Original Research Article: Phytochemical and Biochemical Analysis of Ajwain Seed's Content

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ABSTRACT

Since ancient times, Ajwain is one of the popular ayurvedic medicines in the treatment of indigestion, dyspepsia, and gastric disorders. Phytochemical constituents of Ajwain, are day by day getting more attention as medicine because of their efficiency and safer, and also comes with very less side effects. The natural compounds obtained from this ethno-botanical plants are received much more attention in last decades.

The present investigation is focus on the phytochemical analysis of Ajwain seeds which is commonly used as one of the important ingredients of Indian mouth fresheners. The crude extract of Ajwain seeds were obtained through soxhletion in chloroform and water. The presence of secondary metabolites in the Ajwain seeds was done by qualitative and quantitative analysis. The qualitative analysis of crude aqueous extract of Ajwain seeds shown the presence of Cardiac glycosides, as one of the very important cardiac drug used in the heart treatments.

Introduction

Ajwain is well known Indian mouth freshener and also used as the important Ayurveda medicine [1]. Ajwain (*Trachyspermum ammi* (L.) Sprague) is the member of Apiaceae or Umbelliferae family of plants and originally belongs to Egypt and commonly grown in Indian State such as West Bengal, Rajasthan, Uttar Pradesh, Gujarat, Maharashtra, Bihar, and Madhya Pradesh [2]. The oil obtained from the seeds has several therapeutic purposes such as anti-spasmodic, germicidal and even fungicidal and also it is used for of lack of appetite, bronchial problems and gastro intestinal troubles [3]. The medicinally constituents of this plant is very important as it possess important drug molecules and can be used in the formulation of toothpaste and perfumes [4].

The seeds and obtained oil from it used in the treatment of common cold. As local remedy the ajwain oil is placed on the top of cigarette for the immediate relief from cold and cough. The oil obtained from the ajwain seeds has potential therapeutic components used as antimicrobial agent, carminative, amoebiasis expectorant, antiparasitic, antiplatelet-aggregatory, and antilithiasis, and also it is used in the treatment

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of acute pharyngitis [5]. In addition, the ajwain oil has shown potential properties such as Abortifacient, galactogogic, and diuretic activities [6,7], and also some of authors recorded the therapeutic activities as the anti-cancerous agent [8] and foetotoxic [9].

The herbals and herbal formulations are the major source of remedies for known and emerging disease [10]. The medicines formulated from herbals gradually are getting popularity not only in India also globally as they are very much efficient with less side effects and higher safety [11]. The World Health Organization (WHO) estimated that around 60-80 % of global populations directly depend on herbal formulation for their health care needs [12, 13]. Even these herbal formulations are very much effective in severe to chronic diseases such as allergy to cardio-vascular diseases [14]. It contains diverse group of molecules such as protein, carbohydrates, oil, minerals, fiber, carotene, thiamine, riboflavin, and niacin and elements such as calcium, phosphorus, and iron [15]. Diversity in phyto-constituent leads to diverse physiological activity in Ajwain, principally the extract and seeds are used in gastric disorders such as gastric ulcers and indigestions [16].

Materials and Methods

The materials required for present study, ajwain seeds was purchased from local markets and chemicals were purchased of excel reagent grades. The collected seeds were grind with mixer grinder. Further isolation crude extraction of secondary metabolites has been done using Soxhlet extraction method by water and chloroform as the solvent. The crude extracts were filtered with Whatman filter paper and dried by rotary evaporator. The dried crude extracts were stored in refrigerator till the further use in dark amber colored bottles. Thereafter, the phytochemical analysis was done in crude extracts of ajwain seeds by qualitative and quantitative methods.

The crude extract initially analyzed through the thin layer chromatography to find out number of possible secondary metabolites present in it. The presence of phytochemical such as alkaloids, carbohydrates, cardic glycosidase, flavonoids, phenols, protein, amino acids, saponins, tannins, terpenoids, quinons, resins, and coumarins were done using their respective qualitative analysis. In present investigations, secondary metabolites are estimated in crude extract such as flavonoids [17], Phenolics [18,19], and Tannins [19,20]. The anti-oxidative properties of crude extract were estimated by DPPH assay [21].

Results and Discussion

The collected samples were dried and powdered, and then subjected to extraction of secondary metabolites by Soxhlet method. The obtained crude extract was analyzed through the thin layer chromatography and extract were shown numerous colored bands at different Rf values.

In the present investigation, there is the detection of alkaloids, carbohydrates, cardiac glycosides, flavonoids, phenols, amino acids, saponins, tannins, terpenoids, quinols, and resins (Table 1), among which we estimated concentrations of some secondary metabolites such as flavonoids, phenols, and tannins which come around 60.00, 19.75, and 27.90 µg/l, respectively (Table 2). Presence of secondary metabolites greatly enhances the properties of plants in which it is present. The flavonoids have greater potential properties like anticancer, antioxidant, anti-inflammatory, and antiviral activities. While other secondary metabolites such as phenols and tannins help in the reduction of stress, memory loss, and also have significant role in prevention of cancer and cardiovascular disease [22].Furthermore, the aqueous plant extract shows an antioxidant activity which comes around 63%. The ajwain seeds shown the presence of cardiac glycosides, which are very important medicinal drugs used to treat heart and cardiac related problems [23].

Table 1 Qualitative analysis of ajwain in chloroform and aqueous sample

Sr. No.	Content	Chloroform extract	Aqueous extract
1.	Alkaloid	Positive	Positive
2.	Carbohydrate	Negative	Slightly positive
3.	Cardiac glycosides	Negative	Slightly positive
4.	Flavonoid	Positive	Positive
5.	Phenol	Negative	Positive
6.	Amino acid	Negative	Positive
7.	Saponin	Negative	Positive
8.	Tannin	Positive	Positive
9.	Terpenoids	Negative	Positive
10.	Quinols	Negative	Positive
11.	Resins	Negative	Positive
12.	Quinones	Negative	Positive

Table 2 Concentration of secondary metabolites in ajwain seeds

Secondary metabolites	Concentrations
Flavonoids	60.00 µg/l
Phenols	19.75 µg/l
Tannins	27.90 µg/l

Conclusion

The present investigation conducted for the qualitative and quantitative estimations of phytochemicals present in ajwain seeds. The seeds are having special place in ayurvedic medicines as the major drug obtained from it are involved in the treatment of gastric disorders. The plant contains diverse group of molecules such as carbohydrates, alkaloids, flavonoids, tannins, phenolics, coumarins, resins, and saponins. The plant parts come with different medicinal values and can be used for enormous biotechnological applications.

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