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USE OF ASHWAGANDHA POWDER IN THE MATERIALIZATION OF COOKIES

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ABSTRACT

Since ancient times, ashwagandha, among the most potent herbs in Ayurvedic medicine, has been used to treat a wide range of ailments. It is perhaps best recognised for its rejuvenating properties. In Sanskrit, Ashwagandha signifies "the smell of a horse," "meaning" that the herb bestows the vitality and strength of a stallion. It has long been recommended to assist people boost their immune function following illness. Despite the fact that ginseng and Ashwagandha are unrelated botanically, people often refer to Ashwagandha as "Indian ginseng" because of its restorative qualities. **Incorporation of Ashwagandha Powder in the development of cookies.**

Since the intake of Ashwagandha is bitter in its raw form and not easily acceptable, therefore it can be consumed by incorporating it into various food products. Inclusion of such products in the diet can provide therapeutic benefits of Ashwagandha to the individuals. Further work can be carried out on products development as well as the clinical effects of Ashwagandha on various others medical problem.

Keywords: Ashwagandha, Ayurveda, Loss of Appetite, General Debility, Underweight.

INTRODUCTION

Ayurveda, an ancient form of Indian traditional medicine, uses ashwagandha, commonly known as the "Queen of Ayurveda," "Winter Cheery," and "Indian ginseng." The most well-known ayurvedic herb for rejuvenation, ashwagandha, is named after the Sanskrit phrase that translates to "Smelling like a horse." This phrase likely refers to the fresh root's aroma, which is similar to that of a sweating horse. [1]

Typically referred to as "Medicinal Plants," these are the plants that have curative qualities or have advantageous pharmacological effects on animal bodies. The therapeutic plants growing alongside them may not appear to have any distinguishing physical traits, but they do have certain unique features or virtues that makes them significant from a medicinal standpoint. The existence of plants that naturally produce and accumulate secondary metabolites, such as alkaloids, glycosides, tannins, volatile oils, and contain vitamins and minerals as well as these substances' therapeutic qualities, has now been proved. [2]

Throughout history, all societies have made extensive use of medicinal plants to cure a wide range of human illnesses. The utilisation of health conditions is now the subject of extensive scientific documentation. In the same way that pharmacists and doctors use the word "drug," which means "to dry," so does the word "drug" itself. Some of them are created using plant extracts, while others are artificially created to resemble a substance found in plants.[3]

Secondary metabolites isolated from the plants include alkaloids, steroids, triterpenoids plant phenols, etc. Photochemical investigations confirmed that steroidal compounds are essential components of all plants. Steroids take part in the formation of sterols in the nuclei, chloroplasts, mitochondria, and other cell organelles, mitochondria, and other cell organelles. A peculiar group of phytosteroids, namely with anoloids (Steroidal lactones) are characteristics solely of plants. It can enhance the immune system, by boosting macrophages and phagocytes. These are immune cells that literally gobble up invading bacteria, viruses and malignant cells. Additionally, it can increase the number of white blood cells, red blood cells, and platelets, which are the little blood particles that aid in blood clotting. The symptoms of anaemia may also be lessened. Those with coughs, emphysema, bronchitis, and asthma can benefit from it since it can lessen lung spasms. It works as a bath aphrodisiac and impotence treatment, by nourishing females and boosting sperm count, it can increase fertility. Due to its anti-inflammatory characteristics, ashwagandha is beneficial for treating both arthritis and rheumatism. It is used to regulate blood pressure and cholesterol. Ashwagandha has also been used in a study on Alzheimer's diseases and was found to improve cognitive skills and memory. [4]



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Plant Description: Details in below

- Ashwagandha is just a short, branching, perennial woody shrub that typically reaches a height of 2 feet and is naturally found in a variety of locations, including Africa, the Mediterranean, the East, and India. Due to its extensive distribution, there are significant morphological and chemotypical variations in terms of local species.
- The axillary, sessile blossoms of ashwagandha are either garishly yellow or green. They are a hermaphrodite (means both male and female organs).
- Smooth, oblong, rounded, or somewhat formed at the base, the fruit is an orange-red berry.
- The root is more or less tuberous.
- The seeds are scurfy and golden in colour.
- The seeds of the bright yellow fruit are dried and stored for spring planting after the fruit is gathered in the late fall.

Cultivation

Whithania somnifera requires well-drained, slightly alkaline soil and full sun to part shade. Plants grow on soil that has a pH of 7.5-8.0. It is multiplied through seed, cuttings, or division. During January to March, plants are plucked for their fresh roots. Either the entire object is dried whole, or it is sliced into brief transverse sections and dried in the sun. The best method of propagation is via seed. The germination time for seed on wet sand is between 14 and 21 days.

Constituents Of Ashwagandha

1. **Alkaloids:** The German Pharmacist Karl Friedrich Wilhelm Meissner, first identified in 1818. He gave them this name because they are largely alkaline, although there are a few exceptions. Alkaloids are found in a diverse range of products, which include nicotine, morphine, caffeine, deadly nightshade and lycopodine. Alkaloids, which are typically obtained from plants, are organic molecules made up of carbon, hydrogen, nitrogen, and oxygen. They have a number of medicinal uses, including analgesics, antispasmodics, anti-hypertensive agents, and the treatment of disorders of the central nervous system. Although the alkaloids found in these products are different to those found in Ashwagandha, it is Ashwagandha alkaloids that are attributed to relieve stress. Somnifera and with nine have been identified as having particular importance to this condition. Alkaloids such as Somniferine, somnine, somniferinine, withananine, pseudowithanine, tropino pseudotropine, choline, cuscohygrine, isolettertierine, a ferine, anhydride, 3alpha-gloyloxy tropane, etc. Alkaloids of the plant act as adaptogens or vitalizes.
2. **Steroidal:** A group of components known as withanolides makes up steroidal loc atones. Two main withanolides, withaferin A and withanolide D, are thought to be responsible for a large portion of ashwagandha's pharmacological activity. Withanolides are generally defined as steroids with an ergostane skeleton and lactones ring. The presence of specific steroidal lactones or withanolides is what gives Ashwagandha its peculiar earthy flavour and aroma.
It is thought that Ashwagandha's numerous therapeutic uses are caused by these steroidal compounds. Withanoloids act to fight inflammation.
Withanolides also exert strong effects on stress management. The body can transform these substances into human hormones, making them significant hormone precursors. If there is too much one hormone – for example there may be too much of the stress hormone cortisol – the plant hormone precursors occupies the site where the human hormone is absorbed and block the absorption. Hence balance is restored and maintained and the various systems in the body are regulated.
3. **Beta:** sisterol, chlorogenic acid (in leaf only)
4. Stoindoside VII and VIII, two acyl steryl glycosides, have been discovered.
5. Glycosides and saponins.
6. Choline, beta-sitosterol, flavonoids, tannins, the essential oil ipuranol, a crystalline alcohol called withaniol, and a number of acylsterylglucosides or sitoindosides are other compounds that may be significant.
7. The nutrients present are Vitamins B1 [B2, niacin, biotin, flavonoids, and iron.
8. Extracts of Ashwagandha's leaves and roots were discovered in methanol, hexane, and diethyl ether. Between 0.13 to 0.31% of roots contain alkaloid.
9. The oil recovered from the plant's roots is made up of two components: a water-soluble component and an insoluble component. A small amount of sugar is included in the water soluble portion, whereas essential nutrients such as fatty acids are present in the water insoluble portion. In addition, ashwagandha oil is a good source of tannin, glucose, potassium nitrate, and a number of alkaloids.



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Medicinal uses of Ashwagandha

Ashwagandha is a very valuable herb in the Ayurvedic system and has a myriad of benefits. It is an adaptogenic herb and helps to improve body's immune, hormonal as well as nervous system. Excessive physical training leads to higher levels of cortisol in the body, which in turn eats up the muscle protein. By increasing the number of immune cells in the body, it also helps to fight infections. Because of its high iron content, Ashwagandha is often used to treat anemia. Bhattacharya., SK, Muruganandam AV., (2003).[5] This herb is one of the most important Ayurvedic tonic herbs, recommended for maintain growth, health, energy and stamina healthy hemoglobin levels, ensuring oxygen supply throughout the body. Withania is also an excellent mood tonic with gentle calming properties. Bone K., (1996).[6]

Ashwagandha's Sitoinosides promote phagocyte activity, leading in strong immune system function and the eradication of infections from the body. Ashwagandha not only purges infections from the body but also has potent antioxidant properties. Free radicals called oxidants are dangerous ions that can affect DNA, muscle tissue, and organs, which results in increased cortisol activity, impaired immune system response, and inflammatory reactions in the muscles[7]. Ashwagandha, a stimulant that also has a mild sedative effect, calms the body and eases the mind, which lowers levels of tension and anxiety throughout the body.

Benefits

1. Energy is of vast importance in our body. In its absence body. In its absence body's efficiency to do work lowers, fatigue and other nutritional deficiencies occur.
2. Ashwagandha Possesses
3. Presence of superoxide dismutase, antioxidants, glutathione peroxides and saponins. Thus, it helps in maintain body weight by providing energy, increasing R.B.C. levels enhancing immune system and increasing W.B.C. levels, enhancing immune system and increasing W.B.C. which are all risk factors in underweight.
4. Consumption of Ashwagandha showed relief of symptoms like loss of appetite, general debility.
5. Ashwagandha thus contributes in increasing weight of those who are underweight.
6. Underweight in adolescent girls in common due to psychosocial emotional, gender-based discrimination thus leading to low food take and resulting symptoms like amenorrhea osteoporosis, fatigue, low body weight.

UNDERWEIGHT

Even though it may seem preferable to be underweight than overweight, being excessively thin really comes with risks and drawbacks, just like being obese. Due to their weakened immune systems, poor muscle mass, hair loss, and, in some circumstances, disturbed hormone control, those who are underweight are more likely to contract infections. Kuttan, L. Davis (2002). [8] Having underweight can also affect how essential nutrients, such as vitamins, minerals, and amino acids, are consumed and absorbed, which raises the risk of anaemia and osteoporosis. Women who are underweight are also more likely to experience amenorrhea and potential pregnancy difficulties.

A person who is thought to be beneath the recommended weight for health is referred to as underweight. The body mass index is typically used to define anything (BMI). Underweight is typically defined as having a BMI under 18. L. Davis, G. Kuttan [9] Compared to other definitions of the term, such as those focused on appearance, this medical definition of underweight may be different. Those with "Lean genes" may have a greater metabolic rate. Genetics and disease are two physical causes of underweight. The fact that being underweight could be a symptom of or a secondary problem to an underlying illness is the most pressing issue. A medically qualified diagnosis is required for unexplained weight loss. Underweight in adolescents has been linked to an increased likelihood of becoming underweight as an adult, as well as increased morbidity and mortality in adults, children, and newborns due to a number of negative health effects.

Explanations for Activities

Adaptogen

A substance known as an adaptogen serves as a tool for the body to combat harmful physical, chemical, or biological stress or to increase generalised resistance to such stress, enabling the organism to "adapt" to challenging situations including stress, trauma, anxiety, and exhaustion. J.N. Dhuley 1998a.[10]

Adolescence

Adolescence is a period of transition between childhood and adulthood with a significant period of human growth and malnutrition. Drug Metabol Drug Interact 2003.[11]



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Alkaloids

Alkaloids are natural molecules that frequently come from plants and are made up of carbon, nitrogen, and oxygen. They function as vitalizers or adaptogens.

Ashwagandha

Withania somnifera Dunal (Ashwagandha, WS) also commonly known as Indian Ginseng since the active ingredients are withanolides or steroidal lactones, similar to ginsenosides of Asian ginseng, is widely used in Ayurvedic medicine, the traditional medical system of India. It's also contains alkaloids which act as an adaptogen. Gautam., M Diwanay, SS,[12]

A single herb with anti stress adaptogenic action that leads to improved physical fitness and helps cope with life's daily stress. It raises physiological endurance and protects against effect of stress. It is particularly beneficial in stress related disorders such as arthritis, hypertension, diabetes, and premature aging.

Steroids

The carbon skeleton of a steroid, a terpenoid lipid, has four fused rings and is often organised in a 6-6-6-5 pattern. Through increased protein synthesis, steroids help to improve metabolic processes and muscular growth. Steroids regulate the proper operation of the sexual organs. SK Gupta Dua, A., and Vohra, B.P.[13]

Underweight Solution

A person who is thought to be beneath the recommended weight for health is referred to as underweight. Typically, the body mass index is used to define anything (BMI). Underweight is typically defined as having a BMI under 18.

Withanolides

Steroids with an ergostane skeleton and lactones ring, also known as withanolides, are a class of naturally occurring steroids constructed on an ergostane skeleton, in which C-22 and C-26 are suitably oxidised to create a C-28 steroidal lactones ring. The body may transform these significant hormone precursors into human hormones. [14-22].

Objectives

- To bake cookies and include ashwagandha powder.
- To evaluate the prepared cookies' organoleptic quality.
- To examine the closest components found in Ashwagandha powder.
- To determine the nutrient content of baked goods.

Study limitations

- A semi-trained and untrained panel evaluated the product.
- The cookies area has a restricted selection of goods.
- The constituents have a limited power to change the sensory perception.

REVIEW OF LITERATURE

PRODUCTS WITH VALUE ADDED REPAIRED USING ASHWAGANDHA

Acharya and Shrivastava (2008): - There are various tonics that contain ashwagandha and its extracts.

Such as treatments including chavanaprash, a treatment based on herbal tea, as well as powders, tablets, and syrups. Dried roots are utilized as a tonic for a variety of ailments, including senility, senility in old age, hiccups, ulcers, feminine diseases, and sedation. Ashwagandha leaves are administered topically to reduce swelling and irritation.

Bone (1996): - Three cups (750ml) of the tea can be made by boiling 3-6 tablespoons of Ashwagandha root for 15 minutes and then cooling it. Alternatively, tincturing between a half and a third of a teaspoon (2-4 ml) three times a day is sometimes advised.

MEDICINAL VALUES OF ASHWAGANDHA

Ashwagandha has excellent medicinal potential. It works well for a variety of illnesses, by doing so, we'll research the reviews in regard to the disease and each of its traits.



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1. ADAPTOGEN

Bhattacharya et al. (2003) In adult Wistar rats, the use of *Withania somnifera* (25 and 50 mg/kg po) and *Panax ginseng* (100 mg/kg po) 1 hour before to foot shock for 21 days alleviated CS-induced perturbations (hyperglycemia, glucose intolerance, increase in plasma corticosterone levels, stomach ulcerations, male sexual dysfunction, cognitive impairments, immunosuppressant, and mental depression), proving that WS, like PG, possesses.

Singh et al., (2001): - In all the parameters examined, including hypoxia duration, anti-fatigue effect, swimming performance time, ulceration, auto-analgesia, and biochemical alterations in the adrenal glands, a novel withanolide/free aqueous fraction isolated from the roots of the *Withania Somnifera* plant demonstrated strong anti-stress activity in a dose-related manner.

2. ANTI-INFLAMMATORY

Al-Hindawi and others, 1992: - Similar to hydrocortisone sodium succinate, a methanolic extract of *Withania somnifera*'s aerial portions demonstrated anti-inflammatory properties. Significant anti-inflammatory activity was seen on carrageenan-induced paw edoema when *Withania somnifera* was extracted in 80% ethanol.

3. ANTIOXIDANT

Dhuley (1998): - In mice and rabbits, a rise in experimentally induced lipid peroxidation was stopped by an aqueous suspension of Ashwagandha root extract.

Bhattacharya et al., - According to previous studies, a rat brain extracts from *Withania somnifera* that contained equimolar amounts of the sitoindosides VII-X and withaferin-A, increased the levels of catalase, glutathione peroxide, and superoxide dismutase. Inflammatory, immunomodulatory, and antioxidant activity are reported.

4. ARTHRITIS

Nagareddy et al., (2006) Researchers examined the anti-osteoporotic benefits of *Withania somnifera* (WS) root extract (ethanol), which contains estrogen-like withanolides.

The effects of *Withania somnifera* on bone calcification in calcium-deficient ovariectomized rats were demonstrated in female Sprague/Dawley rats that were administered orally for 16 weeks with WS/vehicle (65 mg kg(1)).

5. CANCER

Ichikawa et al., (2006): - Through the inhibition of nuclear factor/kappa (NF/kappa) activation and NF/kappa/regulated gene expression, withanolides promote apoptosis, prevent invasion, and stop osteoclastogenesis.

Senthilnathan et al., (2006): - According to research on the modulatory action of *Withania somnifera* and paclitaxel on key enzymes of the tricarboxylic acid (TCA) cycle and electron transport chain complexes against lung cancer brought on by benzo(a) pyrene in Swiss albino mice, the combination treatment of W. is effective. As a promising chemotherapy drug, *somnifera* is used alongside paclitaxel.[23-24]

Life Sci., (2003): - Lung, colon, central nervous system, and breast human tumour cell lines were used as test subjects for the anti-proliferative activity of 12 withanolides derived from the leaves of *Withania somnifera*, Withaferin A and its derivatives showed inhibitory doses. The 50% inhibition was visible in viscosalactone B. As a result, adding Ashwagandha to your diet may stop or slow the growth of cancers in people.

6. CENTRAL NERVOUS SYSTEM

Kuboyama et al., (2005): - Withanolide A (WL/A) (10 micromol kg (/1) day (/1), for 13 days p.o.) recovered A beta (25/35) produced memory impairment in mice. Withanolide A (WL/A) (1 microM) therapy induced considerable regeneration of both axons and dendrites as well as the reconstruction of per/and post synapses in the neurons. Since WL/A can rebuild neural networks, it is a strong option for the clinical intervention of neurodegenerative disorders.

Schliebs et al., (1997): - Sitoindosides VII-X and withaferin-A, two isolated components of *Withania somnifera*, improved cortical muscarinic cholinergic receptor capacity, partially explaining the cognitive and memory-improving effects of Ashwagandha.[23]

7. DIABETES

Indian J Exp Biol., (2000): - The effects of Ashwagandha roots on human subjects were evaluated for hypoglycemic, diuretic, and hypocholesterolemic effects. The powdered Ashwagandha root was administered for 30 days to six mild NIDDM participants and six mild hypercholesterolemia subjects. Similar to an oral hypoglycemic medication, blood sugar levels dropped. Indications that the root of Ashwagandha may be a source of hypoglycemic, diuretic, and hypocholesterolemic agents include a significant increase in urine sodium and volume as well as significant decreases in serum cholesterol, triglycerides, low density lipoprotein cholesterol, and very low density lipoprotein cholesterol. Clinical observations revealed no side effects.

8. IMMUNITY

Gautam et al., (2004): - As opposed to untreated mice after challenge, animals who had received the DPT vaccine were treated for 15 days with a standardised aqueous extract of *Withania somnifera* (100 mg/kg/day). According to the study, the test substance could be used as a potential immunopotentiating agent in the immunochemical business and also provides immediate therapeutic effects that



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lower experimental animal morbidity and mortality.

9. LIPID PEROXIDATION

Drug Metabol Drug Interact, (2003): - In the aged spinal cord of Wistar rats, copper-induced lipids per oxidized and antioxidant enzymes were successfully treated with Ashwagandha. This treatment successfully reduced GPx activity and prevented lipid per oxidation in a dose-dependent manner. Both the oxidation of proteins and the oxidation of lipids brought on by copper were prevented by ashwagandha.

10. STRESS

Khan et al., (2006): - To significantly boost the expression of the cytokines in chronically stressed mice, oral administration of the chemically standardised and recognized liquid extract of *W. somnifera* root (WS) at the graded doses of 25, 50, 100, and 200 mg/kg p.o. was responsible.

11. UNDERWEIGHT (3-5 kg)

Acharya Balkrishna Ji Maharaj, (2004) a daily intake of 3-5 grams of Ashwagandha powder for with milk increases the weight of underweight persons by 3-5 kg. The consumption of Ashwagandha powder helps in underweight, arthritis and nervous system problems.

Mishra et al., (2000): - When fed 2 g/day of fortified, purified, and powdered WS in 100 cc of milk for 60 days, children aged 8 to 12 showed growth-promoting effects. At the conclusion of the 60-day period, they showed marginal increases in haemoglobin, packed cell volume, mean corpuscular quantity, serum ferritin, weight, and hand grip, as well as substantial increases in mean corpuscular haemoglobin and total proteins.[21-22]

12. SAFTY STUDIES

(Mishra et al., 2000): - Ashwagandha has a wide range of medicinal properties and almost zero or very little harm.[21]

Frawley et al., (1986): - With clients who are taking barbiturates, benzodiazepines, or anticonvulsants, caution should be taken. Ashwagandha is deliberately ignored during cold and flu season, lymphatic congestion, and when a client has a cold or the flu.

MATERIALS AND METHODS

The present investigation was undertaken to standardize and develop value added products from Ashwagandha and to assess their clinical effects on underweight so as to promote the incorporation of Ashwagandha in food products due to its good therapeutic value. This chapter reveals information pertaining to the research design and methodological steps that will be used for the investigation. The research procedures distinctly are described under following heads

Plan of Work

The Study entitled “**Incorporation of Ashwagandha Powder in the Development of Cookies**”, present study was conducted in Laboratory of Department of Home Science IFTM University.

Collection of raw material

Ashwagandha Powder: Powder of Ashwagandha plants was purchased from Market of Moradabad.

Proximate Analysis of Constituents Present in Ashwagandha Powder

Standardized procedures of AOAC (1980) followed to estimate the moisture, total as, Protein Carbohydrate Crude Fiber, fat, Calcium and iron content. The Carotene present determined by Jensen’s Method.



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Weigh the Ashwagandha Powder



Handpicked



Sun Drying



Bottled

Figure 2. Flow chart of Dehydration of Powder Ashwagandha

Dehydration present calculated to study the efficiency of drying
Dehydration Ratio = weight of the dehydrated material / Initial weight of the material

Preparation of Cookies

Powder of Ashwagandha was used to develop value added cookies.

Figure 3. ?

It was incorporated at different levels and different type of three flavors of Ashwagandha Almond Cookies, Ashwagandha Pista Cookies and Ashwagandha Cashew Cookies were prepared by adding variety of Dry fruits. Table 1,2,3 and 4. Ashwagandha Products:

The following are the Recipes taken to prepare Different type of cookies:

- Ashwagandha Almond Cookies
- Ashwagandha Pista Cookies
- Ashwagandha
- CashewCookies

Ingredients	Amount (gm)
Refined wheat flour (g)	10
Sugar (g)	6
Ghee (g)	6
Milk (ml) Baking Powder(g)	6
Dry fruits	6
(Almond/Pista/Cashew)	18

Table 1. Recipes taken to prepare Different type of cookies

PROCEDURE

- Ghee melted in the pan.
- After adding sugar, it was thoroughly blended.
- To ensure a thorough mixing, milk is added along with the dry fruits.
- The combination was then needed to make dough after being mixed with refined wheat flour.
- The biscuit shape was then given to the dough.



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vi. Then, for a further two minutes, these biscuits were baked in an oven at 2000 C.

Ingredients	I	II	III
Refined wheat flour (g)	10	10	10
Sugar (g)	6	6	6
Ghee (g)	6	6	6
Milk (ml)	6	6	6
Baking powder (g)	6	6	6
Ashwagandha Powder (g)	5	10	15
Almond	6	6	6

Table 2. Ashwagandha Almond Cookies recipe

PROCEDURE

- i. The ghee was melted
- ii. Sugar was added to it and it was mixed well.
- iii. Milk and added to it so that it gets mixed well.
- iv. Refined wheat flour was added to the above mixture.
- v. Ashwagandha powder was added to it and the mixture was needed into dough.
- vi. The dough was then shape into biscuits.
- vii. The biscuits were then baked in oven on 2000 C for 2 minutes.

Ingredients	I	II	III
Refined wheat flour (g)	10	10	10
Sugar	2.5	2.5	2.5
Ghee(g)	2.5	2.5	2.5
Milk (ml)	6	6	6
Baking powder (g)	6	6	6
Dry fruits (pista)	6	6	6
Ashwagandha Powder (g)	5	10	15

Table 3. Ashwagandha Pista Cookies

PROCEDURE

- i. Ghee had melted.
- ii. Ghee was melted before being combined thoroughly with sugar
- iii. To ensure a thorough mixing, milk is added to the mixture.
- iv. The above combination was then supplemented with refined wheat flour.
- v. It was then combined with powdered ashwagandha and used to make dough.
- vi. The biscuits were then formed from the dough.
- vii. After that, the biscuits were baked for two minutes at 2000 C in the oven.

Ingredients	I	II	III
Refined wheat flour (g)	10	10	10
Sugar (g)	6	6	6
Ghee (g)	6	6	6
Milk (ml)	6	6	6
Baking powder (g)	6	6	6
Ashwagandha Powder (g)	5	10	15
Dry fruits(Cashew)	6	6	6

Table 4. Ashwagandha Cashew Cookies



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Organoleptic Analysis - Organoleptic Analysis of the prepared cookies was done by a panel of judges, selected from among the faculty members of the Department of Home Science IFTM University Moradabad.

Value-Added Treatments and Replications The following food items will be enhanced with Ashwagandha powder
Treatments of products

The basic recipe present served as control (T0). Three value addition treatment i.e., incorporation with powder of cookies of Ashwagandha at 5 percent, 10 percent and 15 percent levels present referred to as T1, T2 and T3 treatments respectively. Table 5.

Treatments/Products	T0	T1	T2	T3	Replications
A. Almond Cookies	Control	5%	10%	15%	3
A. Pista Cookies	Control	5%	10%	15%	3
A. Cashew Cookies	Control	5%	10%	15%	3

Table 5. treatments of Ashwagandha(A) Cookies.

Statistical Analysis

Nine-point Hedonic scale values from the sensory evaluation were tabulated, and two-way ANOVA techniques were used to statistically analyse them. Critical Difference (CS) test used to identify significant differences between the current treatments. Standard error of each treatment and data of chemical analysis was also calculated.

SENSORY EVALUATION OF PRODUCTS

Using a nine-point hedonic scale, all the products were organoleptically assessed for their general acceptability, coloring, flavor, taste, consistency, and appearance. in terms of flavour, texture, acceptability, and overall taste Hedonic scale with nine points.

Result and Discussion

- i. In this chapter, the findings of the inquiry are discussed and presented under the following headings and subheadings
- ii. Sensory evaluation of different products.
- iii. Nutritional Composition of the products.
- iv. Proximate Analysis of Constituents Present in Ashwagandha Powder.

Sensory Evaluation of Different Products

Varieties of Ashwagandha Cookies were developed with the use of Ashwagandha powder. Their sensory evaluation was done when they were freshly prepared. All the Products were evaluated all the products were evaluated organoleptically using a nine-point hedonic scale for various attributes such as color, taste, flavor, texture, appearance and overall. Result of organoleptic evaluation of Ashwagandha Almond Cookies, Ashwagandha Pista Cookies, and Ashwagandha Cashew Cookies are presented in table 7(a) and table 7(b) respectively.

Ashwagandha Almond Cookies

The sensory qualities of colour, look, flavour, texture, taste, and overall acceptability of ashwagandha almond cookies made from ashwagandha powder were given scores of 9.40, 9.30, 7.20, 8.60, 7.50, and 8.40, respectively. The panel of judges gave the items high marks for colour and appearance, very high marks for flavour and taste, moderate marks for texture, and low marks for overall acceptability. Organoleptic scores of cookies made with incorporation of Ashwagandha powder 7.45, 7.40, 6.20, 7.20, 6.30 6.20 for color, appearance, flavor texture, taste, overall acceptability respectively. In case of almond cookies prepared with incorporation of Ashwagandha powder, the mean scores achieved were 7.60, 7.65, 6.30, 7.30, 6.40 and 6.30 respectively. The scores of the Ashwagandha powder cookies revealed that the color, appearance and texture were 'liked moderately' and the flavor, taste and overall acceptability was 'like slightly' by the judges. On the whole all types of Ashwagandha Almond Cookies were acceptable and fell in the category of liked extremely to like slightly in the 9-point hedonic scale. The result of sensory evaluation of Ashwagandha Almond Cookies is given in Table 6.

DISCUSSION: Ashwagandha Almond Cookies were liked by the panel of judges and were acceptable. This might be due to the presence of sweetener thus diminishing the bitterness of Ashwagandha.



S.No.	Treatment/Combination	Color	Appearance	Flavor	Texture	Taste	Overall Acceptability
I	Ashwagandha Powder(5)	9.40	9.30	7.20	8.60	7.50	8.40
II	Ashwagandha powder(10)	7.45	7.40	6.20	7.20	6.30	6.20
III	Ashwagandha powder(15)	7.60	7.65	6.30	7.30	6.40	6.30

Table 6. Sensory evaluation of Ashwagandha Almond Cookies

Ashwagandha Pista Cookies

Results of the organoleptic evaluation of Ashwagandha Pista Cookies are presented in Table 7(a)The sensory attributes of colour, look, flavour, texture, taste, and overall acceptability were given to ashwagandha pistachio cookies made from powdered ashwagandha, and they were given scores of 9.35, 9.20, 7.15, 8.55, 7.50, and 7.40, respectively. The panel of judges gave the colour and appearance scores that were extremely high, along with high ratings for flavor, great ratings for texture, and moderate ratings for overall acceptability. Oganoleptic scores of cookies made with incorporation of Ashwagandha powder were 7.40, 7.35, 6.15, 7.10, 6.20, 6.30 for color, appearance, flavor, texture, taste, overall acceptability respectively. The scores were marginally different from Ashwagandha powder. The evaluations showed that the judges were moderate to modest. In case of biscuits prepared with incorporation of Ashwagandha powder, the mean scores achieved were 7.50, 7.45, 6.20, 7.20, 6.30 and 6.40 respectively. The judges had a moderate level of approval for the Ashwagandha powder's colour, look, and texture, as well as a slight level of approval for its flavour and general acceptability.

DISCUSSION: The result of organoleptic evaluation of Ashwagandha Pista Cookies were acceptable and fell in the category of 'liked extremely' to liked slightly in the 9-point hedonic scale. But as compared to Ashwagandha Almond Cookies, Ashwagandha Pista Cookies and Ashwagandha Cashew Cookies were not much acceptable by the panel of judges. This might be due to the bitterness of Ashwagandha and the presence of sweetener in a lesser content.

S.No.	Treatment/Combination	Color	Appearance	Flavor	Texture	Taste	Overall Acceptability
I	Ashwagandha Powder(5)	9.35	9.20	7.15	8.55	7.50	7.40
II	Ashwagandha powder(10)	7.40	7.35	6.15	7.10	6.20	6.30
III	Ashwagandha powder(15)	7.50	7.45	6.20	7.20	6.30	6.40

Table 7(A). Sensory evaluation of Ashwagandha Pista Cookies

1. Ashwagandha Cashew Cookies

Results of the organoleptic evaluation of Ashwagandha Cashew Cookies are presented in Table

7(b) The sensory features of colour, look, flavour, texture, taste, and overall acceptability were given to ashwagandha cookies made from powder, and they were given scores of 9.35, 9.20, 7.15, 8.55, 7.50, and 7.40, respectively. The judges' panel gave the items high marks for colour and appearance, high ratings for flavour, high ratings for flavour, and moderate ratings for texture and general acceptability. Oganoleptic scores of cookies made with incorporation of Ashwagandha powder were 7.40, 7.35, 6.15, 7.10, 6.20, 6.30 for color, appearance, flavor, texture, taste, overall acceptability respectively. The scores were marginally different from Ashwagandha powder. The evaluations showed that the judges had a moderate to modest favorability rating for the ashwagandha powder. In case of cookies prepared with incorporation of Ashwagandha powder, the mean scores achieved were 7.50, 7.45, 6.20, 7.20, 6.30 and 6.40 respectively. According to the judges' evaluations of the Ashwagandha powder, the flavour taste and general acceptability were liked just somewhat, but the colour, look, and texture were loved significantly.

DISCUSSION: The result of organoleptic evaluation of Ashwagandha Cashew Cookies were acceptable and fell in the category of 'liked extremely' to liked slightly in the 9-point hedonic scale. But as compared to Ashwagandha Almond Cookies, Ashwagandha Pista Cookies and Ashwagandha Cashew Cookies were not much acceptable by the panel of judges. This might be due to the bitterness of Ashwagandha and the presence of sweetener in a lesser content.



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Table 7 (B) Sensory evaluation of Ashwagandha Cashew Cookies.

p	Treatment/Combination	Color	Appearance	Flavor	Texture	Taste	Overall Acceptability
I	Ashwagandha Powder(5)	9.35	9.20	7.15	8.55	7.50	7.40
II	Ashwagandha powder(10)	7.40	7.35	6.15	7.10	6.20	6.30
III	Ashwagandha powder(15)	7.50	7.45	6.20	7.20	6.30	6.40

SUMMARY AND CONCLUSION

SUMMARY

Value added products viz. cookies, were prepared from Ashwagandha Powder.

Ashwagandha Almond Cookies were prepared by the incorporation of Ashwagandha Powder in refined wheat flour cookies. Sugar was used for the preparation of cookies. Each cookie contained ½ gm Ashwagandha Powder and weighed about 10 gm.

Ashwagandha Pista Cookies, Ashwagandha Cashew Cookies were prepared in a similar manner but instead of sugar, was used whereas sugar was used in fewer amounts.

Due to the bitterness of the leaves, the products made with Ashwagandha Powder were less palatable than those made with the leaves, albeit they were still acceptable from a therapeutic standpoint. However, Ashwagandha Powder-made products were more palatable than those made with leaves. Ashwagandha Cookies prepared by the incorporation of Ashwagandha Powder were liked very much by the judge.

CONCLUSION: Since the intake of Ashwagandha is bitter in its raw form and not easily acceptable, therefore it can be consumed by incorporating it into various food products.

Inclusion of such products in the diet can provide therapeutic benefits of Ashwagandha to the individuals. Further work can be carried out on product development as well as the clinical effects of Ashwagandha on various other medical problems.

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