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Anti Hyperli Pidemic Potential of Extract of Different Parts of Plant (Apium Graveolens)

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ABSTRACT

APIUM GRAVEOLEN, a yearly or bi-bionomic herbaceous species from Mediterranean areas as Asia, Africa and Europe, belonging to the apiaceae family. Apium graveolens has significant ayurvedic qualities as an important herb. Antioxidants, anti-inflammatory, antispasmodium, antibactérian, antifungal, cancer and diuretic and sedative actions are included in the treatment qualities of Apium gravesolen. Graveolens Apium is utilised for its pleasant food taste as salt and in salads. Apium graveolens does not need a high temperature but comparably high humidity. Accordingly, the cool temperature and temperate areas provide the greatest product. The present article examines the potential for anti-hyperlipidemics in phytochemicals and pharmacological actions. Air, cardiovascular, dental, skin, digestive and urinary problems have been proven to be beneficial. But it would be appreciated to validate scientifically many other traditional uses especially to identify and authenticate new bioactive substances. This page contains extensive information on the relevance of apium graveolen's different extracts of solvents for botany, phytochemistry, pharmacology and nutrition. This article permits researchers to investigate further the potential for several biological uses of this multi-use plant.

Keywords: , apium graveolens, medicinal plant, pharmacology, anti hyperlipidemic

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INTRODUCTION

Around 80% of the world's population, particularly in underdeveloped nations, still utilise medicinal plants for improved tolerance, compatibility and lower negative consequences of fundamental healthcare (WHO, 2005). Medicinal plants have a major impact on world health. For thousands of years plants have been a medicinal source for human and animal cures,[1] and their herbal products are attractive all over the world.[2]

HYPERLIPIEDEMIA

The condition of an unusually high amount of all or some of the lipids or lipoproteins in your blood is hyperlipidemia or hyperlipoproteinemia. Cholesterol, cholesterol ester, phospholipids and triglycerides are all lipids. 3,4 It is carried in the blood in big lipoprotein molecules. Chylomicrons, VLDL, LDL and HDL are included in the lipoproteins. Atherosclerosis and atherosclerotic disorders such as CHD, ischemic cerebroviascular illnesses and peripheral vascular diseases (ICV) are a leading cause of hyperlipidemia.5 Due to the contemporary lifestyles and increased intake of high carbon and fat diets, the prevalence of hyperlipidemics has grown substantially worldwide. 6

Subtypes of hyperlipidemia

The main and secondary subtypes of hyperlipidemia

I. Genetic factors such as a mutation in a receptor normally result in primary hyperlipidemia.
II. Secondary hyperlipidemia that is also known as hyperlipidemia may be comparable to initial types of hyperlipidemia.

Risk factors

Hyperlipidemia causes are evident. The following factors have demonstrated that cholesterol increases: 7,8

- Smoking
- Obesity
- Alcohol abuse

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- Diabetes mellitus
- Cholesterol rich diet (meat, butter, egg, coconut oil, milk and ghee sweets).

MATERIAL

Rough herbal material is typically marketed and occasionally contaminated in the pharmaceutical and pharmaceutical sectors. Therefore pharmacognostic examinations are necessary for the purpose of distinguishing between the genuine and the contaminated vegetable material. Simple pharmacognostic techniques employed for standardising the plants material comprise its morphological, anatomical and biochemical characteristics which lead to a pharmaceutical grade and purity of plant material.9

Apium Graveolen fresh leaves have been obtained locally, and Apium Graveolen seeds. The plants' leaves and seeds were carefully cleaned. Residues and other extraneous particles were removed from the seeds. The components of the plant were air-dried and a mixer was used to make rough powder. The powders have been dried for an hour at about ~50-60oC, then packaged in air tight bottles.10

ANIMALS

Both sexes were obtained using Swiss albino mices measuring 10-200g. The animals were kept in normal circumstances and fed ad libitum with food and drink. Two days before the start of the trial, the animals were heated to laboratory temperatures. This experimental procedure was authorised in accordance with the recommendations of the Animal Experiments Committee of the Institutional Animal Ethics Committee (CPCSEA/IAEC/SPTM/P-36/2011) and was carried out under the guidance of the Animal Experiments Committee of India.11

Preparation of Plant Extracts

Using a methanol of 100ml as solvent in an 18-hour soxhlet appliance, 50 grammes of dry air powder have been extracted. The extracts have been dried at 50oC±2 and kept at 4 oC±2 till further usage via four muslin fabric layers. The percentage returns were measured and reported for both plant extracts.12

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Estimation of Carbohydrate

The amount of carbohydrates were calculated using the modified methodology of Saravanan and Ravindranath's study manual of crustacean biochemistry and physiology, (1981).13

Estimation of Total Protein

The overall protein was calculated by the manual modified methodology adopted by Subhashini and Ravindranath for crustacean biochemistry and physiology, (1981).14

Estimation of HDL

In the presence of metal ions, polyanions precipitate LDL, VLDL and chlyomicrons into the solution of HDL. The surnatant cholesterol content is subsequently defined using the enzyme procedure.15

Calculation of LDL

The LDL-cholesteroI may be determined using the method for specimens where the triglyceride level does not exceed 4.5 mmol/J.15

Calculation of VLDL

Friedewald described a simpler process not requiring ultracentricity (1972). This technique determines plasma total concentrations of cholesterol, triglyceride and HDL cholesterol, as stated above.15

Estimation of Creatinine in serum

The creatinine was estimated by the method of Seation and Ali, (1984) using a reagent kit supplied from Agappe Diagnostic Ltd (Kerala, India).16

Estimation of Calcium in serum

Calcium has been calculated with the Clark and Collip technique (1925), and also according to the modified approach in the Kannan and Ravindranath Research Handbook for Crustacean Biochemistry and Physiology, (1981).17,18

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Estimation of Phosphorous in serum

The phosphorous was estimated by the method of Fridman and Young, (1997) using a reagent kit from Agappe Diagnostic Ltd (Kerala, India).19

RESULTS

Moisture Content

The moisture content of the chosen plant materials found in the current research is 5,76 ± 0,02 (percent Moisture content)

Determination of Ash Content

For its physicochemical characterisation, plant powder of leaves and seeds has been studied in this work. The proportion of the total ash value of plant leaves and seeds, water insoluble ash, acid soluble ash and sulphated ash are shown below in the table:

Table 1.1 - Ash Content

Percentage Ash Content	Leaves	Seed
Total Ash Content	12.38 ± 0.26	6.31 ± 0.15
Water Soluble Ash	3.5 ± 0.08	8.4 ± 0.05
Acid Insoluble Ash	0.61 ± 0.01	0.43 ± 0.01
Sulphated Ash	19.07 ± 0.21	9.2 ± 0.2

Table 1.2 - UV Fluorescence Analysis of Plant Powders

Solvent	Leaves Powder		Seed Powder	
	Visibility	**Uv At 368 Nm**	**Visibility**	**Uv At 368**

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Petroleum Ether	Greenish Yellow	Yellow Orange Fluorescence	Yellowish Green	Red Fluorescence
Chloroform	Blackish	Reddish Brown Fluorescence	Greenish	Pinkish Fluorescence
Ethanol	Yellowish Green	Orange Yellow Fluorescence	Greenish	Reddish Fluorescence
Methanol	Dark Green	Reddish Fluorescence	Greenish	Pinkish Fluorescence
Ethyl Acetate	Yellowish Brown	Reddish Brown Fluorescence	Yellowish Green	Red Fluorescence

Table 1.3 - Behavior Of Leaves And Seed Powders With Different Chemical Reagents

Reagents	**Behaviour**	
	LEAVES	SEED
Picric Acid	Orange	Dark brown
Ferric Chloride	Yellowish	Brown
Conc. Sulphuric Acid	Brown	Yellowish
Conc. Nitric Acid	Light green	Light yellow
Iodine Solution	Yellow	Pale yellow
Conc. Nitric Acid	Dark brown	Yellowish brown
Conc. Hydrochloric Acid	Orange	Dark brown

Preliminary Phytochemical Analysis

The results obtained from the preliminary phytochemical screening of both MEL & MES have been summarised in Table

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Table 1.4 Preliminary Phytochemical Screening of Both MEL & MES

Chemical constituents	Test	Expected results	Inference	MEL	MES
Carbohydrates	Molish's test	Chloroform layer appears red and acid layer shows green fluorescence	Reducing sugars present	+	+
PROTEINS	Biuret test	Violet ring at junction of two liquids	Proteins present	-	+
Steroids	Salkowski's reaction	Reddish brown color appears at junction of two liquids and upper layer appears bluish green	Steroids present	+	+
Cardiac glycosides	KellerKilliani's test	Yellow precipitate	Cardiac glycosides present	+	+
Flavonoids	Shinodas's test	Pink color formed	Flavonoids present	+	-
Alkaloids	Dragendorff's test	Reddish brown precipitate	Alkaloids present	+	+
	Wagner's test	Orange brown precipitate	Alkaloids present	+	+

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"+"Found

"-"Not Founded

Table 1.5 - Ethanolic extract of Apium Graveolens leaves and seeds on hyperlipidemic rats

	Normal Group	Vehicle Group	Inducing Agent Group(25 Days)	25 Days + 15 Days With Leaves Extract	25 Days + 25days With Leaves Extract	25 Days + 15 Days With Seed Extract	25 Days +25 Days With Leaves Extract
Total cholesterol (mg/dL)	52.17 ± 2.46	87.67 ± 3.53	186.33 ± 2.80	105.34 ± 2.72	76.57 ± 1.63	65.90 ± 4.75	54.00 ± 3.20
Triglyceride (mg/dL)	72.57 ± 3.67	108.17 ± 4.54	151.83 ± 5.02	26.17 ± 2.48	101.50 ± 2.88	115.50 ± 3.94	86.02 ± 3.85
HDL (mg/dL)	34.93 ± 2.64	26.50 ± 3.08	16.47 ± 2.54	118.83 ± 3.76	34.50 ± 2.88	28.64 ± 4.31	34.84 ± 1.17
LDL (mg/dL)	2.35 ± 0.52	51.83 ± 0.75	142.17 ± 1.52	55.00 ± 1.41	12.50 ± 5.68	27.60 ± 4.71	2.54 ± 1.63
VLDL (mg/dL)	13.93 ± 0.72	30.43 ± 0.25	26.67 ± 1.11	22.93 ± 0.82	19.83 ± 0.75	22.64 ± 0.84	15.83 ± 0.97

Hyperlipidemic rats treated with ethanolic extract of celery leaves and seeds for 15th, 25th day, there was no significant difference in calcium, phosphorous and magnesium, where as during 25th days calcium showed an increase ($P>0.05$) when compared with cholesterol control.

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Table 1.6 Calcium, Phosphorous And Magnesium

	Normal group	Vehicle group	Inducing agent group(25 days)	25 days + 15 days with leaves extract	25 days + 25days with leaves extract	25 days + 15 days with seed extract	25 days +25 days with seed extract
Calcium (mg/dL)	10.50 ± 1.30	10.32 ± 1.14	7.27 ± 1.04	8.33 ± 1.4	8.93 ± 1.45	7.52 ± 1.49	9.98 ± 1.52
Phophorous (mg/dL)	5.23 ± 1.21	4.59 ± 1.36	3.45 ± 0.14	4.55 ± 0.94	4.51 ± 0.45	4.63 ± 0.55	5.43 ± 0.58
Magnesium (mEq/L)	2.45 ± 0.31	1.73 ± 0.41	1.54 ± 0.23	1.51 ± 0.21	2.08 ± 0.08	1.53 ± 0.41	1.98 ± 0.16

The effect of ethanolic extract of celery leaves and seeds on haematological changes in the hyperlipidemic rats is shown in table below . The results indicate that there is no significant difference in Hb and RBC (P>0.05), where as an increase in WBC and PCV

Table 1.7 Effect Of Ethanolic Extract Leaves And Seeds On Haematological Changes

	Normal group	Vehicle group	Inducing agent group(25 days)	25 days + 15 days with leaves extract	25 days + 25days with leaves extract	25 days + 15 days with seed extract	25 days +25 days with leaves extract
Hb (g/dL)	15.15 ± 1.25	13.57 ± 0.89	10.17 ± 1.29	12.11 ± 0.82	13.55 ± 0.84	12.12 ± 1.12	14.95 ± 0.68
WBC (cells/cmm)	6.56 ± 0.54	8.58 ± 0.54	12.51 ± 0.15	11.45 ± 0.25	10.50 ± 0.21	11.17 ± 0.24	8.40 ± 0.08

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RBC (millions/cmm)	5.74	±	0.65	6.54	±	0.85	8.89	±	0.84	8.25	±	0.89	7.22	±	0.74	8.58	±	0.61	6.73	±	0.72
Platelet (lakhs/cmm)	4.57	±	0.24	5.52	±	0.24	58.52	±	0.52	6.45	±	0.52	5.45	±	0.9	6.58	±	0.24	32.72	±	0.61

Hb – haemoglobin; WBC - white blood cells; RBC - red blood cells; Platelet

CONCLUSION

This human disease does not have an adequate current medical treatment. There are various adverse effects on available contemporary medications for this disease. Traditional herbal remedies for this human disease are available for purchase. Apium Graveolens has demonstrated substantial hypolipidemic efficacy to reduce overall cholesterol in the clinical research with human volunteers. In conclusion, the aqueous extracts of this medicinal plant of Apium Graveolens might very well be regarded as excellent herbal remedies for hyperlipidemia. They are natural, safe, inexpensive, and do not have any side-effects. There was increased body weight observed during 25th days in hyperlipidemic rats when compared with control. Where in hyperlipidemic rats treated with ethanolic extract of celery leaves and seeds gradually reduced the body weight during 24,25 day, when compared with cholesterol control. There was a no significant difference in calcium, phosphorous in vehicle control and there was a decrease in calcium and phosphorous in cholesterol control and no significant different in magnesium on vehicle and cholesterol control when compared with control animals. Hyperlipidemic rats when treated with ethanolic extract of celery leaves, stem and root during 15th, 25th days, showed no significant difference in calcium, phosphorous and magnesium levels. The results indicate there is a no significant difference in Hb and RBC, where as there was an increase in WBC , while in platelet count there was a slightly increase in vehicle control and the cholesterol control and decrease in Hb and increase in the WBC, RBC and platelet when compared with control. The hyperlipidemic rats were treated with ethanolic extract of celery leaves and seeds during 15th, 25th days showed increase the Hb, where as RBC, WBC and platelet count were found to decrease, when compared with the cholesterol control.

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CONFLICT OF INTEREST.

The authors declare no conflict of interest.

REFRENCES

1. Srimal RC 1997. Organisation of biological screening of drugs from medicinal plants. Medicinal plants , their bioactivity, screening and evaluation. Proceedings of the international workshop, Lucknow, India. Dec 2-5, Niscom, New Delhi:19-30.
2. Liang L, Liu CY, Li GY, Lu LE, Cai YC. Studies on the chemical structure of Lucyoside R from leaves of Luffa cylindrica Roem. Acta Pharmaceutica Sinica. 1997;32:761-4.
3. Pande DS. Antihyperlipidemic activity of Sphaeranthus indicus on atherogenic diet induced hyperlipidemia in rats. Int J Green Pharm. 2009;2:159-61.
4. Cheng JW. Rosuvastatin in the management of hyperlipidemia. Clinical Therapeutics 2004;26:1368-87.
5. Jain KS, Kathiravan MK, Somani RS, Shishoo CJ. The biology and chemistry of hyperlipidemia. Bioorg Med Chem. 2007;15:4674-99.
6. Misra A, Khurana L. Obesity and the metabolic syndrome in developing countries. J Clin Endocrinol Metab 2009;93:9-30.
7. Tuetun, B., Choochote, W., Rattanachan, P., Chain, E., Chaithong, U., Jitpakdi, A., Tippawangkosol, P., Riyong, D and Pitasawat, B. 2004. Mosquito repellency of the seeds of Celery (A. graveolens L.). Ann. Trop. Med. Parasitol. 98: 217-223.
8. Klop B, Proctor SD, Mamo JC, Botham KM, Cabezas M Castro. Understanding postprandial inflammation and its relationship to lifestyle behaviour and metabolic diseases. Int. J. Vasc. Med. 2012;10:947-71.

9. Tsi D, Tan BK. The mechanism underlying the hypocholesterolaemic activity of aqueous celery extract, its butanol and aqueous fractions in genetically hypercholesterolaemic RICO rats. Life Sci. 66(8), 2000, 55-67.
10. Al-Asmari AK, Al-Elaiwi AM, Athar MT, et al. A review of hepatoprotective plants used in Saudi traditional medicine. Evid Based Complementary Alter n Med 2014, 2014, 1-23.
11. Fazal SS, Singla RK. Review onn the pharmacological and pharmacognostical characterization of Apiumgraveolens Linn. Indo Glob Pharm Sci 2, 2012, 36-42.
12. Kerishchi P, NasriS, Amim G, et al. The effects of Apiumgraveolens extract on sperm parameters and HG Hormonal axis in mice. In Proceedings of the 20th Iranian Congress of Physiology and Pharmacology, 2011.
13. Saravanan S, Srikumar R, Manikandan S, Jeya Parthasarathy N, Sheela Devi R. Hypolipidemic effect of triphala in experimentally induced hypercholesteremic rats. Yakugaku Zasshi 2007;127:385-8.
14. Subhashini, M.H and Ravindranath, M.H. 1981. Manual of research methods for Crustacean biochemistry and physiology. CMFRI special Publication. 35-36.
15. Fukuyama N, Homma K, Wakana N, Kudo K, Suyama A, Ohazama H, Tsuji C, Ishiwata K, Eguchi Y, Nakazawa H, Tanaka E. Validation of the Friedewald Equation for Evaluation of Plasma LDL-Cholesterol. J Clin Biochem Nutr. 2008 Jul;43(1):1-5. doi: 10.3164/jcbn.2008036. PMID: 18648653; PMCID: PMC2459246.
16. Seation, B and Ali, A. 1984. Blood safety and clinical technology. Guideline on standard operating procedures for clinical chemistry. Med. Lab. Sci. 41: 327-336.
17. Clark, E.P and Collip, J.B. 1925. Determination of calcium by the titrometric method. J. Biol. Chem. 66: 461.
18. Kannan, K and Ravindranath, M.H. 1981. Manual of research methods for Crustacean biochemistry and physiology. CMFRI special Publication. 81-82.
19. Friedman and Young. 1997. Effects of disease on clinical laboratory test (3rd ed). AACC press.