RESEARCH ARTICLE)

Phenolics and phytochemicals in methanolic extract of *Peperomia pellucidia* quantified by HPLC

Abraham Sisein Eboh *, Faith Owabhel Robert and Wodu Ebizimor

Department of Biochemistry, Niger Delta University, Amassoma, Bayelsa State.

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Abstract

Phenolics are compounds that contributed greatly to the healing potentials of many herbs, spices and plants of which *Peperomia pellucidia* is inclusive. This research aimed at determining the various phenolics present in the methanolic extract of *Peperomia pellucidia* extract. High performance liquid chromatography was used to analyse the phenolic content in *Peperomia pellucidia* extract. The result showed the presence of phenols and flavonoid quantified as total phenol 12.78 ± 2.70 mg GAE/g dry extract and total flavonoid as 10.97 ± 0.00 mg QE/g dry extract. HPLC result reveals the following phenols p-coumaric acid 32.76 mg/100g, gallic acid with a concentration of 138.07 mg/100 g. caffeic acid and naringenin were also detected in larger concentration as showed in the table. Ferulic acid, syringic acid and quercetin each has a retention time of 17.09, 17.47 and 22.60 min, a percentage area of 136.77, 96.93 and 91.06 while the concentrations where 16.129 mg/100g, 17.688 and 75.56 mg/100g respectively. Other phenolics with much higher quantity are rosmarinic acid and chlorogenic acid with retention time 23.97 and 25.06, a percentage area of 94.44 and 24.48, while the amounts quantified in *Peperomia pellucidia* extract was 19.133 mg/100g and 28.865 mg/100g. In conclusion methanolic extract of *Peperomia pellucidia* showed a lot of phenols that are very useful in the alleviation of stress that is linked with many diseases.

Keywords: *Peperomia pellucidia*; Phenols; HPLC; Phytochemicals; Flavonoid

1. Introduction

Phenols are metabolites which are essential for human diet and overall health of humans. Also, the phenolic compounds display a broad range of biological activities that are beneficial to the plant and also humans [1]. Other compounds that are not phenolics are also of great benefits to the wellbeing of humans.

The plant *Peperomia pellucida* is used ethno botanically as medicine, food and flavoring agent in various parts of the world. Aerial parts, young shoots, leaves and whole plant are used in the form of decoctions, juice, paste etc. to treat several diseases such as fever, cold, cough, viral diseases, rheumatic pain, asthma, vaginal infections and kidney infections. In Nigeria, the whole plant is used in haemmorhoids, hypertension, convulsion and bone fracture [2].

2. Material and methods

2.1 Chemicals

Methanol, sodium chloride, Folin reagent, sodium carbonate, gallic acid, sodium nitrite, aluminum chloride, sodium hydroxide, quercetin were purchased from a local chemical store and they are of analytical grade.

*Corresponding author: Abraham Sisein Eboh
Department of Biochemistry, Niger Delta University, Amassoma, Bayelsa State.

2.2 Plant material

Fresh leaves of *Peperomia pellucidia* were collected from Amassoma Community, Sothern Ijaw L. G .A Bayelsa State. The plant was identified by the Department of Botany, Niger Delta University, Bayelsa State. Plant was collected in November, 2021.

2.3 Preparation of methanoic extracts of *Peperomia pellucida*

*Peperomia pellucidia*was harvested and dried in the shade for 14 days (Two weeks). Using a grinding machine, it was then processed into a fine powder. A total of 161.8g of crushed plant was soaked in 1.5L methanol for three days (72 hours). The crude extract was then filtered. The extract was evaporated to dryness using rotary evaporator. The resulting paste was weighed and found to be 28.1g. It was then put in the refrigerator to be used later.

2.4 Phytochemical assays

Total phenol was carried out according to the method reported by [3] and [4], total flavonoid by [5]

2.5 Detection of phenolics in *Peperomia pellucida* methanolextract

This was carried out by Agilent 1200 series equipment and according to standard procedures.

3. Results and discussion

Table 1 Results of quantitative Phytochemicals of *Peperomia pellucida*

Sample	Total Phenol Content	Total Flavonoid
Peperomia pellucida	12.78 ± 2.70 (mgGAE/g) dry extract	10.97 ± 0.00 (mgQE/g) dry extract

Each value is a mean ± SD of triplicate samples.

The table above shows the various phytochemicals present in *Peperomia Pellucida* and the quantity of each phytochemical content. The phenolic content of ***Peperomia pellucid*** was slightly higher than the flavonoid content.

GAE = Gallic acid equivalent, QE = Quercetin equivalent,

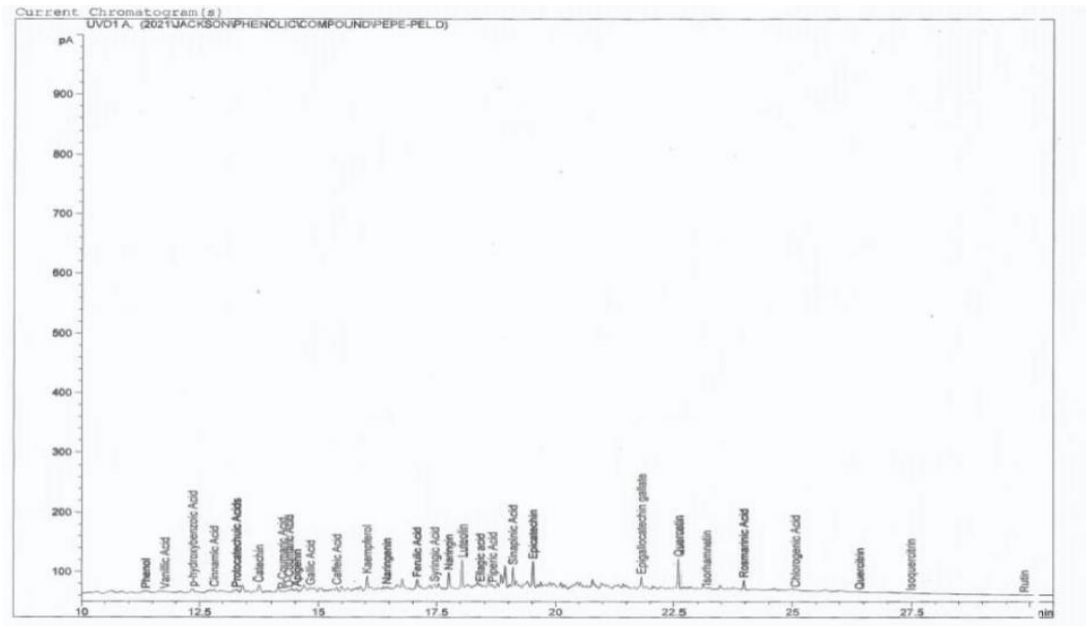

Figure 1 Chromatogram of phenolics in methanolic extract of *Peperomia pellucidia*

Table 2 The different quantities of phenolics in *Peperomia pellucidia*

Retention time (min)	Area	Amount (mg/100g)	Name of compound
11.36	107.73	$7.739 \times x10^{-3}$	Phenol
11.77	44.91	$1.07 x10^{-1}$	Vanillic acid
12.36	60.00	$1.192 x10^{-2}$	p-hydroxybenzoic acid
12.82	43.70	$3.44 \times x10^{-3}$	Cinnamic acid
13.29	89.51	1.071	Protocatechuic acid
13.74	89.90	$1.416 \times x10^{-2}$	Catechin
14.24	27.26	32.76	p-coumaric acid
14.37	48.14	$1.45 \times x10^{-3}$	o-coumaric acid
14.54	47.41	$5.538 \times x10^{-3}$	Apigenin
14.84	59.65	138.07	Gallic acid
15.40	56.68	131.20	Caffeic acid
16.04	108.83	$6.35 \times x10^{-3}$	Kaempferol
16.45	71.12	21.68	Naringenin
17.09	136.77	16.129	Ferulic acid
17.47	96.93	17.688	Syringic acid
17.77	161.30	$9.29 \times x10^{-1}$	Naringin
18.05	214.39	$4.407 \times x10^{-2}$	Luteolin
18.41	60.80	$1.85 \times x10^{-2}$	Ellagic acid
18.67	79.28	$7.77 \times x10^{-5}$	Piperic acid
19.10	131.23	4.633	Sinapinic acid
19.52	199.09	$1.40 \times x10^{-3}$	Epicatechin
21.82	108.68	$8.897 \times x10^{-3}$	Epigallocatechin gallate
22.60	191.06	78.56	Quercetin
23.18	34.42	$4.04 \times x10^{-4}$	Isorhamnetin
23.97	94.44	19.133	Rosmarinic acid
25.06	24.48	28.865	Chlorogenic acid
26.42	25.96	$3.12 \times x10^{-4}$	Quercetrin
27.48	20.99	$9.72 \times x10^{-2}$	Isoquercetrin
29.88	4.76	$1.102 \times x10^{-1}$	Rutin

There are many phenolic compounds detected from the HPLC analysis of *Peperomia pellucidia* extract, which include p-coumaric acid with a retention time of 14.24 min and a % area of 32.76 mg/100g another important phenol that was detected was gallic acid with a retention time of 14.84 and a % area higher than that of p-coumaric acid 59.65 and concentration of 138.07 mg/100 g. Caffeic acid and naringenin were also detected in larger concentration as showed in the table above. They had retention time 15.40 and 16.45, a percentage area of 56.68 and 71.12, and an amount of 131.20 mg/ 100g and 21.68 mg/100g respectively. Ferulic acid, syringic acid and quercetin each has a retention time of 17.09, 17.47 and 22.60 min, a percentage area of 136.77, 96.93 and 91.06 while the concentrations where 16.129 mg/100g, 17.688 and 75.56 mg/100g respectively. Other phenolics with much higher quantity are rosmarinic acid and

chlorogenic acid with retention time 23.97 and 25.06, a percentage area of 94.44 and 24.48, while the amounts quantified in *Peperomia pellucidia* extract was 19.133 mg/100g and 28.865 mg/100g [6], [7], [8].Phenolics are the most abundant secondary compounds in the plant kingdom. These different groups of compounds have received much medical attention as ROS scavengers and metal ion chelator. It has been reported that the antioxidant activity of phenol is mainly due to their redox properties, hydrogen donors and singlet oxygen quenchers [6].

4. Conclusion

The extract of *Peperomia pellucidia* was very rich in phenolics which are part of biological compounds contributing to the medical importance of *Peperomia pellucidia* extract. Therefore, further study is needed to clearly elucidate the major active ingredients in *Peperomia pellucidia*.

Compliance with ethical standards

Disclosure of conflict of interest

The authors declare no conflict of interest.

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