

## Preliminary Phytochemical Qualitatively Investigation of an Medicinal Plant Food in Iran

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**Abstract:** *Solanum indicum* L. is a spontaneous plant widely distributed in India. During ripening stages, *Solanum indicum* L. presents different colors (green, yellow and red). Phytochemical screening was performed on fruits of *Solanum indicum* obtained from India between April and May 2007. To analyze for the bioactive components 10g of each sample was dried in an oven, ground, extracted in distilled water and ethanol respectively and filtered. The filtrates were stored in air-tight containers prior to analyses. The screening revealed the presence of carbohydrate, alkaloids, polyphenols, steroids and saponins either in High (+++), (-) Absence and moderate (++) with different concentrations. These results compared with literature values. The results depicted usefulness of *Solanum indicum* fruits in the treatment of some common diseases. *Solanum indicum* should be harnessed for its potentials.

**Key words:** Edible plant • *Solanum indicum* • Phytochemical compounds

### INTRODUCTION

The *Solanum indicum* (Figure1) is grown naturally in Central and South India. It is a member of the family Solanaceae (Table.1). *Solanum indicum* L. is cultivated in many parts of India. It is consumed fresh or sun dried, usually made as a soup alone or mixed with other vegetables. Like tomato fruits, *Solanum indicum* assumes different colors, from green to yellow and finally red during its ripening period. During the harvest period, from July to October, the local populations eat the vegetable frequently because the product is fresh and savoury [1], though little attention is paid to the degree of ripeness. After this period, the dried berries become available on the markets, but the fruits are not particularly appreciated because they become tasteless. Traditionally *Solanum indicum* L. is also used as an herbal remedy for several diseases such as diarrhea, malaria and prostate disease[6] Despite these supposedly beneficial effects on human health, few scientific studies focused on



Fig. 1: Fruits of *Solanum indicum* Linn.

*Solanum indicum* L. to assess its composition and demonstrate its health effects. In an *in vivo* study, Enomfon and Usuh [2] showed that a standardized extract of *Solanum indicum* L. containing more than 0.15% of chlorogenic acids prevented the development of hypertension in rats. Three studies on edible plants from Iran and India demonstrated that these fruits had the highest content in phenolics.

Table 1: Species, habitat and consumption of vegetables and fruits in Pune, India

Botanical name	Family Plant	part(s) used	Habitat	Typical consumption	Country
<i>Solanum indicum</i> Linn.	Solanaceae	Fruits	Disturbed	Regularly	India

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Compared to the other plants analysed [3]. Considering the scarce information 29 available on the composition of *Solanum indicum*, the purpose of this study was to characterize the phytochemical content of the fruits. This characterisation should allow the definition of the optimal ripening degree at which this food should be consumed in order to introduce the highest amount of antioxidant phytochemicals.

## MATERIAL AND METHODS

The fresh fruits of *Solanum indicum* used for this analysis were collected behind the Garden, around of Pune city, South India between April and May 2007. The samples were transferred to Chemistry Laboratory, Department of Food Sciences and Technology, College of Agriculture, Isfahan Technology University, Iran for the analyses. The fruits were washed with distilled water, oven dried at 80° C or 2hrs to obtain a constant weight. The samples were then finely ground and stored in plastic containers at ambient temperature. Five grams of each sample was placed into two conical flasks containing 100mL water and ethanol respectively. The mixtures were covered and allowed to soak for 3hrs [1] after which they were filtered. The preparations were covered and labeled. Standard quantitative methods were used for the analyses. The procedures are as follows:

**Carbohydrate:** Five centiliters of mixture of equal volumes of Fehling's A and B was added to 2cm<sup>3</sup> of each extract in a test tube. The resultant mixture was boiled for 2min. A brick red precipitation of copper oxide was observed from the fruits diluted with water, while the fruits mixed with ethanol gave green coloration.

**Saponins:** Two centiliters of each extract in a test tube was vigorously shaken for 2 min. Frothing indicating presence of saponins was noted.

**Poly Phenols:** Two centiliters of the extract was heated with 100cm<sup>3</sup> of ethyl acetate in a water bath and allowed to cool. The layers were allowed to separate and the color of the NH<sub>3</sub> layer was noticed (Red coloration formed).

**Alkaloids:** One centiliter of 1% HCl was added to 3cm<sup>3</sup> of each extract in test tubes. Each extract was heated with few drops of Mayer's reagent. A creamy white precipitate was observed indicating presence of alkaloids.

**Steroids:** One centiliter of concentrated H<sub>2</sub>SO<sub>4</sub> was added to 1cm<sup>3</sup> of each extract. A red color in leaf solution mixed with water indicating the presence of sterols was observed, while greenish coloration was observed in others.

## RESULTS AND DISCUSSION

Table 2 shows the results of the phytochemical analyses of aqueous and ethanolic extracts of *Solanum indicum* fruits. In the Table (+++) sign indicates the presence of a particular constituent in high concentration, (++) indicates presence in moderate concentration, while (+) indicates it in low concentration. (-) indicates absence of a constituents. Polyphenols act as antioxidant compounds in plant. Moreover, presence of total phenolics of dry matter was same with previous data obtained in *Solanum indicum*. The presence of bioactive substances present in *Solanum indicum* such as carbohydrate, poly phenols and alkaloids were closely related to those earlier reported on *Solanum indicum* by Abulude [1], Hassan *et al.* [3], Ogukwe *et al.* [5] and Enomfon *et al.* [2]. It has been reported that the presence of bioactive substances in plants play a role in preventing colorectal carcinoma, hypercholesterolemia and renal calculi [4]. It is documented that the absent of Saponins is negative point because it control human cardiovascular disease and reduce cholesterol. Polyphenols have been shown to have antibacterial, anti-inflammatory, antiallergic, antiviral and antineoplastic activity[6-10].

Table 2: Results of Phytochemical analyses of *Solanum indicum* samples in water and Ethanol

	Water Extract of <i>Sindicum</i> Fruits	Ethanolic extract of <i>Sindicum</i> Fruits
Carbohydrate	+++	++
Saponins	-	-
Polyphenols	+++	+++
Alkaloids	-	-
Steroids	-	-

+++ -High concentration, ++ -Moderate concentration, \_ Absence

## CONCLUSION

The results of the phytochemical screening of *Solanum indicum* crude extracts from fruits showed that the samples contained some bioactive substances. Saponins, Alkaloids and Steroids was absent. The fruits can be used in prevention or curing some major diseases since the results show poly phenols compositions. Further research work is in progress on microbial value, food properties, digestibility and fatty acids. Considering its high content of antioxidants, *Solanum indicum* L. might be considered as an interesting food to improve the antioxidant status of people living in Pune, India, even though further studies are needed in order to understand the impact on the nutritional values of *Solanum indicum* L. of various environmental conditions during the growing period and after harvest.

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