

Ethnobotanical Leaflets 12: 868-72. 2008.

Preliminary Phytochemical Analysis of *Diospyros* Species

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Issued 30 October 2008

Abstract

Diospyros species are valuable traditional medicines of Chinese herbal medicine, Tibetan medicine, and Ayurvedic medicine. Extractive values and qualitative identification of phytochemicals constituents of 29 *Diospyros* species was carried out. The methanolic fruit extract was yielded maximum percentage of *Diospyros malabarica* (5.61%), and minimum percentage of *Diospyros foliosa* (1.25%). Fruits of *Diospyros* species were showed the presence of bioactive constituents of alkaloids (82%), flavonoids (68.97%), tannin (55.17%), terpenoids (100%), and essential oils (100%) were detected in 29 *Diospyros* species.

Keywords: *Diospyros*, Ebenaceae, phytochemicals, fruits, extracts.

Introduction

The systematic screening of plant species with the purpose of discovering new bioactive compounds is a routine activity in several laboratories. Plants and plant parts have been provide a good source of pharmaceutical active compounds, such as phenolic compounds, nitrogen compounds, vitamins, terpenoids, saponin and some other secondary metabolites, which are rich in valuable bioactivities of antioxidant, anti-inflammatory, antitumor, antimutagenic, anti-carcinogenic, antimicrobial activities.

The genus *Diospyros* species (Ebenaceae) were growing in subtropical and tropical areas of the China, India, Indonesia, and the Malay Peninsula. The genus *Diospyros* consists of *ca* 240 species, 59 of which are distributed in India (Maridass,1999). The plant and parts, especially the fruit has been used as an anti-inflammatory and antipyretic drug in many local traditional medicines: Chinese herbal medicine, Tibetan medicine, and Ayurvedic medicine. Recently, Maridass (2008) reviewed paper reported that phytochemical and pharmacological studies on 13 *Diospyros* species. The objective of the present study was to investigate phytochemical screening of the fruits extracts of *Diospyros* species.

Material and Methods

Plant material

Fresh fruits of *Diospyros* species were collected from Southern Western Ghats, South India.

Preparation of Crude Extract

Fresh fruits were air-dried and then cut into small strips with a razor blade. All of these materials were ground in a Wiley Mill. The material was then placed in a shaker with sieves. The material that passed through a No.

40 mesh sieve (425µm) yet retained on a No. 60 mesh sieve (250-µm) was collected. The resulting material was placed in glass jars and labeled. Soxhlet extraction of particles was conducted with methanol until the solvent became colorless. Then, all of the extracts were collected, dried under a rotary evaporator, lyophilized in air freeze drier, and kept in the dark at 4°C until testing. The following formula was used to determine the extract yield.

$$\text{Extract yield (\%)} = \frac{W_1}{W_2} \times 100$$

Where

W₁= net weight of extracts (grams)

W₂= total weight of fruits powder (grams)

Phytochemical screening

The presence of alkaloids, flavonoids, steroids, tannins, saponins and triterpenes were detected by the method described by Odebiyi and Sofowora (1978), Maridass,(1999).

Results and Discussion

The methanolic fruit extract yield of 29 *Diospyros* species given in table-1. Species-wise percentages of methanol extract yields in decreasing order were as follows: *Diospyros malabarica*(5.61%), *Diospyros racemosa* (5.21%), *Diospyros Montana* (4.87%), *Diospyros ovalifolia* (4.39%), and *Diospyros melanoxylon* (4.36%). According to table 2, 29 *Diospyros* species analyzed in preliminary phytochemical screening of methanol extracts of fruits were alkaloids, flavonoids, terpenoids, tannin, saponin, and essential oils identified in Table 2. Presence of bioactive constituents of alkaloids (82%), flavonoids (68.97%), tannin (55.17%), terpenoids (100%), and essential oils (100%) were detected in 29 *Diospyros* species. These metabolites have been shown to be responsible for therapeutic activity of plants (Trease and Evans,1996). Active compounds of saponins identification of frothing test to given the results of frothing persistence of methanolic fruits extract of 29 *Diospyros* species. Sodipo *et al.*,(1991) reported that saponins are special class of glycosides that have been shown to be an antifungal agent. Flavonoids are currently of growing interest owing to their supposed properties in promoting health (Rauha *et al.*,2000). The present results of flavonoid was present in the 20 *Diospyros* species given the change from colourless to yellow colouration on addition of hydrochloric acid. Bioactive constituents of alkaloids presence of 24 *Diospyros* species are detected and while, did not detected in alkaloids of *Diospyros affinis*, *Diospyros cordifolia*, *Diospyros ghatensis*, *Diospyros oocarpa* and *Diospyros pyrrocarpoides*. Our laboratories have been going on isolation and identification of pharmaceutical active constituents.

Acknowledgements

This study was supported by the Department of Science and Technology, SERC- Fast Track Scheme (Sanctioned Ref.No.70/2005, Dated on Oct 04/2006), New Delhi, India. We are special thanks to Dr. Jadish Chandler, Scientist “F”, Department of Science and Technology, New Delhi for helping financial assistance. We are thankful to the Principal, St. Xavier’s College (Autonomous), Palayamkottai-627002, for providing laboratory facilities. We would like to thank the Dr. Ramkumar, IFS, Field Director and Conservation of Forest, Kalakad Mundanthurai-Tiger Reserve, NGO B, Colony, Palayamkottai for permission to collection plant materials.

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Table 1. Extractive values of *Diospyros species*.

% of extract	Species	Sl.No
2.56	<i>Diospyros affinis</i>	1.
3.61	<i>Diospyros assimilis</i>	2.
2.87	<i>Diospyros barberi</i>	3.
3.12	<i>Diospyros bourdillonii</i>	4.
2.54	<i>Diospyros buxifolia</i>	5.
3.10	<i>Diospyros candolleana</i>	6.
2.43	<i>Diospyros cordifolia</i>	7.
2.65	<i>Diospyros crumenata</i>	8.
3.87	<i>Diospyros discolor</i>	9.
2.98	<i>Diospyros ebenum</i>	10.
1.25	<i>Diospyros foliosa</i>	11.
3.58	<i>Diospyros ghatensis</i>	12.
3.14	<i>Diospyros hirsuta</i>	13.
1.56	<i>Diospyros humilis</i>	14.
1.49	<i>Diospyros insignis</i>	15.
5.61	<i>Diospyros malabarica</i>	16.
4.36	<i>Diospyros melanoxylon</i>	17.
4.87	<i>Diospyros montana</i>	18.
3.54	<i>Diospyros nilagirica</i>	19.
2.58	<i>Diospyros oocarpa</i>	20.
4.39	<i>Diospyros ovalifolia</i>	21.
1.58	<i>Diospyros paniculata</i>	22.
2.65	<i>Diospyros pruriens</i>	23.

3.45	<i>Diospyros pyrrocarpoides</i>	24.
5.21	<i>Diospyros racemosa</i>	25.
2.65	<i>Diospyros saldanhae</i>	26.
2.32	<i>Diospyros sulcata</i>	27.
1.56	<i>Diospyros sylvatica</i>	28.
1.29	<i>Diospyros trichophylla</i>	29.

Table 2. Phytochemical screening of fruits extracts of *Diospyros* species.

Essential oils	Sapanin	Tannin	Terpenoids	Flavonoids	Alkaloids	Species	Sl.No
+	+	-	+	+	-	<i>Diospyros affinis</i>	1.
+	+	-	+	-	+	<i>Diospyros assimilis</i>	2.
+	+	-	+	-	+	<i>Diospyros barberi</i>	3.
+	+	-	+	+	+	<i>Diospyros bourdilloni</i>	4.
+	+	-	+	-	+	<i>Diospyros buxifolia</i>	5.
+	+	+	+	+	+	<i>Diospyros candolleana</i>	6.
+	+	-	+	-	-	<i>Diospyros cordifolia</i>	7.
+	+	+	+	+	+	<i>Diospyros crumenata</i>	8.
+	+	+	+	-	+	<i>Diospyros discolor</i>	9.
+	+	-	+	+	+	<i>Diospyros ebenum</i>	10.
+	+	-	+	-	+	<i>Diospyros foliosa</i>	11.
+	+	-	+	+	-	<i>Diospyros ghatensis</i>	12.
+	+	+	+	+	+	<i>Diospyros hirsuta</i>	13.
+	+	-	+	-	+	<i>Diospyros humilis</i>	14.

+	+	+	+	+	+	<i>Diospyros insignis</i>	15.
+	+	+	+	+	+	<i>Diospyros malabarica</i>	16.
+	+	+	+	+	+	<i>Diospyros melanoxylon</i>	17.
+	+	+	+	+	+	<i>Diospyros montana</i>	18.
+	+	+	+	+	+	<i>Diospyros nilagirica</i>	19.
+	+	+	+	+	-	<i>Diospyros oocarpa</i>	20.
+	+	+	+	+	+	<i>Diospyros ovalifolia</i>	21.
+	+	-	+	+	+	<i>Diospyros paniculata</i>	22.
+	+	+	+	-	+	<i>Diospyros pruriens</i>	23.
+	+	+	+	+	-	<i>Diospyros pyrrhocarpoides</i>	24.
+	+	-	+	+	+	<i>Diospyros racemosa</i>	25.
+	+	+	+	+	+	<i>Diospyros saldanhae</i>	26.
+	+	-	+	-	+	<i>Diospyros sulcata</i>	27.
+	+	+	+	+	+	<i>Diospyros sylvatica</i>	28.
+	+	+	+	+	+	<i>Diospyros trichophylla</i>	29.
