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QUALITY CONTROL PARAMETER OF ACACIA SEED EXTRACT USING GC-MS ANALYSIS

Type of article : Research article

Running Title : Quality control parameter of acacia seed extract using GC-MS analysis.

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ABSTRACT:

AIM - To determine if the given extract has levels of iron, chromium and manganese within the RDA limit.

BACKGROUND - Acacia catechu is an indigenous tree found all over the world. It has been used in south india to treat digestive issues, fever and cancer. The trend of the modern world is currently self medication of herbal extracts. Before these extracts are used, they have to be tested to ensure that the mineral,heavy metal and pesticide levels are within the RDA limit.

RESULT - The acacia extract was found to contain iron, manganese and chromium levels within the RDA limit.

KEYWORDS *- acacia, extract, seed, iron, manganese, chromium*

I. INTRODUCTION :

Acacia catechu willd, commonly known as Khair, is a deciduous, medium sized tree with forked and crooked trunk [1]. It is an indigenous tree grown across the world [1,2]. The leaves of this tree are used to extract juices, after removing from boiling water, which is then used to treat digestive problems . Studies show that Acacia extract possesses antioxidant, anticancer, anti diabetic, antiulcer, hepatoprotective effects [3–10]. Various parts of the plants like the leaves, heartwood and bark, possess a variety of pharmacological actions for managing several disorders . There are many phytochemical components in Acacia catechu such as Cyanidol,Rutin, Epigallocatechin gallate, isorhamnetin, Taxifolin, Epicatechin, Catechin [11,12].

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There are studies to show that the extract was reported to be antipyretic, antidiarrheal , antiinflammatory hepatoprotective, hypoglycemic [9,13] , antimicrobial, antioxidant as well as anti plaque and anticarious in nature[14]. Scientific data on such derivatives of plants can be of clinical use [15–17]. Extract prepared from the heartwood of Acacia was used to treat fever, diarrhea, erysipelas and leucorrhea .

Quality control is mandatory for global standardization of herbal drugs to enable herbal drug trading. WHO have recognized the need to ensure quality control of natural products by using advanced techniques and by applying suitable standards. Several Pharmacopoeias including Indian Pharmacopoeia, British Pharmacopoeia, Pharmacopoeia of Republic of China, Japanese Pharmacopoeia, and United States of America Pharmacopoeia including monograph and quality control test for the herbal drugs used in their countries. There is a developing interest in the field of herbal medicine. The utilization of medicinal plants has doubled in the last ten years in Western Europe. Global demands are increased for the use of herbal medicine due to an increasing trend towards self-medication, and a reduction in costs of the synthetic drugs. Various international and national health care Forums have been held to improve the status of the herbal medicine industry and attract the interest of industrial sectors in isolating useful compounds from plants.A key challenge in the utilisation of plant based products is to assess the toxicological and epidemiological data, and the verification of herbal materials used.

The aim of the study is to evaluate the amount of iron, chromium and manganese in the Acacia catechu seed extract and determine if the extract has therapeutic levels of the parameters.

II. MATELRIALS AND METHODOLOGY:

ESTIMATION OF IRON IN ACACIA CATECHU SEED EXTRACT BY ATOMIC ABSORPTION SPECTROPHOTOMETER

INSTRUMENT PARAMETERS:

Method	: AA Flame
Lamp	: Iron HCL Lamp
Wavelength	: 248.33 nm.
Flame Type	: Air-Acetylene.
Fuel gas	: 2.5 L/min [Acetylene].
Support gas	: 15.0 L/min [Air].

STOCK SOLUTION:

Iron Standard solution 1000 mg / L Fe in 0.5M Nitric acid.

STANDARD SOLUTIONS:

From the stock solution prepare different standard dilutions of 5, 10, 15, 20,25 ppm solutions using 0.5M Nitric acid.

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SAMPLE SOLUTIONS:

Weigh accurately about 0.5 g of sample in a crucible and incinerate in a muffle furnace at 600º C for 2 hours. Allow it to cool at room temperature. Add a little volume of 0.5M Nitric acid to the crucible and transfer it to 100ml volumetric flask. Repeat the washing until all the contents were removed from the crucible. Digest the sample with 100ml of 0.5M Nitric acid. Mix properly and heat on a water bath for 15- 20 minutes. Filter the sample and make up with 100 ml, 0.5M Nitric acid.

Aspirate blank, standards and sample solutions separately by using above parameters.

ESTIMATION OF MANGANESE ACACIA CATECHU SEED EXTRACT
BY ATOMIC ABSORPTION SPECTROPHOTOMETER

INSTRUMENT PARAMETERS:

Method	: AA Flame
Lamp	: Manganese HCL Lamp
Wavelength	: 279.48 nm.
Flame Type	: Air-Acetylene.
Fuel gas	: 2.5 L/min [Acetylene].
Support gas	: 15.0 L/min [Air].

STOCK SOLUTION:

Manganese Standard solution 1000 mg / L Mn in 1 M Hydrochloric acid

STANDARD SOLUTIONS:

From the stock solution prepare different dilutions of 0.5, 1.0, 1.5, 2.0, 2.5 PPM solutions using 1 M HCL.

SAMPLE SOLUTIONS:

Weigh accurately about 0.5 g of sample in a crucible and incinerate in a muffle furnace at 600º C for 2 hours. Allow it to cool at room temperature. Add a little volume of 1 M Hydrochloric acid to the crucible and transfer it to 100ml volumetric flask. Repeat the washing until all the contents were removed from the crucible. Digest the sample with 100ml of 1 M Hydrochloric acid. Mix properly and heat on a water bath for 15- 20 minutes. Filter the sample and make up with 100 ml, 1 M Hydrochloric acid.

Aspirate blank, standards and sample solutions separately by using above instrument parameters.

ESTIMATION OF CHROMIUM IN ACACIA CATECHU SEED EXTRACT
BY ATOMIC ABSORPTION SPECTROPHOTOMETER

INSTRUMENT PARAMETERS:

Method	: AA Flame

Lamp	: Chromium HCL Lamp
Wavelength	: 357.87 nm.
Flame Type	: Air-Acetylene.
Fuel gas	: 2.5 L/min [Acetylene].
Support gas	: 15.0 L/min [Air].

STOCK SOLUTION:

Chromium Standard solution 1000 mg / L Cr in 0.5M Nitric acid

STANDARD SOLUTIONS:

From the stock solution prepare different dilutions of 2, 4, 6, 8, 10 ppm solutions using 0.5M Nitric acid.

SAMPLE SOLUTIONS:

Weigh accurately about 1.0 g of sample in a crucible and incinerate in a muffle furnace at 600º C for 2 hours. Allow it to cool at room temperature. Add a little volume of 0.5M Nitric acid to the crucible and transfer it to a 50ml volumetric flask. Repeat the washing until all the contents were removed from the crucible. Digest the sample with 50ml of 0.5M Nitric acid. Mix properly and heat on a water bath for 15- 20 minutes. Filter the sample and make up with 50 ml, 0.5M Nitric acid.

Aspirate blank, standards and sample solutions separately by using above parameters.

III. RESULT & DISCUSSION :

Product Name: Acacia catechu seed extract

S.No	Parameters	Actual Values
1	Iron	84.5 PPM
2	Manganese	5.1 PPM
3	Chromium	4.7 PPM

Table 1 : Values of the parameters in the Acacia catechu seed extract

Iron is an extremely vital mineral which is responsible for a variety of metabolic processes, such as electron transport, DNA synthesis and oxygen transport. The RDA for iron is 13.7 to 15.1mg/day. When the iron is above the RDA specification, the individual is prone to iron poisoning. The clinical features of iron poisoning are hypotension, GI irritation, vomiting, diarrhea,metabolic acidosis, if severe, the patient might have renal failure, convulsions,coma , gastric or duodenal stenosis [18,19]. The study shows that the value of iron in the Acacia catechu seed extract is well within the RDA amounts.

Manganese is a metal which is diffuse in nature and is available in its oxide form, manganese dioxide. The RDA specification for manganese is 2.1-2.3mg/day. When manganese is within the RDA values, the benefits and function

of manganese are multiple. It activates the enzymes required for digestion, healing wounds, activates enzymes which enable the usage of other vital nutrients, energy production,etc. When there is an overdose of manganese, the patient starts developing clinical features such as clumsiness, exaggerated reflexes, speech disorders,difficulty in certain types of movements, spasmodic laughter and tears,etc [20,21].

Chromium was proposed to become an essential trace element over 50 years ago and it has been accepted as an essential element for 30 years [22]. It has been found that ingestion of high doses of chromium can lead to GI irritation, nausea, liver and kidney damage,stomach ulcers, convulsions and finally, death [23].

IV. CONCLUSION:

It can be concluded that the given extract contains values of iron, chromium and manganese which is within the RDA limit. Thus, further clinical trials can be pursued to evaluate these parameters and determine if this extract can be utilized as a herbal remedy by the public population.

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