

Isolation and Characterization of the Basic Metabolites of the Methanol Extract of the Leaves of Rose Flower

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ABSTRACT

Rose flower leaves were recorded to possess a great medical value due to the presence of some biological active components. The phytochemical screening carried out on the leaves showed the presence of alkaloids saponins, tannins, flavonoids and cardiac glycosides. Quantitative analysis showed that alkaloids have $8.40 \times 100\text{g}^{-1}$, saponins ($1.90 \times 100\text{g}^{-1}$), tannins ($2.26 \times 100\text{g}^{-1}$) and flavonoids ($28.40 \times 100\text{g}^{-1}$). The IR analysis indicated the presence of functional group of O-H stretch in alcohols, C = C stretch in aromatic ring C-O stretch in primary alcohols and C-N in amides. Also the UV analysis indicated the presence of phenolic compounds which may have supported the use of the leaves of the plant locally in treatment and prevention of diseases like malaria and typhoid fever.

Key Words: Alkaloids, Rose flower, Saponnin, Phytochemical, Ultraviolet (U.V)

INTRODUCTION

Roses, the queen of the flower have been enjoyed for thousands of years. Cultivating of roses dated back to at least. Greek and Roman times and many varieties and descendents from ancient garden plants in China, Persia or Turkey. The world of roses is indeed varied and diverse, (Andreas, 2009). Wild roses grow in all corners of the world and many habitats are in forest along coastlines and rivers and even high mountain elevations. True roses belong to the genus *rosa*, but this is a subset of a larger family known as Rosaceae (Godwin, 1986). The rose family includes a tremendous number of blooming and edible plants including fruits trees (Apples, pear, cherry, peach and plum), hawthorn, straw berries, raspberries cotoneaster. Generally, all roses like full sun (at least 6 hours a day) and average garden soil. In most areas of the country like Turkey, they will survive on annual rainfall, but during the summer months most benefit from supplemental irrigation (Lewis, 2007). Roses require good drainage, if the soil is soggy they may develop root rot (Owulade, Eghianruwa & Daramola, 2004).

It has been found to be a source of food and also a source of medication for different ailments. The experimental method of extraction of some natural products like alkaloids, tannins, phenols, flavonoids and saponins were carefully carried out in order to identify the components and structures of these products that are present in the dry leaves of rose flower (Kaufman 1989). Rose flowers are used as ingredients in perfumes and health tonics. The flowers are used in the decoration of homes and environment thereby giving them a neater and better appearance. The petals and hips (berries) are used to make rose tea which is high in vitamin C (Weiss 1997). Its petals contain an astringent tannins and can be used to control bleeding (Okwu, 2004). The leaves and flowers can be used in making dye. Rose tea contains other vitamins and compounds that may help stomach problems such as bladder infection and diarrhea. Hence, the objectives of this study are:

1. To perform qualitative phytochemical analysis.
2. To perform quantitative phytochemical screening on the leaves of rose flower.
3. To elucidate the structure of the chemical compound present in the leaves of rose flower using the combination of spectroscopic methods of analyses like ultra violet and infra-red spectroscopy.

MATERIALS AND METHOD

Sample Collection and Preparation

The leaves of Rose flower were collected from the rural areas of Onitsha in Anambra State. The leaves were dried at room temperature for about three weeks and ground in a mill. The powdered sample obtained was stored in a clean polythene bag at ambient temperature ready for analysis. The qualitative phytochemical analysis was carried out using the method of Harbone 1998. This is to ascertain the presence of the phytochemicals before embarking on the quantitative phytochemical analysis. Quantitative phytochemical analysis was also carried out using the method of Okwu 2004. Extraction and isolation of the active components from the leaves of rose using sorhlet extraction technique and method by Okwu 2004. The extract was analysed using the IR analysis and ultraviolet visible analysis by GENESIS 105 UV SCANNING SPECTROPHOTOMETER.

RESULTS

Tables 1, 2 and 3 show the result obtained from the qualitative phytochemical and quantitative phytochemical analysis, U.V analysis and I.R. analysis respectively.

Table 1: Result of the qualitative and quantitative phytochemical analysis of rose flower.

Constituents	Qualitative Results	Quantitative result 100g
Alkaloids	+	8.40
Saponins	+	1.90
Tannins	+	2.26
Flavonoids	+	28.40
Terpenoids	+	10.40
Glycosides (cardiac)	-	0.00

+ = Present
- = Absent

Table 2: Result of ultraviolet spectrophotometric analysis

Wave length (mm)	Absorbance	Interpretation
281	1.319	Conjugated aromatics
279	1.008	Benzene ring
253	0.461	Substituted aromatic ring
231	0.402	Diene
211	0214	Monosubstituted cyclo compound

Table 3: Result of Infrared Spectrophotometric analysis

Wavelength peak (cms)	Functional groups (Suspected chromophores)
674.47	C – H bend in aromatics, alkenes
1242.22	C – O stretch for ethers and Esters, primary alcohols, carboxylic acid.
1632.56	C = O Stretch for Anhydride Anti-Symmetric Amide
2850.43	C – H stretch for alkene symmetric
2921.05	C – H stretch for alkene anti-symmetric and methyl group
3637.28	O – H, stretch in alcohols. N-H stretch in amines
3849.86	CONH ₂ for benzene rings

DISCUSSION

The quantitative phytochemical analysis shown in table 1 gave the following results: 8.40mg for alkaloids, 1.90mg. for saponins, 2.2mg for tannins and 28.40mg for flavonoids. Flavonoid has the greatest concentration which is attributed to the fact that flavonoids are the principal component of pigments it is responsible for the different colours found in flowers and fruits. The ultraviolet visible analysis was done by GENESIS 105 UV SCANNING

SPECTROPHOTOMETER. The U.V absorption wavelength around 231 indicated the presence of conjugated diene. The absorption at 279 – 281nm may be due to the presence of benzene ring. In the IR analysis result, the peaks below 900cm^{-1} – 1000cm^{-1} (674.47cm^{-1}) suggest the presence of aromatic rings, bands between 1000cm^{-1} – 1700cm^{-1} (1242.22cm^{-1}) suggest the presence of C – O stretch in primary alcohols, ester and carboxylic acids. Bands around 1632.56cm^{-1} suggest the presence of C=O stretch for anhydride anti symmetric amide. The peaks around 2000cm^{-1} – 3000cm^{-1} (2850.42 – 2921.05) may be due to presence of C – H stretch in alkenes and alkanes in methyl group. The bands around (3850.78 , 3878.28cm^{-1}) may be due to the presence of CONH₂ in benzene ring and O – H stretch in alcohols. The readings of IR and UV above strongly suggest the presence of aromatic rings with hydroxyl attachment. The attachment of the conjugated ring or diene system could be as result of the presence of flavonoids and cardiac glycosides as regards to the absorbance in the U.V 0.402 and in the IR 2850.43cm^{-1} – 2921.05cm^{-1} . Since in each case there is an attachment of benzene ring, this may suggest the presence of aldehyde and O – H attachment at 3637.28cm^{-1} and 3849.86cm^{-1} . The presence of some biological active components in the rose made it medicinal. For example, tannins when mixed with water and boiled with some other constituents is a good antidote against malaria and typhoid fever.

CONCLUSION

The phytochemical screening of the leaves of Rose flower has indicated the presence of alkaloids, flavonoids, saponins and tannins. This highlights its possibility of being used in the treatment and prevention of diseases and this may be possible due to the presence of conjugated hydroxyl (O-H) in IR and UV.

RECOMMENDATIONS

It is however recommended that every university should have access to analytical equipment like IR and UV because the cost of sending samples to another institution as far as to the West made the research more difficult and risky.

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