

Extraction of Starch from Ginger Rhizome (ZingiberOfficinale)



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Abstract

Zingiberofficinale belonging to family Zingiberaceae is an ancient Indian medicine used in several disorders. The main object behind to isolate starch from the ginger rhizome. Ginger is the rhizome of the plant Zingiberofficinale, Starch is one of the most abundant organic chemicals on earth and it is synthesized in the amyloplasts of seeds, grain, roots and tubers of many plants where it serves as the chemical storage form of energy from the sun. Many drugs commonly used today are herbal origin. Herbal medicine is the oldest form of healthcare known to mankind. Herbs have been used by all cultures throughout history. Herbal medicine is also in great demand in developed world for primary healthcare because of their efficacy, safety and lesser side effects. The aim of present study is to isolate and Phytochemical screening tests were performed. Zinger officinale rhizomes were extracted by using centrifugation process at 3500rpm. Preliminary Phytochemical screening tests of ginger rhizome extract were performed. Ginger contains a many constituent like starch, fat, Gingerol, volatile oil. And it is used traditionally for dizziness, arthritis, menstrual pain. While isolation of starch from ginger rhizome will be used for pharmacological effect.

Introduction

Since the beginning of human civilization, medicinal plants have been used by mankind for its therapeutic value. Nature has been a source of medicinal agent for thousands of years and an impressive number of modern drugs have been isolated from natural sources. Many of these isolations were based on the usage of the agents in the traditional medicine system continues to play an essential role in health care, with about 80% of the world's inhabitants relying mainly on traditional medicines for their primary health care. India has several traditional medical systems, such as Ayurveda and Unani, which has survived through more than 3000 years, mainly using plant-based drugs [1,2]. The material medica of these systems contains a rich heritage of indigenous to herbal practices that have helped to sustain the health of most rural people of India. The ancient texts like the Rig Veda (4500-1600BC) and the Atharva Veda mention the use of several plants as medicine. The books on ayurvedic medicine such as Charaka Samhita and Sushruta Samhita refer to the use of more than 700 herbs [3,4]. According to the World health organization (WHO, 1977) "a medicinal plant" is any plant, which in one or more of its organs contains substances that can be used for the therapeutic purpose or which, are precursors for the synthesis of useful drugs [5]. This

definition distinguishes those plants whose therapeutic properties and constituents have been established scientifically and plants that are regarded as medicinal but which have not yet been subjected to a thorough investigation. The term "Herbal drug" determines parts/parts of plant (leaves, seeds, roots, rhizomes) used for preparing medicine [6]. Furthermore, WHO (2001) defines medicinal plant as herbal preparations produced by subjecting plant materials to extraction, purification, concentration or other physical or biological processes which may be produced for immediate consumption or as a basis for herbal products. Medicinal plants are plants containing inherent active ingredients used to cure disease or relieve pain [7].

Material and Methodology

The materials that are used are fresh ginger rhizomes of about 250gm with required sufficient quantity of (700mL 1%W/V) of sodium metabisulphate and required quantity of water.

Extraction Process

This paste was dispersed in (1% of 1g) of sodium Metabisulphate in 100ml of distilled water. So that the paste was filtered through a muslin cloth. The suspension was centrifuged at 3500rpm

for 10mins to removal of dirt particles to facilitate to form cleared supernatant and it is decanted and finally the mucilage is scraped off. This following centrifugation process is repeated for four times by keeping with the same rpm and time to get the fine extraction of ginger starch. After getting the fine starch was further dried at 60c in hot air oven and finally the starch is weighed and stored[8].

Determination of Swelling Power

The sample was taken (0.1g) of starch and to that 10ml of distilled water was added, and then this mixture was heated in a water bath at 50c for 30mins with continuous shaking. After that the mixture was taken into centrifuge tubes for the balancing take another tube with a distilled water and for centrifugation for 20mins at 1500rpm to facilitate to remove of supernatant and carefully decanted and weight of starch paste was taken to calculate the swelling power by using following formula as follows as:

Swelling power = weight of starch paste

Weight of dry starch sample

Determination of Solubility Power

Starch sample containing 0.5g was added to 10ml of distilled water and it is heated for 30mins at 50c in a water bath. This mixture was subjected to centrifuge at 1500rpm for 30mins. In this 5ml of supernatant was decanted to constant weight. So that the solubility was expressed as percentage by following formula as follows as

%percentage solubility = weight of starch paste × 100

Weight of sample on dry basis

Gelatinization Temperature

Take 20ml beaker to that add 1gm of starch sample and dissolved in 10ml of distilled water. And it is heated on a hot plate. So that the gelatinization temperature was noted by using thermometer when dispersion is suspended in a starch slurry form[9].

Identification Tests for to Characterise Various Chemical Constituents

Test For Carbohydrates

Molish's test: To the 2ml of plant extract add molish's reagent of few drops in a test tube and 2ml of conc. sulphuric acid was added along the sides of test tube the formation reddish violet ring indicates at the junction of two layers that indicates as presence of carbohydrates.

Tests for Reducing Sugar

Benedict's test: To 2ml of benedict's reagent, 1ml of extract was added and allow to warm to stand for 2mins so, that it gets red precipitate and that indicates the presence of sugar.

Fehling's test: Mix the equal volume of (5ml) extract solution to fehling's solution (same volume of fehling's solution A and B) and boil it for few minutes until the appearance of brick red precipitate. It indicates the presence of reducing sugar.

Test for monosaccharide's

Barfoed's test: Take the equal volumes of extract solution and barfoed's reagent. Allow it to heat in water bath for 1-2mins and cool it a side then it gets red precipitate for indication of presence of monosaccharides.

Test for Pentose Sugar

Test for pentose sugar: For the 2ml of test solution add 2ml of HCL and heat for 1-2mins while heating add phloroglucinol then read the colour appears.

Test for hexose sugar: Take water bath to heat 3ml of selwinoff's reagent and add 1ml of test solution and it is heated upto 2mins until the red colour appears[10].

Test for Non-Reducing Sugar

Benedict's test: Take 1ml of test solution (extract solution) to that adds few ml of Benedict's reagent and allow swarming for a few minutes then it gets red precipitate. So, that it indicates presence of sugar (Table 1).

Table 1:

Phyto chemicals	Test	Observation	Inference
Carbohydrate test	Molish's test	Formation of reddish violet ring	+
Reducing sugar	Benedict's test	Red precipitate	+
Reducing sugar	Fehling's test	Brick red precipitate	+
Monosaccharide's	Barfoed's test	Red precipitate	+
pentose sugar		Colour appears	+
Hexose sugar		Red colour appears	+
non-reducing sugar	Benedict's test	Red colour	+
Iodine test		On cooling presence of blue colour	+
Tannic acid test		Formation of precipitate	+

Iodine test: For the 3ml of test solution add few drops of (1-2) iodine solution. Allow it to for few minutes while, boiling absence of blue colour will appear, while cooling presence of blue colour will appear[11].

Tannic acid test: To the 3ml of test solution add 2% of tannic acid then it will get precipitate that indicates of tannins are present.

Results

From the above identification of preliminary screening tests shows the presence of carbohydrates are extracted from the starch of zinger.

Conclusion

The present study the starch was extracted from zinger officinale by using centrifugation process at 3500 rpm for 10mns. And the process is repeated for four times to get the fine starch. This fine starch is carried for the phytochemical screening tests. There that starch that indicates the presence of carbohydrates.

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