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Comparative Phytochemical Analysis and Mineral Profile of *Rosa damascene* and *Rosa centifolia*

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ABSTRACT

The present study was mainly focused to analyse the phytochemical, biochemical quantification and mineral profile of dried rose petals of *Rosa damascena* and *Rosa centifolia*. The Quantitative analysis of carbohydrates, protein, phenol and the qualitative phytochemical analysis were carried out in aqueous and ethanolic extract of *Rosa damascena* and *Rosa centifolia* petals using the standard procedures. From the present study it can be interpreted that the preliminary phytochemical analysis of the aqueous and ethanolic petal extract of *Rosa damascena* showed positive results in many tests namely carbohydrate, protein, flavonoid, glycosides and alkaloids. Nutrient composition of the dried rose petals of *R. damascene* and *R. centifolia* contain carbohydrate, protein and phenol**.** The highest amount of carbohydrate (448.70 mg GL /gm), Protein (312.33mg BSA/gm) and phenol (287.42 mg GAE/gm) were observed in *Rosa damascene* and the lowest amount of carbohydrate (100.22 mg GL /gm), Protein (170.17mg BSA /gm), and phenol (245.45mg GAE/gm) were observed in *Rosa centifolia*. Mineral profile of the following parameters such as Nitrogen, Potassium, Calcium, Magnesium, Chloride, Iron, Sodium, Sulphate were determined and quantified. In conclusion, the presence of nutrients was considered to be the first biochemical quantification that reports the major nutrients of carbohydrates, proteins and phenol and some minerals in the dried rose petals of *Rosa damascene* and *Rosa centifolia* that can be strongly recommended for human diet intake.

KEYWORDS: Phytochemical, Biochemical quantification, Dietary human intake, Nutrient composition

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INTRODUCTION

Traditional medicines, modern medicines, nutraceticals, nutritional supplements, folk medicines, pharmaceutical intermediates, and chemical entities for synthetic drugs all depend on medicinal plants. The chemical profile of medical plants produce a clear physiological action on the biological system, which has been identified as the most biologically important chemicals of plants, has been revealed as the value of medicinal plants as a source of active pharmaceuticals. The Rosacea family has around 150 species of ornamental plants that has been referred to as the "Queen of flowers" and are widely distributed in Europe, Asia, the Middle East, and North America, with wild roses being one of the most desired of all cultivated plants. Many wild species have been turned into a wide variety of cultivated species in vibrant colours. *Rosa damascene* Mill is one of the most significant *Rosa* species, known as the Damask rose since it was first imported to Europe from Damascus Jalali-Heravi. (2008**).** Rose oil, rose water, rose concrete, rose absolute, and dried petals are the major products of the Damask rose are utilised in scents, cosmetics, pharmaceuticals, and food industries. The best cut flower; as a result, it is in high demand both domestically and internationally. *Rosa centifolia* petals are used in herbal concoctions and it is an excellent source of vitamin C and is frequently used to make tea (Baser, 1992, Kurkcuoglu**,** 2003, Kazaz, 2010**)**. Flowers are enjoyed by people all over the world in their meals. Eating a varied diet consisting of unique dishes is the best way to ensure that you get enough vitamins and minerals, and adding rose petals may explore to try new cuisines. Rose petals contain roughly 95% water, their nutritional value is restricted, and

their calorie content is low, they were recommended in ancient Chinese medicine to treat digestive issues, pain from injuries, and menstrual irregularities.

For generations, rose petals have been used in various traditions as jams, teas, pastries, and flavour extracts Cutler, (2003). Flowers have gained attention as fresh edible crops in recent years, and roses, with their variety of colours and scent, are great prospects for commercialization as fresh edible crops (Kelley *et al*., 2002). The use of natural resources, particularly plants, is increasing on a daily basis in the search for new therapeutic agents. For many years, rose products have been employed in the food, fragrance, and cosmetics industries. (Vamanu and Nita., 2013 Cai, *et al.*, 2005 Kazaz *et al*., 2010**).** There is currently a global trend toward using natural plant treatments for therapeutic purposes and the rose flower extracts have been examined for a variety of health benefits and as a mild laxative in folk medicine. The present study was undertaken to evaluate the phytochemical analysis and biochemical estimation of *Rosa damascene* and *Rosa centifolia* flower petal extract.

MATERIALS AND METHODS

Plant Material

Collection and Preparation of flower sample

Flower sample (*Rosa centifolia & Rosa damascena*) were collected in and around Coimbatore district, Tamil Nadu, South India. The flower sample was collected during the month of June and they were shade dried and ground to fine powder and stored in air tight container for future studies.

Preparation of the Plant Extracts

15grm of powdered samples was measured and mixed with 100mL of ethanol and hot water. Then the extractions were carried out by shaker for 72 hours. The extract obtained was stored in screw cap bottle in refrigerator for further study. The extracts of the sample were tested for flavonoids, saponin, terpenoids, carbohydrates, proteins, amino acids, steroids, glycosides and resins. The phytochemical screening was carried out by standard methods (Kokate *et al*. 2001, Ramman, 2006and Karpagam *et al*, 2008).

Phytochemical Screening

Test for carbohydrates

To 2mL of the test solution 2 drops of molish reagent was added and the solution is slowly poured into a test tube containing of concentrated sulphuric acid so that 2 layers were formed. The formation of a purple colour at the interference of the 2 layer indicate the presence of carbohydrates

Test for Protein

It is used to determine the presence of the peptide bond in protein. To 3mL of total sample 3 % of NaOH was added and a few drops of 1 % of C uSO4 were added. The solution turns from blue to violet colour or to pink indicating the presence of Protein

Test for Steroids

To 2mL of the extract 2mL of chloroform and 2mL of concentrated sulphuric acid was added. Two layers were formed chloroform and acid layer were formed showing greenish yellow florescence colour indicating the presence of steroids.

Test for Glycosides

To the test solution few drops of glacial acetic acid was added followed by few drops of 5% of ferric chloride and concentrated sulphuric acid and it was observed for brown coloration out the junction of 2 layer and bluish green colour in upper which indicates the presence of glycosides.

Test for Flavonoids

To 2mL of the extracts and few drops of 1% of ammonium solution was added. A yellow colour was observed for flavonoid.

Test for Alkaloid

To the test sample 5mL of 1% of aqueous HCL acid and was kept in water bath. 1mL of the filtrate was treated with Mayer's reagent. A formation of yellow coloured precipitate indicate the presence of alkaloids.

Test for tannins

To some test solution 1mL of water and 1 – 2 drops of ferric chloride was added. Blue colour observed for Gallic tannin and black colour for catecholic tannins.

Test for Saponins

To 2mL of the extract solution, 1mL of the water was added. The persistent foam indicate the presence of saponin.

Test for Terpenoid

2mL of extract was mixed with 2mL of chloroform in a test tube. This 3mL of the concentrated sulphuric acid was added along the walls of the tubes to form a layer. An interference with a reddish brown colouration will confirm the presence of terpenoids.

Estimation of Total Carbohydrate by Anthrone Reagent Method

100mg of the sample was weighed and it was hydrolysed by keeping it in a boiling water bath for three hours with 5mL of 2.5 N HCL and was cooled to room temperature. The sample was neutralized with solid sodium carbonate until the effervescence ceases and the volume was made to 10mL and centrifuged. The supernatant was collected and 0.5 and 1 mL of aliquots were taken for analysis. The standards were prepared by taking 20, 40, 60, 80, 100µL and 1 mL of the working standard with "0" as blank. Then the volume was made to 1mL in all the tubes including the sample by adding distilled water followed by the addition of 4mL of anthrone reagent. The standards along with the samples were heated for 8 minutes in a boiling water bath and cooled rapidly observation of the colour change from green to dark green colour was read at 630nm. A standard graph was plotted by concentration of the standard on the X –axis

versus absorbance on the Y – axis. From the graph the amount of carbohydrate present in the sample was calculated.

Estimation of total Protein by Lowry's Method

100mg of the sample was weighed, grinded well with a pestle and mortar in 5 – 10 mL of the phosphate buffer and centrifuged; the supernatant was used for protein estimation. The different standards 50,100,150, 200, 250 µL of the working standard were pipetted out into a series of test tube. 0.1ML and 0.2mL of the sample extract was pipetted out in two other test tubes. And the volume is made up to 1mL in all the test tube and a tube with 1mL of water serves as blank. 5mL of reagent C was added in each tube including the blank and was mixed well and allowed to stand for 10 minutes. Then 0.5mL of reagent D was added in all the test tube and was mixed well and incubated at room temperature in the dark for30 minutes. Blue colour is developed. The readings were taken at 660 nm. A standard graph was plotted by concentration of the standard on the X –axis versus absorbance on the Y – axis. From the graph the amount of protein present in the sample was calculated.

Estimation of total phenol by Follin – Ciocalteau reagent method

10 g of the sample was weighed and was grinded with pestle and mortar in 80 % of ethanol. The sample was centrifuged for 20 minutes, and the supernatant was evaporated to dryness. The residue was dissolved in a known volume of distilled water of 5 ml. Different concentration of 50, 100, 150, 200, 250 aliquots were pipetted out into test tubes and the volume was made to 3ml with distilled water with each tube. 0.5 mL of Follin – Ciocalteau reagent was added to all the test tube after 3 minutes 2 mL of 20 % of sodium carbonate solution was added to each tube and was mixed thoroughly and the test tube was kept in boiling water for one minute, cooled and measured at the absorbance at 650nm. A standard graph was plotted by concentration of the standard on the X –axis versus absorbance on the Y – axis. From the graph the amount of phenol present in the sample was calculated.

Determination of Minerals

The concentration of Nitrogen, potassium, Calcium, Magnesium, chloride, Iron, sodium and Sulphate were quantified by Atomic Absorption spectroscopy (AAS). Parameters of the Instrument were chosen in accordance with the manufactured instructions. The absorbance was measured by UV – Visibile spectrophotometer at 430 nm. Mineral content was expressed as mg/100g DM.

RESULTS

Qualitative Phytochemical analysis

Table 1. Preliminary qualitative Phytochemical analysis of extracts of *Rosa damascene and Rosa centifolia* flower petals

	Rosa damascene		***Rosa centifolia***	
Test	**Aqueous extract**	**Ethanol extract**	**Aqueous extract**	**Ethanol extract**
Carbohydrate	++	++	++	++
Protein	+	+	+	+
Flavonoid	+	+	+	-
Saponin	-	-	-	-
Glycosides	+	+	_	+
Steroid	-	-	-	-
Terpenoids	-	-	-	-
Alkaloids	+	+	-	-

+++: Highly present, ++: Moderately present, +: Low, -: absence

The qualitative phytochemical analysis of aqueous and ethanolic extracts in rose petals of *R. damascene* and *R. chinensis* were performed to confirm the presence of secondary metabolites. The results revealed the presence of carbohydrate, protein, flavonoid, glycosides and alkaloids in which carbohydrate was present higher amount in *Rosa damascene* and *Rosa centifolia* and the results were interpreted on the basis of the positive reaction characterized by a visible colour change.

Biochemical Estimation of *R. damascene* and *R. centifolia*

Table 2. Showing the total amount of carbohydrate, protein and phenol in dry petals of *R. damascene* and *R. chinensis.*

SL. No	**Biochemical constituents**	***Rosa damascena***	***Rosa centifolia***
1	Carbohydrate (mg GL /gm)	448.70±1.35	100.22±3.24
2	Protein (mg BSA /gm)	312.33±4.20	170.19±4.27
3	Phenol (mg GAE /gm)	287.42±2.10	245.45±5.37

All values are meant standard deviation±

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In the present investigation, the total amount of carbohydrate, protein and phenol were quantified. The highest amount of carbohydrate **(**448.70±1.35mg GL /gm)**,** protein **(**312.33±4.20mg BSA /gm) and phenol **(**287.42±2.10mg GAE /gm) were present in *Rosa damascene* compared to *Rosa centifolia* as shown in the table: 2

Table 3. Mineral Profile of *Rosa damascene* and *Rosa centifolia*

Sl.No	Parameter	*Rosa Damascena*	*Rosa centifolia*
1	Nitrogen	*1.32*	*1.63*
2	Potassium	0.26	0.32
3	Calcium	0.19	0.88
4	Magnesium	0.13	0.07
5	Chloride	0.60	0.23
6	Iron	0.39	0.60
7	Sodium	0.22	0.62
8	Sulphate	0.19	0.38

From the results it can be concluded that the different concentrations of macro and micro elements were identified and quantified. The nitrogen were exhibited significantly with high concentration of Nitrogen *Rosa damascene(1.32)* and *Rosa centifolia* (1.63) when compared with other minerals such as potassium, calcium, magnesium, chloride, iron, sodium and sulphate as shown in the table.3.

DISCUSSION

The present study revealed that the aqueous and ethanoloic extracts of *R. damascena* and *R. centifolia* contained Carbohydrate, Protein, Flavonoid, glycosides and alkaloids. However, alkaloids were detected in the aqueous and ethanloic extract of *R. damascene.* Compared to all Flavonoid, glycoside and alkaloids were determined tobe present with lesser amount *(+)* in aqueous and ethanolic extract of *R. damascena* and *R. centifolia*. These secondary metabolities are said to have many biological and therapeutic properties. So the selected *R. damascena and R. centifolia* are expected to have many medicinal properties. Similarly Kanegusuku *et al.* (2007) have evaluated the phytochemical analysis of *Rubus rosafolius* in hydroalcoholic extract results interpreted that certain hexane, dichloromethane, ethyl acetate, and butanolic fractions, as well as the pure substance were obtained from aerial components of *R. rosaefolius.* Phytochemical analysis of *Rubus apetalus* in the leaf extract revealed the presence of saponins, alkaloids, flavonoids, phrnolics, tannins, phytosterols and triterpenoids reported by (Raghavendra and kekuda., 2018). The preliminary phytochemical analysis and the results revealed the presence of phytochemicals namely saponins, alkaloids, flavonoids and tannins in the leaf extract of *Rubus steudneri* reported by (Raghavendra *et al*., 2018). Sytar *et al. (*2015) have assessed the flavonoid content in Rosaceae and the results has been evaluated to be found in decreased order as the highest value of flavonoids that was determined in the leaves of *Cotoneaster horizontalis*, *Agrimonia eupatoria*, *Rosa rubiginosa*, *Eriobotrya japonica*, *Alchemilla mollis*, *Laurocerasus officinalis*, *Potentilla recta* and in *Cerasus avium*.

In the present investigation *R.damascena and R.centifolia* were evaluated quantitatively for the analysis of total carbohydrate, Protein and Phenol. The total amount of carbohydrate, protein and phenol present in *R. damascena* were high when compared to *R. centifolia and the amount of Crbohydrate* was preset in higher amount when compared to Protein and phenol in *R.damascena and R. centifolia.* Similarly Khalid. (2021) have studied that the plant of *Crataegus azarolus* interpreted and that the total phenol and tannin content were determined. The results represented the highest significant value was observed from leaf, when compared with other parts of *Crataegus azatolus* .On the other hand, the total tannin was showed uppermost in leaf and the steam. Whereas, the smallest total tannin was observed from the seed. Furthermore, the total phenolic contents of the plant were observed the lowest value in seed. Whereas, the total phenol in leaf was observed a higher significantly value and in stem, with all significant value and the study showed that the leaf and other part of *Crataegus Azarolus* L, rich in total phenolic and total tannin after orbital shaker method was used.

CONCLUSION

In the present study, it can be concluded that *Rosa centifolia and Rosa damascene* is outstanding source of carbohydrate, Protein and phenol and the presence of some secondary metabolites can be suggested and strongly recommended for the intake of human diet.

REFERENCES

I. Cutler, R. R. 2003. Culinary and Medicinal Uses and Nutritional value. In: “Encyclopedia of Rose Science”, (Eds.): Roberts, A. V., Debener, T. and

Gudin, S. Elsevier, Academic Press, San Diego, CA, PP. 707-726.

II. E. Vamanu and S. Nita, "Antioxidant capacity and the correlation with major phenolic compounds, anthocyanin, and tocopherol content in various extracts from the wild edible Boletus edulis mushroom," *Biomedical Research International*, vol. 2013, Article ID 313905, 11 pages, 2013.

III. H. C. Baser, "Turkish rose oil," *Perfume and Flavor*, vol. 17, pp. 45–52, 1992

IV. Kanegusuku, Marcia, et al. "Phytochemical and analgesic activity of extract, fractions and a 19-hydroxyursane-type triterpenoid obtained from Rubus rosaefolius (Rosaceae)." *Biological and Pharmaceutical Bulletin* 30.5 (2007): 999-1002.

V. Kelley, K. M., Behe, B. K., Biernbaum, J. A and POff, K. L. 2002. Combinations of colours and species of containerized Edible Flowers: Effects on consumer Preferences. Hortsci., 37: 218-221.

VI. Khalid, Karzan Khalid, *et al*. "Estimation Of Total Tannin And Total Phenolic Content In Plant (Crataegus azarolus L) by orbital shaker technique." *International Journal of Agriculture Environment and Food Sciences* 5.1 (2021): 1-6.

VII. M. Jalali-Heravi, H. Parastar, and H. Sereshti, "Development of a method for analysis of Iranian damask rose oil: combination of gas chromatography-mass spectrometry with Chemometric techniques," *Analytica Chimica Acta*, vol. 623, no. 1, pp. 11–21, 2008.

VIII. M. Kurkcuoglu and K. H. C. Baser, "Studies on Turkish rose concrete, absolute, and hydrosol," *Chemistry of Natural Compounds*, vol. 39, no. 5, pp. 457–464, 2003.

IX. Raghavendra, H. L., and P. T. R. Kekuda. "Preliminary phytochemical analysis, antiradical and lipid peroxidation inhibitory activity of Rubus steudneri Schweinf.(Rosaceae)." *Int J Green Pharm* 12.1 (2018): 49-55.

X. Raghavendra, H. L., T. R. Prashithkekuda, and D. M. Chetan. "Phytochemical analysis and in vitro antioxidant activity of Rubus apetalus Poir (Rosaceae)." *Pharmacology OnLine* 1 (2018): 187-195.

XI. S. Kazaz, S. Erbas, H. Baydar, T. Dilmacunal, and M. A. Koyuncu, "Cold storage of oil rose (*Rosa damascena* Mill.) flowers," *Scientia Horticulturae*, vol. 126, no. 2, pp. 284–290, 2010.

XII. Sytar, Oksana, *et al*. "The application of multiplex fluorimetric sensor for the analysis of flavonoids content in the medicinal herbs family Asteraceae, Lamiaceae, Rosaceae." *Biological research* 48.1 (2015): 1-9.

XIII. Y.-Z. Cai, J. Xing, M. Sun, Z.-Q. Zhan, and H. Corke, "Phenolic antioxidants (hydrolyzable tannins, flavonols, and anthocyanins) identified by LC-ESI-MS and MALDI-QIT-TOF MS from *Rosa chinensis* flowers," *Journal of Agricultural and Food Chemistry*, vol. 53, no. 26, pp. 9940–9948, 2005.