

ELEMENTS FROM STEM BARK OF ORCHARD TREE – *Juglans regia*

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ABSTRACT: *Juglans regia*, the royal species from *Juglandaceae* family, well-known for its valuable medicinal uses is grown in the forests of Himalayas in India. It is a woody, deciduous and frost-tender tree. The root, stem bark, leaves, seeds, cotyledons and seed oil are useful to treat various health complaints including cancer in the folk medicines. Chemical analysis is carried out on the stem bark of the species to determine qualitatively and quantitatively the elements present in it. Different standard methods like Kjeldahl, Colorimetry, Flame photometry and Atomic absorption spectrophotometry (AAS) are used for the experiments. Results show considerable percentage of Iron, Nitrogen, Copper and traces of Zinc, Manganese and Potassium Phosphorous.

Key-words: *Juglans regia*, Iron, Nitrogen, Colorimetry, Flame photometry, AAS.

INTRODUCTION

Juglans regia, known as Akhort in India, a native of Eastern Europe to North Asia i.e. China, Iraq, Mexico, Spain, Turkey, Nepal, India (forests in Himalayas) is a member of *Juglandaceae* family. It is a woody, deciduous and frost-tender tree growing to 20m. height. The wood is heavy, durable and polishes well. The bark is resinous and scented. The tree is in flower in June and a seed ripe in October¹. This valuable tree has a long history of medicinal use to treat a wide range of health complaints. Almost all parts of the plant are medicinally important. The dried green husks contain 2.5-5% ascorbic acid (vitamin C) which can be extracted and used as a vitamin supplement². The root and stem bark are anthelmintic, astringent and detergent. The stem bark is dried and used as a tooth cleaner. The decoction of leaves and bark is used with alum for staining wool brown³. The cotyledons are used in the treatment of cancer since a long time. Some extracts of the plant have shown anticancer activity⁴. Juglone found in the leaves and its derivatives show a wide spectrum of applications in the field of cosmetics, pharmacology and ecology.

Considering the vast medicinal applications of the royal species, an attempt is made to technically analyze the plant material. Present work is an analytical study to determine the elements present in the stem bark of *Juglans regia*⁵.

EXPERIMENTAL

A Perkin-Elmer 3110 Atomic Absorption Spectrophotometer was used for the quantitative determination of transition elements. Determination of alkali and alkaline earth metals was performed on the Flame photometer of Madiflame, model 127. Photoelectric colorimeter of Systronics, model 113 was utilized for phosphorus.

Ash was prepared by taking 1gm. shade-dried and powdered sample of stem bark and keeping it in muffle furnace at 550 deg.C till constant weight was obtained. The major constituent of ash was determined qualitatively and quantitatively. For detection of metals the ash was converted to chloride and was tested for metals by applying standard procedures. Initially the ash was dissolved in 10% HCL (0.5ml.) and evaporated to dryness on water bath. The material was filtered through Whatmann filter paper no. 40.

The residue was made chloride free (tested with AgNO₃) by washing with hot water. The acid soluble and acid insoluble parts of ash determined gravimetrically (Table-1). The filtrate was diluted to 50ml. and used to estimate metal contents by standard methods as shown in Table-2.

RESULTS AND DISCUSSION

Trace elements are spark plugs of life because they are abnormalities in pancreas, disturbances in lipid and required to activate hundreds of enzymes reactions within carbohydrate metabolism can develop due to manganese the human body. Herbs are classified according to mineral deficiency⁶.

content as stimulatory and sedative. Stimulatory herbs It is generally recommended that Fe contents should be at contain higher percentage of potassium, phosphorus and least 50ppm. in ruminant feeds, Zn and Cu deficiency may iron; those rich in calcium and magnesium are sedative result in infertility, bone deformation, anaemia and a herbs⁶. The stem bark powder of *Juglans regia* showed the weakened immune system⁷.

presence of common elements like potassium, calcium, Qualitative and quantitative estimation of different phosphorus, iron, manganese, and zinc along with copper. elements present in the stem bark sample of medicinally Quantities of calcium, potassium were found to be less, but useful *Juglans regia* shows presence of biologically iron, zinc, manganese and copper are major constituents. important transition metals in considerable percentage. As the sample of *Juglans regia* is rich in iron, manganese, Iron, copper, zinc, manganese are present in greater it is advised in traditional and folk medicines. Potassium amounts which may be responsible for the traditional use plays important role in treatment of diabetes as it has effect of the plant material in medicines.

TABLE-1: Ash content from stem bark of *Juglans regia*.

Sr.No.	Particulars	Stem Sample %
1	Acid soluble ash	5.98%
2	Acid insoluble ash	0.35%

TABLE-2: Element content of stem bark of *Juglans regia*.

Sr.No.	Element	Method	Percentage
1	Nitrogen	Kjeldahl method	0.49%
2	Phosphorous	Colorimetric method	0.05%
3	Potassium	Flame photometry	0.10%
4	Calcium	Flame photometry	0.089%
5	Copper	Atomic absorption spectrophotometry	109ppm.
6	Zinc	Atomic absorption spectrophotometry	59ppm.
7	Iron	Atomic absorption spectrophotometry	612ppm.
8	Manganese	Atomic absorption spectrophotometry	67ppm.

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REFERENCES

1. www.botanical.com
2. Chopra R. N. Nayar S. L. and Chopra R. C. Glossary of Indian Medicinal Plants (Including the Supplement) Council of Scientific and Industrial Research, p.11, New Delhi, (1986).
3. Duke J. A. Handbook of Energy Crops, 269 (1983).
4. Bown D. Encyclopedia of Herbs and their uses. Darling Kinderley, London (1995) ISBN O-7513-020-31.
5. Duke J.A. and Ayensu E. S., Medicinal Plants of China Reference Publications, Inc. (1985) ISBN O-917256-20-4.
6. D.L.Watts, Trace Elements and Other Essential Nutrients, Clinical Application of Tissue Mineral Analysis, Writer's B-L-O-C-K Edition, USA (1997)
7. M.Hidiroglu and J. E. Knipfel, J. Dairy Sci.67,1141, (1984).
