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# IN VIVO AND IN VITRO BIOCHEMICAL INVESTIGATION OF PRIMARY METABOLI FROM *PEDALIUM MUREX*

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**ABSTRACT**

*Pedalium murex* L. is an important medicinal plant belongs to family pedaliaceae. It is commonly known as 'Bada Gokhru'. The present investigation was aimed to investigate primary metabolites present in *P. murex.* In the present study, various *in vivo* plant parts (leaves and stem) and *in vitro* (calli) of *P. murex* was carried out for biochemical estimation of primary metabolites viz. total soluble sugar, starch, lipid, protein and phenol. Results showed that plant parts varied in composition of their primary metabolites.

**Key words**: Biochemicals, Primary metabolites, *Pedalium murex*.

## INTRODUCTION

***Pedalium murex*** **(Bada Gokharu)** is an important medicinal plant and it has been used traditionally in various disorders and as a health tonic. It is mainly found near the sea coasts of South India, Gujarat, Konkan, Mexico and Tropical Africa (Chopra and Chopra, 1956). The species also found in Delhi, Rajasthan and Punjab. Considerable progress has been achieved regarding the biological activity and medicinal applications of this plant. It is now considered as a valuable source of unique natural products for development of medicines against various diseases and also for the development of industrial products. Whole plant parts are used as medicine. Fruits of the plant are available in market for medicinal purpose. Fruits are considered demulcent, diuretic, antispasmodic, antiseptic and aphrodisiac. Juice of fruit is believed to dissolve the kidney stone (Satyavati and Gupta, 1987; Ebadi, 2004). It has been traditionally used for the treatment of puerperal diseases, digestive tonics, ulcers, fevers, wounds other ailments and general debility. The primary metabolites, in contrast, such as carbohydrate, lipid, protein and phenol are found in all plants and perform metabolic roles that are essential for plant growth and development. Primary metabolites are generally distributed within all living organism and are intimately connected with essential life processes and include ubiquitous compounds, such sugars, amino acids, or organic acid. These are involved in primary metabolic processes, such as glycolysis, respiration, or phytosynthesis.

## MATERIALS AND METHODS

*Pedalium murex* plants were collected from Rajasthan University Campus, Jaipur from August to September. Plants were identified by comparing with those available in the Herbarium, Department of Botany, University of Rajasthan, Jaipur, India. For *in vitro* studies callus developed by tissue culture technique using Murashige ang Skoog's (1962) medium. The dried calli of 8 weeks old tissues were powdered and used for further biochemical estimation. The quantitative estimation of primary metabolites was carried out using different protocols.

The dried plant materials stem, leaf and callus (50 gm each) were homogenized separately in a mortar and pestle and was used for estimation of estimation of sugar and starch (Dubois et al., 1956), protein (Lowry et al., 1951), lipid (Jayaraman,1981), and Phenol (Bray and Thorpe,1954) respectively. All experiment repeated in triplicate and means (± SD) were calculated.

## RESULTS AND DISCUSSION

The present study carried out on the plant samples revealed the presence of primary metabolites viz. total soluble sugar, starch, lipid, protein and phenol of *P. murex* investigated are summarized in Table 1. In the present investigation, among all the samples (*in vivo* and *in vitro)* tested, higher soluble sugar, starch and protein level was observed in stem of *P. murex* (43.8±1.33 mg/g.dw; 39.6±0.08 mg/g.dw; 41.3±0.44 mg/g.dw) and minimum

in calli (29.0±1.26mg/g.dw; 22.1±1.37 mg/g.dw;21.2±0.45mg/g.dw) (Fig.1). The maximum content of phenol was observed in leaves of *P. murex* (52.06±1.21mg/gdw) while minimum was in stem of *P. murex* (29.0±0.34mg/g.dw) (Table 1) (Fig. 1,2,3,4,5).

Higher content of total soluble sugar was reported in leaves of *Madhuca indica* (Vijayvergia and Shekhawat, 2009) and plant parts of two species of verbenaceae family viz. *Clerodendrum inerme* and *Clerodendrum phlomidis* (Chahal *et.al*., 2011). Starch can represent 50-80% of the total non structural carbohydrate reserves in sugar maple. Trees with depleted starch reserves are more prone to die back and decline from various biotic and abiotic stressors (Gregory,1986). Similar studies were carried out on protein content in leaves of *M .indica* (Vijayvergia and Shekhawat, 2009) and *Clerodendrum* sps (Chahal *et.al*., 2011).. Plant lipid have developed products that work with diverse requirements, be it culinary, medicinal or cosmetic (Yadav and Tyagi, 2006).

| **Plant** | **Plant parts** | **Primary metabolites (mg/gfw)** | | | | |
|---|---|---|---|---|---|---|
| | | **Sugar** | **Starch** | **Lipids** | **Proteins** | **Phenols** |
| ***P. murex*** | Leaf | 35.6±1.28 | 32.13±0.91 | 21.8±0.97 | 34.2±0.49 | **52.06±1.21** |
| | Stem | **43.8±1.33** | 39.6±0.08 | 32.3±0.26 | 41.3±0.44 | 29.0±0.34 |
| | Callus | 29.0±1.26 | 22.1±1.37 | 19.5±0.51 | 21.2±0.45 | 43.3±0.37 |

**Table 1: Estimation of primary metabolites (mg/gfw) in *P. murex***

mg/gfw = mili g per g fresh weight of tissues Values represent treatment of three replicates ± SE

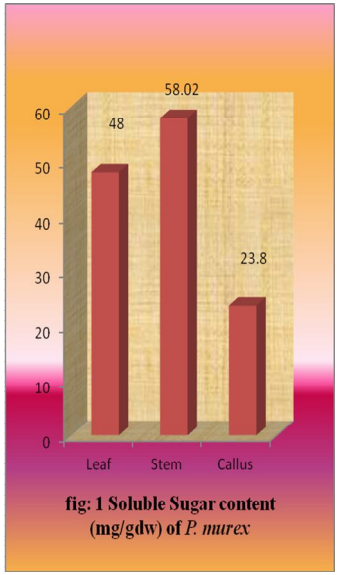


**fig: 1 Soluble Sugar content (mg/gdw) of *P. murex***

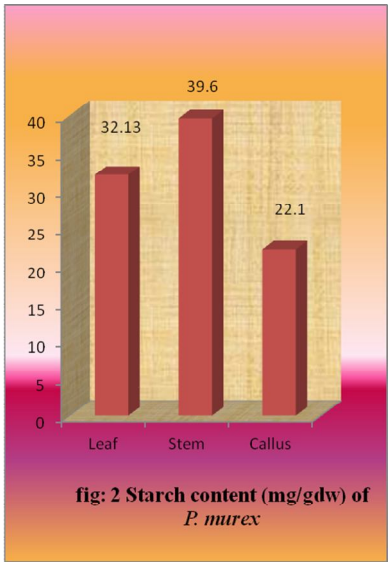


**fig: 2 Starch content (mg/gdw) of *P. murex***

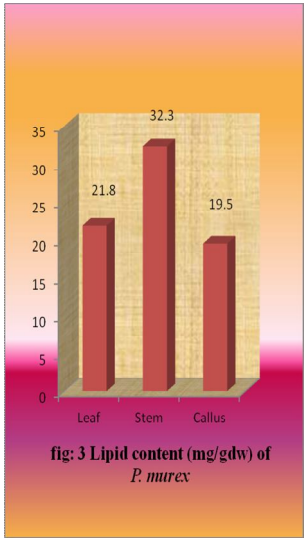


**fig: 3 Lipid content (mg/gdw) of *P. murex***

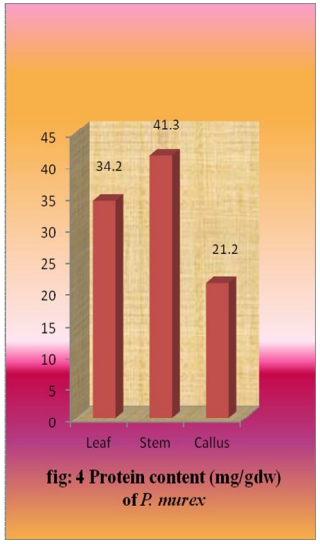


**fig: 4 Protein content (mg/gdw) of *P. murex***

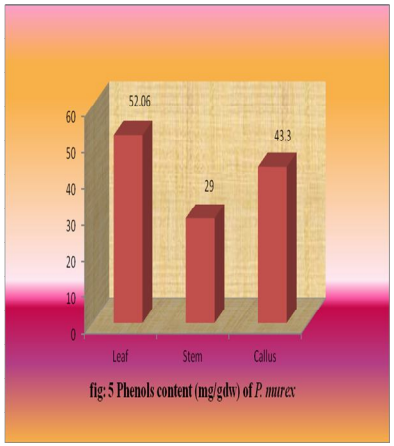


fig: 5 Phenols content (mg/gdw) of *P. murex*

**DISCUSSION**

It may be concluded from this study that the leaves of *P. murex* are highly rich in phenol content. In addition, the results confirm the use of the plant in traditional medicine. The plant parts varied in composition of their primary metabolites. The quantitative estimation of the primary metabolites yields of chemical constituents of the plants studies showed that the leaves and stems were rich in soluble sugar, starch, protein and phenol. The investigation can be subjected to the therapeutic uses and carry out further pharmacological evaluation.

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