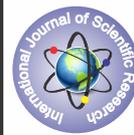


EFFECT OF VARIOUS DRYING CONDITIONS ON THE IRON CONTENT OF *Phyllanthus emblica* (L.) and *Phyllanthus acidus* (L.)



Botany

KEYWORDS: Nutraceuticals, Iron content ,Drying effect.

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ABSTRACT

*Nature has gifted us with many medicinal plants for a disease free and healthy life. Fruits and vegetables form an essential part of a balanced diet. Fruits are a good source of essential nutrients which are important for human nutrition. An attempt was made to find out if different drying conditions had any effect on the nutrition status of the fruits. In the present investigation the effect of various drying conditions on the Iron content of fruits of *Phyllanthus emblica* (L.) and *Phyllanthus acidus* (L.) was studied. Maximum Iron content was observed in *Phyllanthus emblica* (L.) and in *Phyllanthus acidus* (L.) fruits when dried in Sun as compared to oven drying. Another interesting observation made was that the iron content in the fruits of both *Phyllanthus emblica* (L.) and in *Phyllanthus acidus* (L.) were found to be maximum when dried entire i.e. uncut.*

Introduction Fruits are a good source of essential nutrients which are important for human nutrition. *Phyllanthus emblica* (L.) which is known as amla is an Indian herb which is extensively used in ayurvedic system of medicine. According to ayurvedic doctors, the regular usage of Amla increases longevity. Amla is supposed to rejuvenate all the organ systems of the body, and provide strength and wellness. (K.P. Sampath Kumar 2012). *Phyllanthus acidus* (L.), locally named as Arbaroi in Bangladesh and gooseberry or star gooseberry in India, is an edible small yellow berry fruit belonging to Euphorbiaceae family. The medicinal activities of *Phyllanthus* species are antipyretic, analgesic, antiinflammatory, antihepatotoxic and antiviral (Unander et al.,1995;Chang et al 2003., Zhang et al.,2004;Sousa et al.,2007). Iron deficiency anaemia (IDA) is the result of long-term negative iron balance and is the most common nutritional disorder in the world(WHO.2000). According to the biomedical understanding, there are mainly three factors which determine the amount of iron absorbed from the diet, they are the amount of iron ingested, its availability for absorption in the body, and iron status of the individual. Bioavailability represents the integration of processes whereby an ingested nutrient becomes available for digestion, absorption, transport, utilization and elimination. The amount of ingested iron that is available for use in metabolic processes or deposition in storage forms like ferritin is a key factor in iron nutrition. (Padma Venkatasubramanian 2014).

MATERIAL AND METHODS

The two most commonly available fruits i.e. *Phyllanthus emblica* (L.) and *Phyllanthus acidus* (L.) were selected for the study. The fruits were dried under two conditions, i.e. sundried and oven dried and the drying was done with the fruits kept in two conditions i.e. Uncut and Cut condition.

Iron Estimation: Iron content was estimated by the following method: Aliquot was prepared by drying the fruit of *Phyllanthus emblica* (L.) and *Phyllanthus acidus* (L.) and making it into a powder. This powder was then mixed with Nitric acid and digested to prepare the aliquot. This aliquot was used for estimating the iron content.

Iron content: In a test tube 10 ml of plant extract was taken and dropwise 40% NaOH solution was added till alkaline. The test tubes were kept in water bath at 37°C for one hour. It was cooled and to each test tube 0.3 ml conc. HCl was added. The final volume was made up to 50 ml with distilled water. Transferred 10 ml solution to measuring cylinder and added 5 ml KCNS + 10 ml amyl alcohol. Mixed the contents thoroughly by shaking and allowing it to stand for 10 minutes. Separated the amyl alcohol layer (coloured layer) with the help of a pipette and OD was read at 440 nm.

Observation

The Iron content in both the fruits *Phyllanthus emblica* (L.) And

Phyllanthus acidus (L.) were found to be maximum when the fruit were sundried as compared to oven dried.

In *Phyllanthus emblica* (L.) the iron content was found to be 1 mg/100gm when the fruit were sundried. However it was found to be 0.7mg/100gm when they were dried in oven (Table no. 1).

In *Phyllanthus acidus* (L.) The iron content was found to be 3 mg/100gm when the fruit were sundried. However it was found to be 2.2mg/100gm when they dried in oven. (Table No. 2). It was also observed that the Iron content also showed variation when the fruits were dried in cut condition.

When the fruits of *Phyllanthus emblica* (L.) were sun dried and oven dried after cutting, the iron content was found to be 0.8mg/100gm and 0.4mg/100gm (Table No. 1). However the iron content of the fruits were found to be much higher when they were dried under both condition i.e. sun drying and oven drying in the uncut condition as compared to cut conditions. (Table No.1)

When the fruit of *Phyllanthus emblica* (L.) were sundried and oven dried after cutting the iron content was found to be 2.7mg/100gm and 1.6mg/100gm (Table No. 1). However the iron content of the fruit were found to be much higher when they were dried under both condition i.e. sun drying and oven drying in the uncut condition as compared to cut conditions. (Table No.2)

Table 1: Effect of drying under different conditions on the iron content of *Phyllanthus emblica* (L.) in mg/100gm.

Sr. no.	Condit	Drying conditions	
		Sunlight	Oven
1	Uncut	1±0.07	0.7±0.17
	Cut	0.8±0.13	0.4±1.41

Values given are mean ± SD

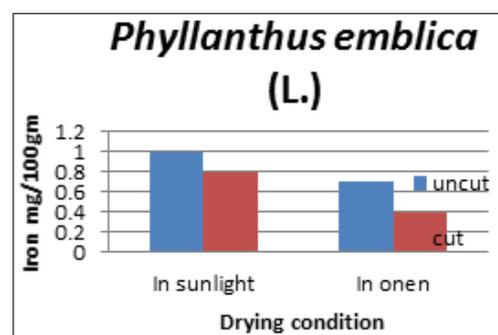
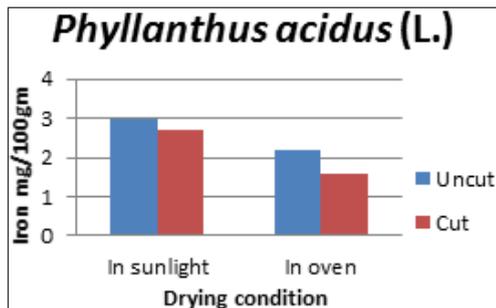


Table 2: Effect of drying under different conditions on the iron content of *Phyllanthus acidus* (L.) in mg/100gm.

Sr. no.	Condition	Drying condition	
		Sunlight	Oven
1	Uncut	3±0.03	2.2±0.73
	Cut	2.7±0.43	1.6±0.17

Values given are mean ± SD



RESULT AND DISCUSSIONS

The iron content in the fruits of *Phyllanthus emblica* (L.) and *Phyllanthus acidus* (L.) were found to be lower in the oven dried fruit as compared to the sundried fruits. Sunil pareek and R.A. Kaushik (2012) have reported lower sugar content (total sugar) in the fruits of *Phyllanthus emblica* (L.), when dried in the sun as compared to those dried in oven.

The iron content of both the fruits i.e. *Phyllanthus emblica* (L.) and *Phyllanthus acidus* (L.) when dried under uncut condition (entire) was found to be higher as compared to the fruits dried after cutting them into pieces. Poonam Mishra et al. (2009) have reported a low vitamin C content when Aamla fruits were cut and dried in sun. This could be due to the oxidation process which was higher when the fruits are cut and exposed to the sun.

CONCLUSION

- Iron content in the fruits of *Phyllanthus emblica* (L.) and *Phyllanthus acidus* (L.) were found to be maximum when they were Sun dried as compared to oven dried.
- The Iron content was found to be higher when the fruits were dried entire i.e uncut as compared to drying in cut condition

Sundried Photo- Effect of drying conditions on fruits of *Phyllanthus emblica* (L.)

Ovendried

Pemblica(uncut)
Pacidus(uncut)

Pemblica(cut)
Pacidus(cut)



Pemblica(uncut)
Pacidus(uncut)

Pemblica(cut)
Pacidus(cut)

REFERENCES

1. Chang CC, Lien YC, Liu KCSC, Lee SS. 2003. Lignans from *Phyllanthus urinaria*. *Phytochemistry* 63:825-33
2. K.P. Sampath Kumar, Debjit Bhowmik, Amitsankar Dutta, Akhilesh Pd.Yadav, Shrawan Paswan, Shweta Srivastava, Lokesh Deb. (2012).Recent Trends in Potential traditional Indian Herbs. *Emblica officinalis* and Its Medicinal Importance.Vol. 1 No. 1, ISSN 2278-4136.
3. Padma Venkatasubramanian, Indu Bala Koul, Reeya Kochuthekil Varghese, Srividya Koyyala and Arun Shivakumar. (2014).Amla (*Phyllanthus emblica* L.) enhances iron dialysability and uptake in vitro models. *Current Science*, Vol.107,NO.11.
4. Poonam Mishra, Vijeya Srivastava, Deepmala Verma, Chauhan O. P. and Rai G.K.(2009).Physico-chemical properties of Chakiya variety of Amla (*Emblica officinalis*) and effect of different Dehydration methods on quality of powder.
5. Sousa M, Ousingsawat J, Seitz R, Puntheeranurak S, Regalado A, Schmidt A, et al. 2007. An extract from the medicinal plant *Phyllanthus acidus* and its isolated compounds induce airway chloride secretion: a potential treatment for cystic fibrosis. *Mol Pharmacol*. 71:366-76.
6. Sunil Pareek and Kaushik R.A.,(2012).Effect of drying Method and quality of Indian gooseberry (*Emblica officinalis* Gaertn.) powder During storage. *Journal of Scientific & Industrial Research*. Vol.71,November 2012, pp. 727-732.
7. Unander DW, Webster DW, Blumberg BS. 1995. Uses and bioassays in *Phyllanthus* (*Euphorbiaceae*) IV. Clustering of antiviral uses and other effects. *J Ethnopharmacol* 45:1-18 299,152-178.
8. WHO (2000). Nutrition for health and development: a global agenda for combating malnutrition. Department of Nutrition for Health and Development, World Health Organization, Geneva, pp. 16-17.
9. Zhang YJ, Nagao T, Tanaka T, Yang CR, Okabe H, Kouno I. 2004. Antiproliferative activity of the main constituents from *Phyllanthus emblica*. *Biol Pharm Bull*. 27:251-5.