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# COMPARATIVE STUDY OF PROXIMATE COMPOSITION OF STEM AND LEAVES OF EPIPHYLLUM OXYPETALUM FROM DIFFERENT DISTRICT OF MAHARASHTRA

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## ABSTRACT

Proximate compositions of leaves and stem of Epiphyllum Oxypetalum from Kalyan, Jalgaon and Ratnagiri district of Maharashtra were investigated. Moisture content in the leaf (10.2433± 0.2032%) is lower than the stem (21.5567±0.9175%), crude fibre (32.2057±0.0272%) and the total extract (27.2827±0.0587%) higher than the stem, (24.8857±0.0509%) (16.0523±0.1106%) respectively. The crude protein (0.717±0.0053%) and (1.1277±0.0605%), total carbohydrate (1.2780 ±0.0085%) and (1.0883±0.0583%) is present in leaves and stem respectively. Reducing sugars is absent in both leaf and stem. Non-reducing sugars (1.2780 ±0.0085%) (1.0883±0.0583%) is present in leaf and stem respectively. Total ash content (2.6070±0.0046%) of leaves is higher than stem (2.0860±0.0217%). Water soluble ash (0.1733±0.0045%) (0.8770±0.0036%), Water insoluble ash (2.4273±0.0021%) (1.1993±0.0300%), acid soluble ash (2.3987±0.0133%) (1.9263±0.0064%), acid insoluble ash (0.2013±0.0121%) (0.2103±0.0709%) is present in leaf and stem respectively. Elements like Calcium (0.1183±0.0031%), Magnesium (0.7177±0.0050%), and Sulphur (8.8140±0.6083%) in leaf is higher than stem (0.0401±0.0019%), (0.0307±0.0015%), (2.3220±0.0030%) respectively. Carbon(69.0497±0.1271%) (65.8013±0.2849%), Hydrogen(1.1680±0.0040%) (2.5147±0.0095%), and Nitrogen (0.1480±0.0546%) (0.1910±0.0215%) is present in leaf and stem respectively. However there is some variation in proximate composition and elemental analyses of leaf and stem of Epiphyllum Oxypetalum in Kalyan, Jalgaon and Ratnagiri district of Maharashtra.

**KEYWORD:** Proximate composition, Epiphyllum Oxypetalum stems and leaves, proximate analyses, comparative study.

## INTRODUCTION

According to the Food and Agriculture Organization (FAO), 50,000–75,000 plant species are used in the traditional folk medicine throughout the world.[1,2] The contribution of different species of plant part to health status of human cannot be over emphasized.[3] Each medicinal plant species have its own nutrient composition besides having pharmacologically important phytochemical. These nutrients are essential for physiological functions of human body. Such nutrients and biochemical, like carbohydrates, fats and proteins play an important role in satisfying human needs for energy and life process.[4]

Proximate analysis in plant gives valuable information and help to access the quality of sample. Proximate composition is the term usually used in the field of feed/food and means the 6 components of moisture, crude protein, ether extract, crude fiber, crude ash and nitrogen free extracts, which are expressed as the content (%) in the feed, respectively etc.[5] Carbohydrates, fats and protein are the essential nutrients of life.[6] Mineral nutrients are usually present in plants in low concentrations which fluctuate greatly in both space and time due to environmental factors such as weather, climate and physico-chemical properties, including soil type, soil pH and erosion.[7] As various medicinal plant species are also used as food along with their medicinal benefits, evaluating their nutritional significance can help to understand the worth of these plants species.[8]

*Epiphyllum Oxypetalum* (Bramhakamal) plant is a epiphytic or lithophytic, widely cultivated in tropical and sub-tropical region, known as orchid cactus, queen of lady, queen of night.[9,10,11,12]

Evaluating the proximate analysis and nutritional significance of *Epiphyllum Oxypetalum* can help us to understand the importance of these plant species in different ecological conditions.[13] The knowledge of this innovation and investigation will be useful for the plant breeders for further improvement in this plant. The scientist can also use the information developed in value addition of the medicine. The information generated through this research can be used by the traders in national as well as international market.

There for the present study was carried out with the objective to evaluate the proximate composition of *Epiphyllum Oxypetalum* from different district of Maharashtra.

**Table 1. Taxonomy of Epiphyllum Oxypetalum Kingdom Planta**

| | |
|---|---|
| **Kingdom** | **Plantae** |
| **Sub Kingdom** | **Tracheobionta** |
| **Superdivision** | **Spermatophyta** |
| **Division** | **Magnoliophyta** |
| **Class** | **Magnoliopsida** |
| **Order** | **Caryophyllales** |
| **Family** | **Cactaceae** |
| **Genus** | **Epiphyllum** |
| **Species** | **E. Oxypetalum** |
| **Binomial name** | **Epiphyllum Oxypetalum** |

## MATERIAL

### Chemicals

All chemicals and reagents used during this test were of analytical grade (Loba chemical). These chemicals and reagents were obtained from Department of Chemistry, Mithibai College, Mumbai-400056, Maharashtra, India.

### Collection of plant material

The fresh stem and leaves of *Epiphyllum Oxypetalum* were collected from local garden of kalyan, Jalgaon and Ratnagiri, district of Maharashtra, India. The collected stem and leaves were identified and authenticated by Dr. Sashirekha Suresh Kumar (Head of Botany Department) from Mithibai College.

### Preparation of plant extract

The fresh stem and leaves were selected and washed under running tap water, shed dried and coarsely powdered in a mechanical grinder.

The powder was extracted with pet ether in soxhlet extractor at temperature $40^{o}$-$50^{o}$C. The extract was concentrated using rotary evaporator and preserved at room temperature in air tight bottle prior to their use in actual experiment.

## METHODS

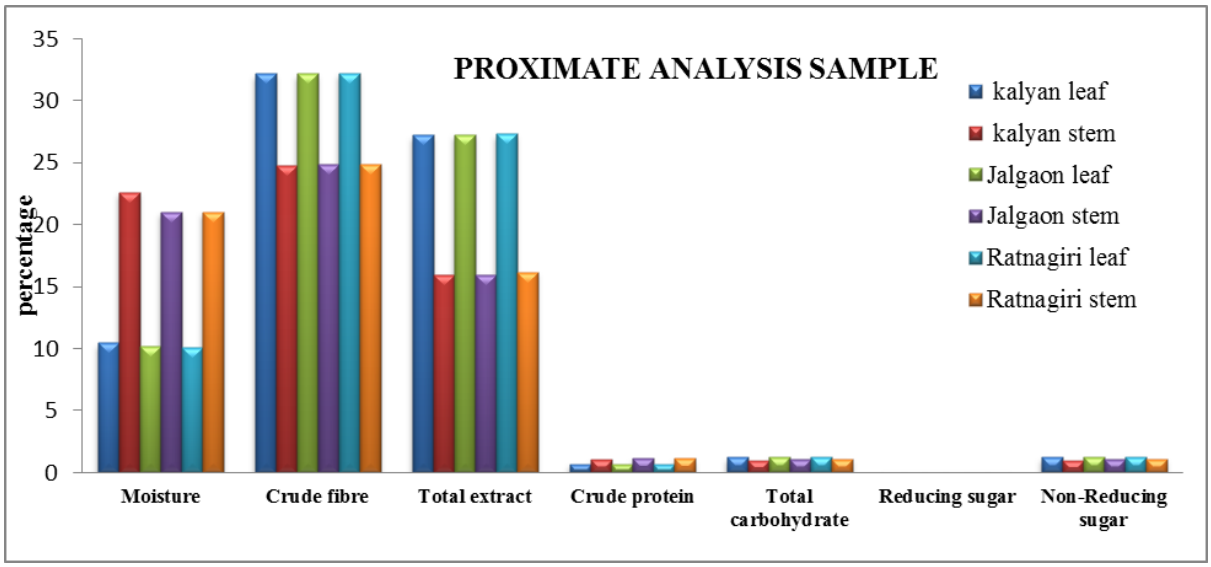
Moisture, Ash (its analysis) and Calcium and Magnesium content were determined by the methods as described by Pearson.[14, 15,19] Crude fibre content was determined by the method recommended in the Fertilizer and feeding stuff regulations.[16] Total extract was determined

by the methods used by Colowick and Kaplan.[17] Carbohydrate, reducing and non-reducing sugar were estimated by the method used by Nelson.[18] Crude protein was estimated by "Micro Kjeldhal'' method (N X 6.25).[20] Sulphur, Carbon and Hydrogen were estimated by method used by Sharma and Jeffry.[19,20]

All analysis was carried out in triplicate and average is recorded.

**Table 2. Comparative study of proximate principles of air dried sample (g/100 g).**

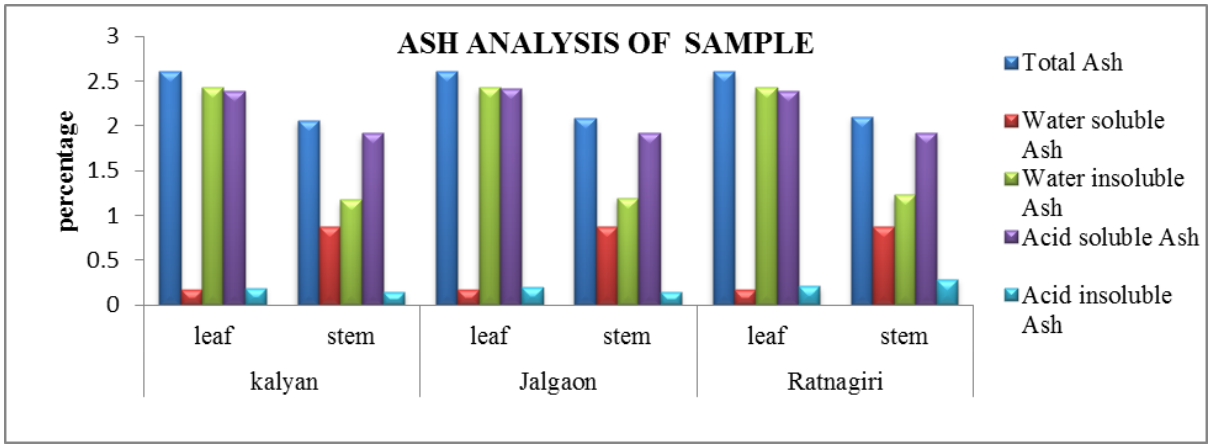
| Location | Kalyan | | Jalgaon | | Ratnagiri | |
|---|---|---|---|---|---|---|
| Constituent | Leaf | Stem | Leaf | Stem | Leaf | Stem |
| Moisture | 10.466 | 22.616 | 10.196 | 21.038 | 10.068 | 21.016 |
| Crude fibre | 32.175 | 24.827 | 32.215 | 24.912 | 32.227 | 24.918 |
| Total extract | 27.215 | 15.985 | 27.313 | 15.992 | 27.32 | 16.18 |
| Crude protein | 0.711 | 1.058 | 0.719 | 1.158 | 0.721 | 1.167 |
| Total carbohydrate | 1.27 | 1.021 | 1.277 | 1.121 | 1.287 | 1.123 |
| Reducing sugar | 0 | 0 | 0 | 0 | 0 | 0 |
| Non-reducing sugar | 1.27 | 1.021 | 1.277 | 1.121 | 1.287 | 1.123 |




**Graph 1. Comparative study of proximate principles of air dried sample.**

**Table 3. Comparative study of Ash analysis of air dried sample (g/100 g).**

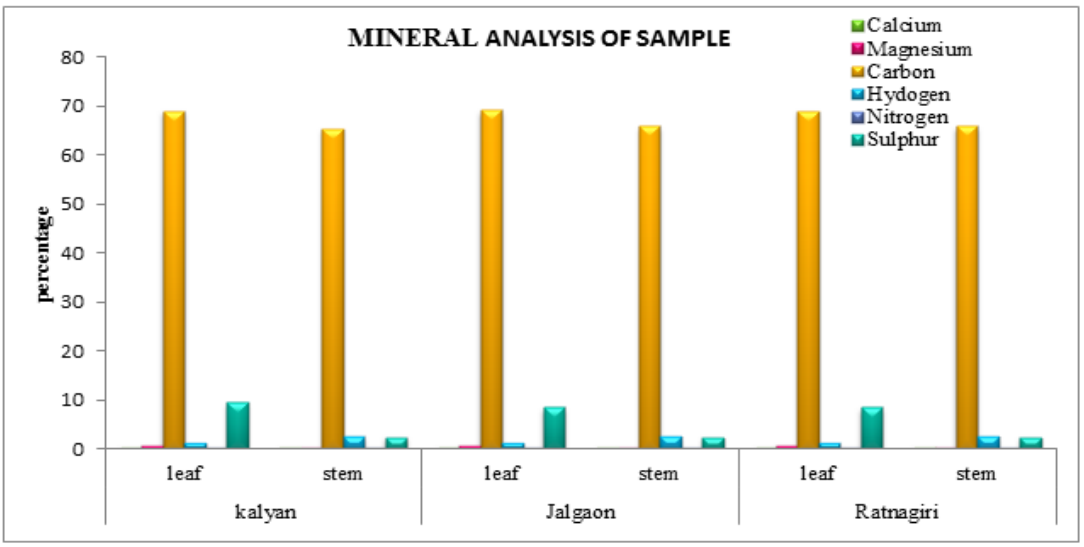
| Location | kalyan | | Jalgaon | | Ratnagiri | |
|---|---|---|---|---|---|---|
| Constituent | Leaf | Stem | Leaf | Stem | Leaf | Stem |
| Total ash | 2.603 | 2.063 | 2.612 | 2.089 | 2.606 | 2.106 |
| Water soluble ash | 0.178 | 0.874 | 0.173 | 0.876 | 0.169 | 0.881 |
| Water insoluble ash | 2.425 | 1.173 | 2.429 | 1.193 | 2.428 | 1.232 |
| Acid soluble ash | 2.391 | 1.919 | 2.414 | 1.929 | 2.391 | 1.927 |
| Acid insoluble ash | 0.192 | 0.147 | 0.197 | 0.197 | 0.215 | 0.287 |




**Graph- 2: Comparative study of ash analysis of air dried sample.**

**Table- 4. Comparative study of elemental analysis of air dried sample (g/100 g).**

| Location | Kalyan | | Jalgaon | | Ratnagiri | |
|---|---|---|---|---|---|---|
| Constituent | Leaf | Stem | Leaf | Stem | Leaf | Stem |
| Calcium | 0.115 | 0.038 | 0.119 | 0.041 | 0.121 | 0.0414 |
| Magnesium | 0.713 | 0.029 | 0.717 | 0.0312 | 0.723 | 0.0319 |
| Carbon | 68.967 | 65.473 | 69.196 | 65.947 | 68.986 | 65.984 |
| Hydogen | 1.164 | 2.505 | 1.168 | 2.515 | 1.172 | 2.524 |
| Nitrogen | 0.114 | 0.17 | 0.119 | 0.19 | 0.211 | 0.213 |
| Sulphur | 9.514 | 2.325 | 8.514 | 2.322 | 8.414 | 2.319 |




**Graph 3. Comparative study of mineral analysis of air dried sample.**

**Table 5. Comparative study of proximate principles of air dried stem sample (g/100 g).**

| Location | Stem | | | | |
|---|---|---|---|---|---|
| Constituent | Kalyan | Jalgaon | Ratnagiri | Average | Standard deviation |
| Moisture | 22.6160 | 21.0380 | 21.0160 | 21.5567 | 0.9175 |
| Crude fibre | 24.8270 | 24.9120 | 24.9180 | 24.8857 | 0.0509 |
| Total extract | 15.9850 | 15.9920 | 16.1800 | 16.0523 | 0.1106 |
| Crude protein | 1.0580 | 1.1580 | 1.1670 | 1.1277 | 0.0605 |
| Total carbohydrate | 1.0210 | 1.1210 | 1.1230 | 1.0883 | 0.0583 |
| Reducing sugar | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| Non-reducing sugar | 1.0210 | 1.1210 | 1.1230 | 1.0883 | 0.0583 |
| Total ash | 2.0630 | 2.0890 | 2.1060 | 2.0860 | 0.0217 |
| Water soluble ash | 0.8740 | 0.8760 | 0.881 | 0.8770 | 0.0036 |
| Water insoluble ash | 1.1730 | 1.1930 | 1.2320 | 1.1993 | 0.0300 |
| Acid soluble ash | 1.9190 | 1.9290 | 1.9310 | 1.9263 | 0.0064 |
| Acid insoluble ash | 0.1470 | 0.1970 | 0.2870 | 0.2103 | 0.0709 |
| Calcium | 0.0380 | 0.0410 | 0.0414 | 0.0401 | 0.0019 |
| Magnesium | 0.0290 | 0.0312 | 0.0319 | 0.0307 | 0.0015 |
| Carbon | 65.4730 | 65.9470 | 65.9840 | 65.8013 | 0.2849 |
| Hydrogen | 2.5050 | 2.5150 | 2.5240 | 2.5147 | 0.0095 |
| Nitrogen | 0.1700 | 0.1900 | 0.2130 | 0.1910 | 0.0215 |
| Sulphur | 2.3250 | 2.3220 | 2.3190 | 2.3220 | 0.0030 |

**Table 6. Comparative study of proximate principles of air dried leaf sample (g/100 g).**

| Sample | Leaf | | | | |
|---|---|---|---|---|---|
| Constituent\ location | Kalyan | Jalgaon | Ratnagiri | Average | Standard deviation |
| Moisture | 10.4660 | 10.1960 | 10.0680 | 10.2433 | 0.2032 |
| Crude fibre | 32.1750 | 32.2150 | 32.2270 | 32.2057 | 0.0272 |
| Total extract | 27.2150 | 27.3130 | 27.3200 | 27.2827 | 0.0587 |
| Crude protein | 0.7110 | 0.7190 | 0.7210 | 0.7170 | 0.0053 |
| Total carbohydrate | 1.2700 | 1.2770 | 1.2870 | 1.2780 | 0.0085 |
| Reducing sugar | Absent | Absent | Absent | Absent | Absent |
| Non-reducing sugar | 1.2700 | 1.2770 | 1.2870 | 1.2780 | 0.0085 |
| Total ash | 2.6030 | 2.6120 | 2.6060 | 2.6070 | 0.0046 |
| Water soluble ash | 0.1780 | 0.1730 | 0.1690 | 0.1733 | 0.0045 |
| Water insoluble ash | 2.4250 | 2.4290 | 2.4280 | 2.4273 | 0.0021 |
| Acid soluble ash | 2.3910 | 2.4140 | 2.3910 | 2.3987 | 0.0133 |
| Acid insoluble ash | 0.1920 | 0.1970 | 0.2150 | 0.2013 | 0.0121 |
| Calcium | 0.1150 | 0.1190 | 0.1210 | 0.1183 | 0.0031 |
| Magnesium | 0.7130 | 0.7170 | 0.7230 | 0.7177 | 0.0050 |
| Carbon | 68.9670 | 69.1960 | 68.9860 | 69.0497 | 0.1271 |
| Hydrogen | 1.1640 | 1.1680 | 1.1720 | 1.1680 | 0.0040 |
| Nitrogen | 0.1140 | 0.1190 | 0.2110 | 0.1480 | 0.0546 |
| Sulphur | 9.5140 | 8.5140 | 8.4140 | 8.8140 | 0.6083 |

**RESULT**

The present study was carried out on stem and leaf of the plant *Epiphyllum Oxypetalum* from different district of Maharashtra. The moisture contents in leaf and stem of Kalyan sample were found to be 10.466 and 22.616 is higher than Jalgaon sample 10.196 and 21.038, and Ratnagiri sample 10.068 and 21.016, however crude fibre, total extract, crude protein, total carbohydrate, non-reducing sugar in leaf and stem of Kalyan sample is found to be 32.175 and 24.827, 27.215 and 15.9850, 0.711 and 1.058, 1.270 and 1.021, 1.270 and 1.021 respectively. This is lower than Jalgaon sample and Ratnagiri sample as shown in figure 1. However reducing sugar was found to be absent in stem as well as leaf of Kalyan, Jalgaon and Ratnagiri sample.

The result of ash content and its analysis of air dried leaf and stem of Kalyan, Jalgaon and Ratnagiri sample are shown in Table 2. Leaf and stem of Kalyan shows that the ash, water soluble ash, water insoluble ash, acid soluble ash and acid insoluble ash is 2.603 and 2.063, 0.178 and 0.874, 2.425 and 1.173, 2.391 and 1.919, 0.192 and 0.147 respectively. Which were found be lower than the air dried leaf and stem of Jalgaon sample and Ratnagiri Sample represented by graph 2.

The result of elemental analysis of air dried leaf and stem of Kalyan, Jalgaon and Ratnagiri sample are shown in Table 3. It is found that Calcium, magnesium, Carbon Hydrogen, Nitrogen and were found comparatively maximum in air dried leaf and stem of Jalgaon and Ratnagiri sample as shown in graph 3. However sulphur content of Kalyan sample of leaf and stem is 9.514 and 2.325 respectively. This is more than Jalgaon sample and Ratnagiri sample.

However Leaf of plant *Epiphyllum Oxypetalum* from different district of Maharashtra *shows* Moisture 10.2433± 0.2032, Crude fibre 32.2057±0.0272, Total extract 27.2827±0.0587, Crude protein 0.717±0.0053, and Total carbohydrate 1.2780 ±0.0085, Reducing sugar absent, Non-reducing sugar 1.2780±0.0085, Total ash 2.6070±0.0046, Water soluble ash 0.1733±0.0045, Water insoluble ash 2.4273±0.0021, Acid soluble ash 2.3987±0.0133, Acid insoluble ash 0.2013±0.0121, Calcium 0.1183±0.0031, Magnesium 0.7177±0.0050,Carbon 69.0497±0.1271, Hydrogen 1.1680±0.0040, Nitrogen 0.1480±0.0546, Sulphur 8.8140±0.6083. However stem shows Moisture 21.5567±0.9175, Crude fibre 24.8857±0.0509, Total extract 16.0523±0.1106, Crude protein 1.1277±0.0605, Total carbohydrate, 1.0883±0.0583, Reducing sugar absent, Non-reducing sugar, 1.0883±0.0583, Total ash 2.0860±0.0217, Water soluble ash 0.8770±0.00300, Water insoluble ash

1.1993±0.0300, Acid soluble ash 1.9263±0.0064, Acid insoluble ash 0.2103±0.0709, Calcium 0.0401±0.0019, Magnesium 0.0307±0.0015, Carbon 65.8013±0.2849, Hydrogen 2.5147±0.0095, Nitrogen 0.1910±0.0215, Sulphur 2.3220±0.0030.

## DISCUSSION

Screening of *Epiphyllum Oxypetalum* showed the variation in amount of crude fibre, moisture and elemental constituents like Carbon, Hydrogen, Nitrogen and Sulphur, in leaf and stem of the Epiphyllum Oxypetalum while reducing sugar was found to be absent in all . The nutritive values of plants were shown significant presence of proteins of stem and leaf 1.1277±0.0605% and 0.717±0.0053% respectively, and carbohydrates of stem is 1.0883±0.0583 % whereas leaf contains 1.2780 ±0.0085 %.

It also showed the presence of minerals Calcium and Magnesium of stem and leaf 0.0401±0.0019% and 0.0307±0.0015% & 0.1183±0.0031% and 0.7177±0.0050% respectively.

The variation of these compounds shows the medicinal potential of the plant depend on location and part of plant used for preparation of extract. Since the present study was only carried out on stem and leaves of different district of Maharashtra. Climatic effect on chemical composition of different parts of the plant like flower and root can be studied further.

## CONCLUSION

This is the first report of comparative proximate analysis of Epiphyllum Oxypetalum. Present investigation revealed that *Epiphyllum Oxypetalum* leaves and stem could be very useful resource as bio therapeutic agent. *Epiphyllum Oxypetalum* shows variation of proximate composition and mineral in leaves and stem district wise. Hence it is very important to know the source of raw material used in the preparation of medicine.

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