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DEVELOPMENT AND QUALITY ASSESSMENT OF BIOTIN POWDER FORMULATION

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Abstract: Biotin, also known as vitamin B7, is a water-soluble vitamin that plays a vital role in metabolism, gene regulation, and cell signaling. It's a type of vitamin called a co-factor; it helps enzymes to break down fatty acids, glucose, and amino acids so your body can function properly. While biotin gained fame as a beauty booster, it does more than keep your hair, nails and skin healthier. The substances introduced on this combination had been Wheat (*Triticum aestivum*), Peanuts (*Arachis hypogaea*), Pumpkin seeds (*Cucurbita maxima*), Almonds (*Prunus dulcis*), Beetroot powder (*Beta vulgaris*), Gooseberry powder (*Phyllanthus emblica*), Jaggery (*Saccharum Officinarum*). The biotin extract had been undergoing and take a look at the phytochemical evaluation and indicates the presence of Carbohydrate, Protein, Amino acid, Tannins, Saponins, Glycosides, Flavonoids, Phenol, and Terpenoids. The pattern turned into analyzed below FTIR spectroscopy for quantitative evaluation. By this evaluation and take a look at the general to observe famous that the biotin content material is wealthy in biotin powder and it is ideal powerful to humans.

Keywords: Biotin powder, Skin, Nails, *Triticum aestivum*, *Arachis hypogaea*, *Cucurbita maxima*, *Prunus dulcis*, *Beta vulgaris*, *Phyllanthus emblica*, *Saccharum Officinarum*

INTRODUCTION

Biotin, vitamin B7, is essential for life. The major biological function of biotin is to act as a covalently bound cofactor for the biological activities of five mammalian biotin-dependent carboxylases. These biotin-dependent carboxylases have a crucial role in essential biological processes including fatty acid synthesis, gluconeogenesis, and amino acid metabolism (Amitav. A et al., 2019). Vitamin B7 cannot be synthesized by human cells, but it is produced by bacteria in the body, and it is present in numerous foods. Biotin therapy may help treat Trusted Source some medical conditions. Some people take supplements to strengthen their nails and hair, but there is a lack of evidence supporting this use. This

article looks at why we need biotin, the recommended intake, sources, and any possible health risks (Megan Ware, 2017).

Eating a well-balanced diet that contains all of the 13 essential vitamins can help maintain hair health. Although there is no evidence to suggest that individual vitamins can encourage the hair to grow faster, deficiencies in specific vitamins can lead to hair loss or thin, brittle hair. Consuming enough of each vitamin in the diet may help keep the hair healthy (Zohra et al., 2020). The practice of sprouting cereal grains has become popular in the western world. Sprouted grains are thought of as having exceptional nutritive value. Sprouting is easy and can be done without sophisticated equipment. Untreated seeds of good quality and high germination percentage are placed in an environment of adequate water, a desirable temperature, and a certain composition of gases in the atmosphere for several days for sprouting. The sprouts can be kept for a few days to over a week under refrigeration. They can be used in many different foods including breakfast items, salads, soups, casseroles, pasta, and baked products (M Karaoglan et al., 2021).

(Table. 1 Ingredient table)

S.NO	INGREDIENTS	IN GRAMS
1	Sprouted wheat pearls	100g
2	Peanuts	100g
3	Pumpkin seeds	100g
4	Almonds	100g
5	Beetroot powder	4tbsp
6	Gooseberry powder	2tbsp.
7	Jaggery	150g

MATERIALS AND METHODS

PROCEDURE FOR THE PREPARATIONS OF BIOTIN POWDER

- All the grains, nuts, and seeds were taken then grinded into a fine powder and the fine powder was added one by one according to their grams.
- The beetroot was taken raw then it is grated by using a grater and kept in sunlight for 2 days for grinding.
- After the process of grinding all the fine powders are mixed well and for the taste, we are added Jaggery.
- Finally, all the grinded powders were mixed as a biotin powder and it was shown in fig. 1



(Fig. 1 Biotin powder)

PHYTOCHEMICAL ANALYSIS SCREENING

The biotin powder extract becomes organized with the aid of using an aqueous answer and the biotin powder becomes soaked inside the aqueous answer and the extract becomes organized. The extract becomes taken for the take a look at to perceive their parts of bioactive compounds (Carbohydrates, Proteins, Alkaloids, Flavonoids, Phenolics, Tannins, Saponins, and Terepenoids) which agree with to be accountable for the biotin content material of their body. (Junaid R Shaikh et. al., 2020)

TEST FOR CARBOHYDRATE (Molisch's test)

Test solution with a few drops of Molisch's reagent and concentrated H_2SO_4 added slowly from the sides of the test tubes. The formation of a violet ring at the junction of two liquids indicates the presence of carbohydrates.

TEST FOR PROTEIN (Biuret test)

To the test solution, 4% sodium hydroxide and a few drops of 1% copper sulfate solution was added, development of violet or pink color indicates the presence of proteins.

TEST FOR ALKALOIDS (Hager's test)

To 1ml of extract, add 1ml of Hager's reagent, and saturated solution of picric acid is added and mixed. A crystalline yellow precipitate indicates the presence of alkaloids.

TEST FOR FLAVONOIDS (Sodium hydroxide test)

2ml of extract were taken in separate test tubes and add few drops of sodium hydroxide solution. The yellow color was formed and it turns colorless, while the addition of dilute sulphuric acid, confirms the presence of flavonoids.

TEST FOR PHENOLICS (Ferric chloride test)

To the extract add 3 - 4 drops of 5% ferric chloride solution and observe the formation of dark blue or blackish color which may indicate the presence of phenols.

TEST FOR TANNINS (Prussian blue test)

To 1ml of extract add 1ml of 0.008M potassium ferrocyanide and 1ml of 0.02M $FeCl_3$ in 0.1M HCl. The appearance of blue color indicates the presence of tannins.

TEST FOR SAPONINS (Froth test)

About 5ml of extracts were taken in a test tube and shaken vigorously and kept for 5mins. The formation of foamy layer indicates the presence of Saponins.

TEST FOR TEREPENOIDS (Salkowshi's test)

About 5ml of the extract was taken and add 2ml of chloroform and 3ml of concentrated sulphuric acid and notice the formation of layer and color. A reddish-brown coloration of the interface confirms the presence of Terepenoids.

PHYSICAL ANALYSIS (Instrumentation for biotin powder)

FTIR Spectrometry - FTIR is commonly known as (Fourier Transform Infrared) Spectrometry and it also known as FTIR analysis, it is an analytical method used to identify the functional group of the sample, organic and inorganic materials. In this source it is used to analyze the functional group present in Biotin powder. (Griffiths, p et. al., 2007)

All the materials are gathered, and then they grin into a fine powder (fig2 – fig 8). After the grinding process, the fine powders were mixed well in confirming by their grams. The extract of biotin powder (fig 9) was tested by using a phytochemical analysis test. It proves that the biotin powder is a rich biotin content and it is an effective drink for humans.

S.NO	TEST	PRESENCE	ABSENCE
1	Carbohydrate	+	-
2	Protein	+	-
3	Flavonoids	-	+
4	Alkaloids	+	-
5	Saponins	-	+
6	Glycoside	-	+
7	Phenols	+	-
8	Tannins	+	-

(Table. 2 This table shows the result of phytochemical analysis of biotin powder)



(Fig.3 Phytochemical analysis of biotin powder which shows the presence of Carbohydrates, Proteins, Tannins Alkaloids, Phenols, and absence of Saponins and Flavonoids, Glycoside and Terepenoids) FTIR Spectroscopy

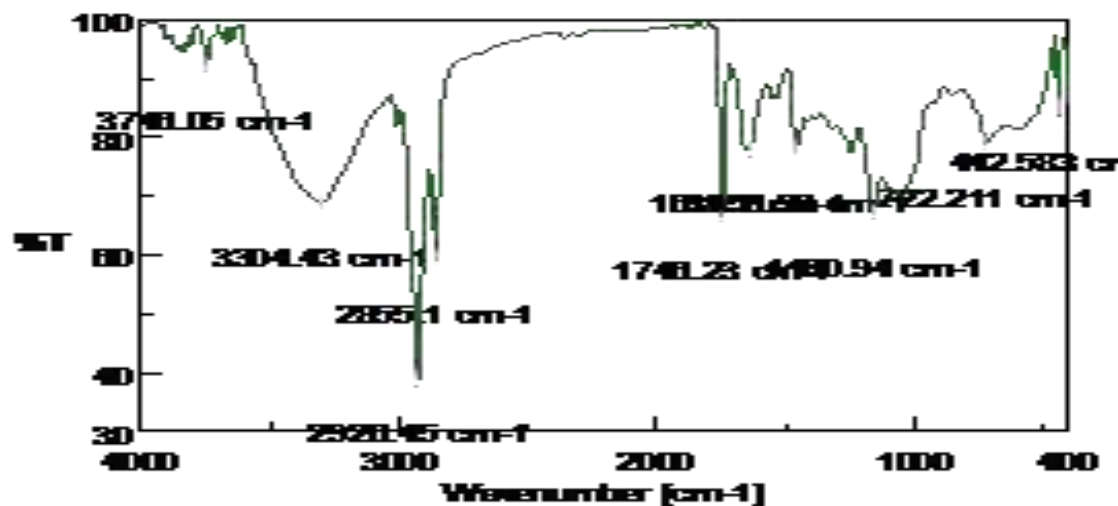


Fig. 5 Graph of FTIR

FTIR SPECTROSCOPY GRAPH TABLE

In the FTIR spectroscopy, the peak levels are noted and we find the functional group then the vibration types and intensity were given below the (table.3)

S.NO	PEAKS	FUNCTIONAL GROUPS	TYPES OF VIBRATIONS	INTENSITY
1	3346.43cm ⁻¹	C-N Amide	Stretch	Strong
2	3304.43cm ⁻¹	C-N Bonded Amide	Stretch	Medium to Strong
3	2855.1cm ⁻¹	R-COOH Carboxyl acid	Stretch	Medium
4	2926.45cm ⁻¹	C-H Alkane	Stretch	Medium or Weak
5	1746.23cm ⁻¹	C=O Ketone	Stretch	Weak

(Table. 3 FTIR Spectroscopy peak values)

DISCUSSION

Biotin is nutrition required in very small (microgram) portions as a cofactor to important enzyme reactions. Biotin powder is a wealthy fitness drink, it facilitates hair growth, nail growth, sparkling pores, and skin and it's also useful for being pregnant and breastfeeding with no facet effects. Compared to the opposite fitness drink biotin powder is extra powerful. This prevents biotin deficiency with a few biotin-wealthy ingredients like Sprouted wheat, Peanuts, Pumpkin seeds, Almonds, Beetroot powder, Gooseberry powder. As an examination begins off evolved with nuts and cereal grains. All the substances have been dried and grind to get the first-rate powder. The instruction of biotin powder turned into executed via way of means of the jarring process.

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The powdered pattern turned soaked in distilled water for the in-addition test. Phytochemical evaluation carried out at the aqueous extract of biotin powder discovered the presence of parts which includes carbohydrates, proteins, Alkaloids, Flavonoids, Saponins, and Tannins which might be represented within side the (table.2). We additionally executed a quantitative evaluation in biotin powder via way of means of FTIR Spectroscopy and the end result is proven within side the graph (fig.5) and the price of the peaks and their practical companies have been displayed at the (table.3) and the best height is 3346.05cm⁻¹ and the practical institution of this height is C-N

Amide.

Biotin is tough to locate in dairy and meals samples, special strategies of giving special answers. Biotin tiers in dairy merchandise are the handiest slight and inadequate delivery human's day by day needs. Infants feed on dairy primarily based totally formulae want extra biotin delivered to their ingredients. Thus, the examination proved that the extracts of biotin powder own precious phytochemicals and it may act as a powerful and biotin-wealthy drink for humans.

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