



Short Communication

Proximate Analysis of Peel and Seed of *Annona squamosa* (Custard Apple) Fruit

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Abstract

Proximate analysis of peel and seeds of *Annona squamosa* plant species were studied at the laboratory. The plant material of *Annona squamosa* was collected from wild plants found in Thane Mumbai, and the herbarium specimen was prepared and authenticated from Botanical Survey of India (BSI), Government of India, Ministry of Environment and forests, Pune, India. The proximate analysis sample was analyzed. The fruits contained between 3.73 and 3.96 percent moisture in peel and 1.22 and 1.46 in seeds by Karl-Fischer method and loss on drying method respectively. 4.08% in peel and 1.12% in seeds foreign organic matters are present. 3.94% in peel and 2.39% in seeds is total ash contain. Water soluble ash is 8.18% in peel and 3.79% in seeds. Acid insoluble ash is 1.90% in peel and 1.05% in seeds.

Keyword: *Annona squamosa*, peel, seeds, proximate analysis.

Introduction

Annona squamosa is a member of the family of Custard apple trees called Annonaceae and a species of the genus *Annona* known mostly for its edible fruits *Annona*¹. It is commonly found in India and Cultivated in Thailand and originates from the West Indies and South America. *Annona squamosa* produces fruits that are usually called sugar apple or custard apple in English, sitafal in Marathi, sharifa in hindi and sitaphalam in telugu in india and corossolier and cailleux, pommier cannelle in French². It is mainly grown in gardens for its fruits and ornamental value. It is considered as beneficial for cardiac disease, diabetes hyperthyroidism and cancer. The root is considered as a drastic purgative³. An infusion of the leaves is considered as efficacious in prolapsusani of children, the crushed leaves are sniffed to overcome hysteria and fainting spells, they are also applied on ulcer and wounds. The ripe fruits of this plant are applied to malignant tumors to hasten suppuration. The dried unripe fruit powder is used to destroy vermin. the seeds are acrid and poisonous powdered seeds serve as fish poison and insecticides. A paste of seed powder has been applied to the head to kill lice. It is also used for destroying worm in the wound of cattles⁴. In the present research work, the plant material (dried peel and seed powder of *Annona squamosa*) was subjected to specified quality tests, as per World Health Organization (WHO)⁴ and Indian Herbal Pharmacopoeia (IHP)⁵.

Material and Methods

Collection of the plant material: Variations in collection site, altitude, plant age, climate and soil can affect the concentration of secondary metabolites among different batches of the same

plant, collected at different times. Hence it is necessary to carry out the collection of plant material with utmost care. The plant materials and their different parts are collected when they contain maximum amount of active constituents. Flowering tops of the plants are collected before they reach the flowering stage. The ripe fruits are collected.

Methods: Proximate analysis of *Annona squamosa* seed and peel Foreign organic matter, Total ash content, Acid insoluble ash, Water soluble ash, Loss on drying, Percentage moisture content were determined using the methods subjected to specified quality tests, as per World Health Organization (WHO)⁴ and Indian Herbal Pharmacopoeia (IHP)⁵. All determinations were done in triplicate. Whereas the ash content was determined using the method of Pomeranz and Meloan (1994) and total carbohydrate was determined by difference.

Foreign organic matter: Plant materials should be entirely free from visible signs of contamination, *i.e.* moulds, insects and other animal contamination, including animal excreta. No poisonous, dangerous or otherwise harmful foreign matter or residue should be allowed. Any soil, stones, sand dust and other foreign organic matter must be removed before materials are cut or ground for testing. Macroscopic examination can conveniently be employed for the determination of foreign matter in whole or cut plant materials. Foreign matters were weighed and the contents of foreign matter in grams per 100 grams of the sample were calculated.

The seed and peel material was washed thoroughly with water to remove the dust particles on the surface of the roots and the soil particles adhering. Excess water was allowed to drain off by spreading the seeds and peel on filter paper. Then 250.218 g of

the washed and drained tuber material was taken and spread as a thin layer on a white, clean muslin cloth. Foreign matters were weighed and the contents of foreign matter in grams per 100 grams of the sample were calculated.

Ash contents: The ash remaining after the ignition of plant materials is determined by three different methods which are: Total ash, Acid- insoluble ash and Water- soluble ash.

Total ash content: This method is designed to measure the total amount of material remaining after ignition. This includes both “physiological ash”, which is delivered from the plant tissue itself, and “non-physiological ash”, which is residue of the extraneous matter (e.g. sand and soil) adhering to the plant surface.

Apparatus Silica crucible, desiccators, air oven, muffle furnace. Accurately weighed 2.0004 g of the dried peel and 2.008 seed powder of *Annona squamosa* was taken in a tarred silica crucible in a muffle furnace at 5500 C + or – 20 till white carbon free ash was formed. The silica crucible was then cooled in a desiccator and weighed. The percentage total ash content of *Annona squamosa* peel and seed powder was then calculated.

Acid insoluble ash: It is the residue obtained after boiling the total ash with dilute hydrochloric acid and igniting the remaining insoluble matter. This measures the amount of silica present as sand siliceous earth.

Chemicals: Conc. HCl, 2N HCl, and AgNO₃

Apparatus: Silica crucible, desiccators, air oven, muffle furnace.

Accurately weighed 2.003 g of the peel and 2.002 g seed of *Annona squamosa* was taken in a silica crucible and was ignited with a Bunsen burner for about 1 hr. The ignition was completed by keeping silica crucible in a furnace at 5500°C + or – 200°C till white carbon free ash was formed. The ash was moistened with concentrated HCl and evaporated to dryness after which it was kept in an electric air oven maintained at 1350°C + or -20°C for 3 hours After cooling, the ash was taken in a beaker 25 cm³ of dilute hydrochloric acid (2N HCl) was added, and crucible was kept covered and heated on a water bath, for 10 minutes. It was allowed to cool, and contents were filtered through Whatman filter paper no. 41 (E. Merck Mumbai India). The residue was then washed with distilled water, till ashing are free from chloride (as tested with AgNO₃ solution). The filter paper and the residue were placed in a silica crucible and ignited in muffle furnace, at 5500°C + or – 200°C, for 1 hour. The crucible was cooled and weighed to a constant weight. The percentage acid-insoluble ash content was then calculated of dried powder of peel and seed of *Annona squamosa* fruit.

Water- soluble ash: It is the difference in weight between the total ash and the residue after treatment of the total ash with water.

Chemicals Distilled water.

Apparatus Silica crucible, desiccator, air oven, muffle furnace.

About 2.004 g of the dried peel and 2.005 g seed powder of *Annona squamosa* fruit was accurately weighed and transferred to a silica crucible and was ignited with a Bunsen burner, for about 1 hour. The silica crucible was then kept in a muffle furnace at 5500°C + or- 200°C, till a white carbon free ash. After cooling, the ash was taken in a beaker (capacity 50 cm³) and to it 25 cm³ of distilled water was added, and crucible was kept covered and heated on a water bath, for 10 min. It was allowed to cool, and contents were filtered through Whatman filter paper no. 41 (E. Merck, Mumbai India). The residue were placed in a silica crucible and ignited in a muffle furnace, at 5500°C + or- 200°C for 1 hour. The crucible was cooled and weighed to a constant weight. The percentage water-soluble ash content was then calculated of dried powder peel and seed of *Annona squamosa* Fruit.

Moisture content: The presence of moisture in plant material indicates the possibility of microbial or fungal growth during storage Thus the moisture content in dried seed and peel powder of *Annona squamosa* can be using the following methods: i. Karl Fisher Titrimetric method, ii. Loss on drying method.

Karl Fischer Titrimetric method The moisture content in plant material is determined by using Karl Fischer titrator. Digital Automatic Karl Fischer Titrator, (Lab India).

Reagents: Pyridine, Karl Fisher reagent (E.Merck, Methanol (Karl Fisher grade) were used as the reagents. Distilled water used in the present work, was purified with a Sartoriou (Arium 61315, made in USA) water purification unit.

The dry reaction bottle was filled with methanol. The auto titrator was filled with pyridine- free Karl Fischer Reagent. Instrument equipped with magnetic stirrer was switched on. 10 µL of distilled water was added to methanol and a Karl Fischer reagent was added to the reaction bottle, till the end point was reached. Titre factor was thus calculated. Accurately weighed, about 100.02 mg of peel powder was transferred to the same bottle. Titration with Karl Fischer reagent was carried out as described above reading was recorded and moisture content of dried peel powder of *Annona squamosa* was recorded as percentage. Similarly 100.03 mg seed powder was transferred for percentage moisture.

Loss on drying Method: The loss on drying method determines both moisture content as well as the volatile matter, present in the plant material.

Apparatus: Wide mounted stoppered weighing bottle, desiccator, air oven.

Procedure: About 5.001g of dried powder of peel and 5.002 g of dried powder of seed of *Annona squamosa* was accurately weighed, in a previously dried, wide mounted flat weighing

bottle. The bottle was then placed in an air oven, maintained at 1000°C + or- 200°C, for 2 hours and the above procedure was repeated (heating, cooling and weighing) till the difference in the weight between two successive weighing was less than 5mg. The percentage loss in the weight on drying was then calculated of dried powder of peel and seed of *Annona squamosa*.

Results and Discussion

Proximate analysis of *Annona squamosa* peel: Results obtained showed that the peel contained 4.08% foreign organic matter, 3.94% total ash content, 1.90% acid-insoluble ash content, 8.18% water soluble ash and 3.73% Moisture content by Karl Fischer Method and 3.96% by loss on drying method.

Proximate analysis of *Annona squamosa* seed: Results obtained showed that the seeds contained 1.12% foreign organic matter, 2.39% total ash content, 1.05% acid-insoluble ash content, 3.79% water soluble ash and 1.22% Moisture content by Karl Fischer Method And 1.46% by loss on drying method.

Conclusion

The Peel and Seed of *Annona Squamosa* (Custard Apple) fruit was collected, dried and powdered and was subjected to proximate analysis such as foreign organic matter, total ash values, water soluble ash values, acid insoluble ash values, moisture content by karl fischer method and loss on drying and the results were explain to note down how far they differ in their qualities determination of proximate analysis of these samples will give a finger print of whether the species is adulterated or not. Ash value is useful in determining authenticity and purity of sample and also these values are important qualitative standards. *Annona squamosa* peel and seed shows lower total Ash value which shows higher mineral content, lower value of aqueous extractive value shows that it is less assimilated when taken with water which is an not effective solvent. More research work is recommended on the plants leaves, seed and fruits for isolation and characterization of bio active compounds that may be active against malarial parasites and other diseases.

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