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DETERMINATION OF SOLUBLE EXTRACTIVES OF *TRIGONELLA FOENUM-GRAECUM* LINN

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ABSTRACT

The seasonal variation of water soluble extractive, alcohol soluble extractive and ether soluble extractive have been investigated in leaves, stem and root of *Trigonella foenum-graecum* Linn. Comparative account of water soluble extractive of leaves showed high level (range from 7.573 to 8.244%) than stem (range from 4.984 to 5.683%) and roots (range from 4.217 to 4.512%) in all seasons. Alcohol soluble extractive of leaves showed higher level (range from 9.731 to 11.508%) as compared to stem (range from 7.162 to 7.843%) and roots (range from 5.834 to 6.361%). Ether soluble extractive of leaves of *Trigonella foenum-graecum* showed higher (range from 4.127 to 4.756%) than stem (range from 3.247 to 3.896%) and roots (range from 2.212 to 2.673%).

KEYWORDS: Water, Alcohol and Ether soluble extractive, Medicinal plant, *Trigonella foenum-graecum* L.

INTRODUCTION

Man has been depending on plants since time immemorial for the most of his basic needs like food, clothing, shelter, medicines etc. Many plants have been used in the cure and control of disease, but their medicinal properties are yet to be more thoroughly and scientifically studied for their proper utilization. It is also important to know about their occurrence, frequency, abundance, phenology, biochemistry and its physiology. Plants have always played a major role in the treatment of human traumas and diseases worldwide (Principe et. al., 1991) .They have been used as sources of modern drugs, either by providing pure compounds , starting materials for partial synthesis of useful compounds or models for synthesis of drugs (Hansel, 1972; Kadam et.al.,2015).

Since the beginning of human civilization plants have been used as one of the most important sources of medicine. In spite of tremendous development in the field of allopathy, plants still form one of the major sources in the modern as well as traditional medicine throughout the world. India is storehouse of medicinal plants. Developing countries uses more than 80% traditional medicines for primary healthcare. (Farnsworth, N. and Soejarto, 1991) The herbal medicines are in global demand. (Srivastava, 2000). In India, the Ayurvedic medicines are estimated in market level at 20% annually (Subrat, 2002).

Trigonella foenum-graecum is one such plant that has been extensively used as a source of antidiabetic compounds, from its seeds, leaves and extracts in different model systems (Raju, et al. 2001; Khalki, et al. 2010). Fenugreek is traditionally used in India, especially in the Ayurveda and Unani systems (Grover et.al, 2002). Fenugreek has been used traditionally to treat diabetes , coughs, congestion, bronchitis, fever, high blood pressure, headaches/ migraines, diarrhea, anemia , flatulence, irregular menstrual cycles, analgesic, inflammation and arthritis, to ease labor pains and menstruation pain, and as an appetite stimulant. The fenugreek can be used in the treatment of patients with calcic urolithiasis. In 2010 Chauhan et al reported an anti-inflammatory potential of fenugreek.

Administration of *Trigonella foenum-graecum*, seed powder to diabetic animals has been shown to lower blood glucose levels and partially restore the activities of key enzymes of carbohydrates and lipid metabolism to near normal levels in various animal models (Raju *et. al.* 2001; Yadav, *et. al.* 2005; Mohammad, *et. al.* 2006 b).

MATERIALS AND METHODS

Determination of Water-Soluble Extractive - 1gm of air dried drug, coarsely powered was macerated with 100 ml distilled water in a closed flask for 24 hours shaking frequently. Solution was filtered and 25 ml of filtered was evaporated in a tarred flat bottom shallow dish, further dried at 100 ^{0}c and weighed. The percentage of water soluble extractive was calculated with reference to the air dried drugs.

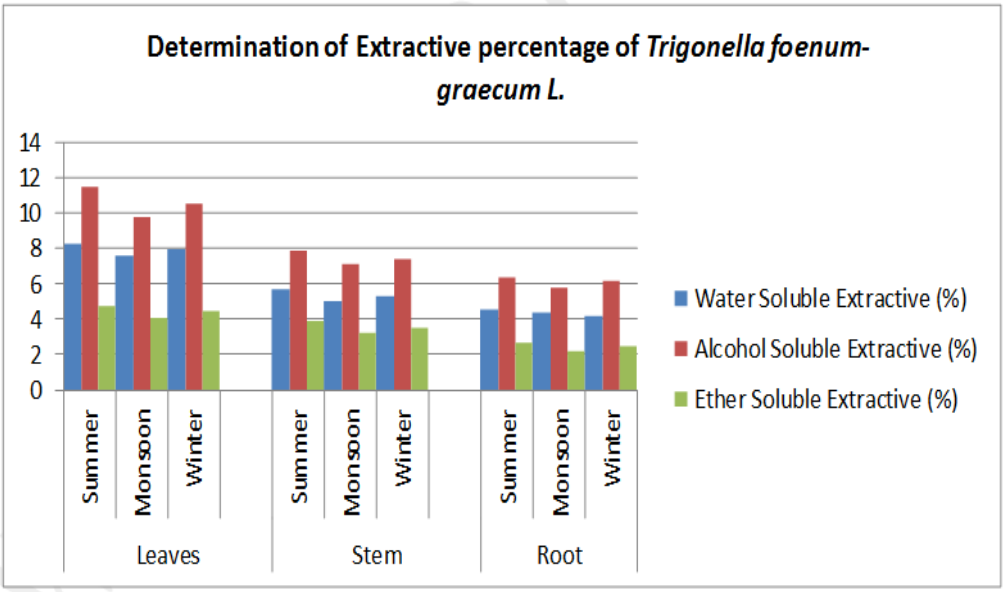
Determination of Alcohol-Soluble Extractive -1gm. of air dried drugs, coarsely powdered was macerated with 100 ml alcohol in closed flask for 24 hours with frequent shaking. It was filtered rapidly taking precaution against loss of alcohol. 25 ml of filtrate was then evaporated in a tarred flat bottom shallow dish, dried at 100 ^{0}c and weighed. The percentage of alcohol soluble extractive was calculated with reference to the air dried drugs.

Determination of Ether-Soluble Extractive - 1gm. of air dried drugs, coarsely powdered was macerated with 100 ml ether in closed flask for 24 hours with frequent shaking. It was filtered rapidly taking precaution against loss of ether. 25 ml of filtrate was then evaporated in a tarred flat bottom shallow dish, dried at 100 ^{0}c and weighed. The percentage of ether soluble extractive was calculated with reference to the air dried drugs.

RESULTS AND DISCUSSION

Table No. 1- Determination of Extractive percentage of *Trigonella foenum-graecum L.*

Plant part	Season	Water Soluble Extractive (%)	Alcohol Soluble Extractive (%)	Ether Soluble Extractive (%)
Leaves	Summer	8.244	11.508	4.756
	Monsoon	7.573	9.731	4.127
	Winter	7.932	10.491	4.467
Stem	Summer	5.683	7.843	3.896
	Monsoon	4.984	7.162	3.247
	Winter	5.278	7.423	3.543
Root	Summer	4.512	6.361	2.673
	Monsoon	4.402	5.834	2.212
	Winter	4.217	6.124	2.472



Graph No. 1

Different plant species would obviously have different chemical profile. Chemical present in the plant material could be dissolved in different solvent for the purpose of further analysis. Therefore, three solvents - water, alcohol and ether were selected to determine the soluble substance, this was again carried out in three seasons viz. summer, monsoon and winter.

The summer collection of leaves showed higher content (8.244 %) of water soluble extractive as compared to winter (7.932 %) and monsoon (7.573 %). However, the summer sample of stem exhibited higher at summer (5.683 %) as compared to winter and monsoon (Table No. 1). In root summer shows higher content of water soluble extractive (4.512 %) as compared to winter (4.217 %) and monsoon (4.402 %). The lowest amount of water soluble extractive content in winter (4.217 %) season (Table No. 1 and Graph No. 1).

The summer collection of leaves showed higher content (11.508 %) of alcohol soluble extractive as compared to winter (10.491 %) and monsoon (9.731 %). However, the summer sample of stem exhibited higher amount of alcohol soluble extractive (7.843 %) as compared to summer and monsoon (Table No.1). In root summer shows higher content of alcohol soluble extractive (6.361 %) as compared to winter (6.124 %) and monsoon (5.534 %) (Table No. 1 and Graph No. 1).

The ether soluble extractive in leaves ranged from 4.127 % to 4.756 %. Highest concentration being observed during summer season (4.756 %). Ether soluble extractive of stem showed the ranged of (3.247 % to 3.896 %) for three seasons tested. The root seemed to be having the lowest concentration of (2.212 % to 2.673 %) ether soluble extractive when compared to leaves, and stem during three seasons examined. Generally, it was observed that the summer of leaves (4.756 %), in summer of stem (3.896 %) and summer of root (2.673 %) showed significantly higher percentage of ether soluble extractive. The range of extractive percentage in water, alcohol and ether were found to be increasing order root< stem< leaves (Table No. 1 and Graph No. 1).

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