

Review on Formulation and Evaluation of Polyherbal Nutraceutical Powder

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Abstract: Nutraceuticals are essential food constituents that have nutritional value with additional health benefits. Nutraceutical is a term derived from nutrition and pharmaceuticals. These are the products that are isolated from herbal products, dietary supplements (nutrients), specific diets, and processed foods such as cereals, soups, and beverages which are also useful in the treatment and prevention of many diseases. Nutraceuticals may be used to improve health, delay the aging process, prevent chronic diseases, increase life expectancy, and regulate the functions of the human body. Nutraceutical powder are the preparation that come as powdered herbal materials meant for direct use or by incorporation into foods, beverages for drinking, insufflations and wounds. They may be finely sifted herbal materials from various parts of plants meant for a particular therapeutic effect.

Keywords: Nutraceuticals

I. INTRODUCTION

The nutraceutical industry lies under three main segments including functional foods, dietary supplements, and herbal natural products. Nowadays, nutraceuticals have received considerable interest due to potential nutritional, safety and therapeutic effects. Market research recently proposed that the worldwide nutraceuticals market is expanding as nutraceuticals provides many health benefits with minimal side effects. The most rapidly growing segments of the industry were dietary supplements (19.5 percent per year) and natural/herbal products (11.6 percent per year).

Nutraceuticals found in many fruits and vegetables that gives medicinal value. Due to these health benefits of nutraceuticals, they might regularly be taken to cure or reduce the risk factors such as high cholesterol, high blood pressure and diabetes.

- It has less side effect.
- May increase the health beneficial effect.
- May have naturally dietary supplement, so do not have unpleasant side effect.
- May increase the health value, our diet and improve medical condition of human.
- May easily be available and economically affordable.
- Nutritional therapy is a healing system using dietary therapeutics or nutraceuticals

According to nutraceutical and nutritional therapy theory, it achieves this goal by using efficacy of such nutraceuticals in detoxifying the body, avoiding vitamin and mineral deficiencies, and restoring healthy digestion and dietary habit. Phytonutrients are basically the nutrients isolated from plants which regulates the normal biological activities.

Phytochemicals used as nutraceutical ingredients:

Plants comprise primary and secondary metabolites, which showed and regulates various types of functions. The primary metabolites may be simple sugar, carbohydrates, nucleic acids, lipids, and amino acids, which play a vital position in mobile strategies. Plants grow and expand the special varieties of secondary metabolites, which provides many beneficial actions in humans and organisms.

Saponins

Saponins are reported to possess antimutagenic and antitumor activities and might lower the risk of human cancers, by preventing cancer cells from growing. They are also well known for lowering lipid level thus used in regulating blood glucose level in diabetic patients.

Flavonoids

Flavonoids are secondary metabolites found in plants with multiple functions such as an antioxidant and anti-inflammatory. It is used for those patients, who are suffering from radiation and chemotherapy.

Tannins

Tannins are used as an astringent and are commonly found in bark of trees, woods, leaves, bud, stem and fruits. These are responsible for growth rate, improve the feed efficiency and protein digestibility.

Phenolic Acids

The phenolic compounds used as an antioxidant, anti-carcinogenic, anti-aging, anti-proliferative and anti-inflammatory agents.

Alkaloid

Alkaloids are nitrogen containing bases particularly well known as anaesthetics, cardioprotective, and anti-inflammatory agents.

Carbohydrates

Carbohydrates are one of three macronutrients, which are nutrients that the body needs in larger amounts. Carbohydrates provide glucose to the body, which is converted to energy used to support bodily functions and physical activity.

II. REVIEW OF LITERATURE

Das L. Nutraceuticals are essential compounds derived from food and plant source. The demand for nutraceuticals is increasing due to their well-known effect and negligible side-effect. Nutraceuticals provide potential merits and demerits to healthy individuals. The food products used as nutraceuticals can be categorized as dietary fibre, prebiotics, probiotics, polyunsaturated fatty acids, antioxidants and other different types of herbal/ natural foods. These nutraceuticals help in combating some of the major health problems of the century such as obesity, cardiovascular diseases, cancer, osteoporosis, arthritis, diabetes, cholesterol etc.

Chandra S. Nutraceutical use is growing fast and is well accepted by people for its all natural origin. Nutraceuticals cannot replace pharmaceuticals but can be used in the prevention and cure of some pathological conditions. Nutraceuticals provide benefits in the prevention and treatment of various diseases. With increasing incidences of lifestyle-related health problems, they have emerged as an essential component of the diet for the common consumer. Nutraceuticals cannot replace pharmaceuticals but can be a strong high-value tool for prevention and aid in therapy of some pathological conditions.

Chauhan B. et.al.: The term nutraceuticals were coined from "nutrition" and "pharmaceutical". Nutraceutical; on the basis of their natural source, chemical grouping, categories into three key terms -nutrients, herbals, dietary supplements, dietary fibre, etc. Herbal nutraceutical is a powerful instrument in maintaining health and to act against nutritionally induced acute and chronic diseases, thereby promoting optimal health, longevity, and quality of life.

III. PLANT PROFILE

Beet Root:-

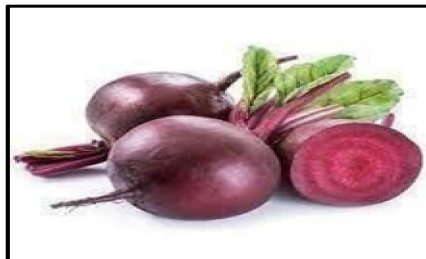


Figure 1: - Morphological diagram of *Beta vulgaris*

Synonyms: - Beetroot, Garden beet, Table beet, Chukandar, Sugar beets, Mangel, Spinach beet

Biological source: - *Beta vulgaris*

Family: - Amaranthaceae

Chemical constituents: - Beetroot contains high amounts of biologically active substances including betalains, carotenoids, phenols, B-vitamins (B1, B2, B3, B6 and B12), folate minerals, fibres, as well as sugars with low energetical value and inorganic nitrate

Uses: - It is used as sweetening agent, reduce blood pressure, increase blood stamina and to prevent cancer

Carrot:-



Figure 2: - Morphological diagram of *Daucus carota*

Synonyms: - Gajar

Biological source: - *Daucus carota*

Family: - Apiaceae

Chemical constituents: - Carrots contains carotenes especially alpha and beta carotenes, vitamin A and C, and dietary fibres. It is rich in calcium and potassium. Red carrots also contain lycopene.

Uses: - Raw carrot and its juice are a good tonic for eyes, skin, physical and mental development. Red carrots contain mainly the lycopene which makes carrot heart-healthy.

Carrots also used for a weight management.

Moringa :-



Figure 3 - Morphological diagram of *Moringa oleifera*

Synonyms: -Drumstick tree, Horseradish tree

Biological source: - Moringa *oleifera*

Family: - Moringaceae

Chemical constituents: - This plant contains alkaloids, flavonoids, saponin, tannins, zeatin, quercetin, kaempferol and terpenoids.

Uses: - Moringa helps to reduce the amount of glucose in the blood, as well as sugar, protein in Urine

Fenugreek :-



Figure 4: - Morphological diagram of *Trigonella foenum-graecum*

Synonyms: - Methi, Methika, Chandrika

Biological source:- *Trigonella foenum-graecum*

Family:- Fabaceae

Chemical constituents :- The major bioactive compounds in fenugreek seeds are believed to be polyphenol compounds, such as rhaponticin and isovitexin. Seeds also contain the saponin Fenugreek seeds have been found to contain several coumarin compounds as well as a number of alkaloids

Uses :- Fenugreek is taken by mouth for digestive problems such as loss of appetite, upset stomach, constipation, inflammation of the stomach (gastritis). Fenugreek is also used for diabetes, painful menstruation, polycystic ovary syndrome, and obesity.

Amla :-



Figure 5: - Morphological diagram of *Emblica officinalis*

Synonyms :- Emblica, Indian goose berry, Amla.

Biological source :- *Emblica officinalis*

Family :- Euphorbiaceae.

Chemical constituents :- It is highly nutritious and is an important dietary source of vitamin C, minerals, and amino acids. The pulpy portion of fruit contains: gallic acid, tannin, sugar, gum, albumin, crude cellulose.

Uses :- The fruits are diuretic, acrid, cooling, refrigerant, and laxative. Dried fruit is useful in haemorrhage, diarrhoea, diabetes, and dysentery.

IV. AIM AND OBJECTIVE

Aim :

The aim of this work is to formulate and evaluate the nutraceutical powder by using different herbs in order to prevent and treat many diseases.

Objective :

The main objective is to formulate and evaluate the polyherbal nutraceutical powder for medicinal purpose.

V. EXTRACTION PROCESS FOR HERBAL CRUDE DRUGS

Beet root:

Beet root samples were brought from the local market, washed, dried and ground, 10 g of powder was taken and placed in 125 ml distilled water for the purpose of preparing the aqueous extract, by the process of maceration using distilled water as a solvent. Then the resultant material placed in a vibrator for one hour, the extract was filtered by filter paper (Whatman filter paper No.1) and the filtrate was concentrated in a water bath at 50 °C until full drying.

Carrot:

Carrot samples were brought from the local market, washed, dried and ground, 10 g of powder was taken and placed in 125 ml distilled water for the purpose of preparing the aqueous extract by using the maceration as an extraction method, placed in a vibrator for one hour, the extract was filtered by filter paper (Whatman filter paper No. 1) and the filtrate was concentrated by a water bath at 50 °C until full drying.

Fenugreek:

Fenugreek seeds were soaked in water and germinated for 24 hours. They were kept at 4 °C for 2 days, dried in shade and powdered. Take 10 g of fenugreek powder in 100 ml of distilled water. This solution was stirred on a magnetic stirrer for 1 hour by using the infusion process supernatant stored at -20 °C until use

VI. PHYTOCHEMICAL SCREENING

Sr. no.	Chemical tests	Observations	Conclusion
1.	Test for steroids		
	Hesse's reaction: A little fraction from each extract was taken with a few drops of chloroform and an equal volume of concentrated sulfuric acid was added to it the sides of the test tube	Appearance of a blood red colour indicated the presence of sterols.	Positive
2.	Test for alkaloids		
	Dragendorff's test: - Extract treated with Dragendorff's reagent	It produces a reddish- brown precipitate	Positive
	Mayer's test : Take 1ml of test solution and add a few drops of Mayer's reagent	White or creamy precipitate was obtained	Positive
	Wagner test: - Take 1 ml of test solution and add few drops of Wagner reagent	Yellow or brown precipitate	Positive
3.	Test for carbohydrates		
	Fehling's test :- Dissolved 2 mg of dry extract in 1 ml of distilled water and added 1 ml of Fehling's reagent A and Fehling's reagent B, shook and heated on a water bath for 10 minutes. Then brick red precipitate was formed.	Brick red precipitate was observed	Positive

4.	Test for saponins		
	Foam test: - 5 ml of test solution taken in a test tube was shaken well for 5 minutes. formation of stable foam confirmed the test.	Formation of stable foam	Positive
5.	Test for flavonoids		
	Lead acetate test: - A few drops of 10% lead acetate added to 1 ml of the test solution resulted in the formation of yellow precipitate confirmed the presence of flavonoids.	Formation of yellow precipitate	Positive

METHOD OF PREPARATION FOR NUTRACEUTICAL POWDER

The Beetroot, Carrot, Moringa, Fenugreek and Amla procured from the local market, but the care should be taken that the material is fresh and hygienic.

All the herbs were clean and slices in small pieces and placed under shade until fully drying.

Then the dried powder subjected for extraction in order to obtain the active phytoconstituents.

Then all the obtained extract were mixed together with the excipients of required quantity in the mortar and pestle.

After mixing all extract herbal with excipients were pass through the sieve no. 40.

Transfer the powder into the plastic container to protect it from atmospheric contamination.

Finally polyherbal nutraceutical powder was properly packed and well labelled

COMPOSITION OF NUTRACEUTICAL POWDER

Sr. No.	Ingredients	Quantity Taken (in %)
1.	Beet root extract	12 %
2.	Moringa extract	2 %
3.	Amla extract	1.2 %
4.	Carrot extract	1.5 %
5.	Fenugreek extract	3.3 %
6.	Starch	60 %
7.	Lactose	19.7%
8.	Sodium Chloride	0.03%

VII. CONCLUSION -

Nutraceuticals will continue to appeal because they are convenient for today's lifestyle. Some are the specific nutrients that bring about marked health benefits much quicker than that expected from conventionally healthy foods alone. The present work represents the medicinal and health benefits of nutraceuticals, nutraceuticals used in day-to-day life as nutritional supplement in order to overcome many diseases. Nutraceuticals are the plant-oriented products essential for maintenance of normal regulatory functions of the body. Nutraceuticals opens up the door of the pharmaceutical market due to their major role in treatment of several diseases with less side effects.

REFERENCES

- [1]. Dillard, C.J. and German, J.B., 2000. Phytochemicals: nutraceuticals and human health. Journal of the Science of Food and Agriculture, 80(12), pp.1744-1756.
- [2]. Nasri, H., Baradaran, A., Shirzad, H. and Rafieian-Kopaei, M., 2014. New concepts in nutraceuticals as alternative for pharmaceuticals. International journal of preventive medicine, 5(12), p.1487.
- [3]. Nwosu, O.K. and Ubaoji, K.I., 2020. Nutraceuticals: history, classification and market demand.

- [4]. Functional Foods and Nutraceuticals: Bioactive Components, Formulations and Innovations, pp.13-22.
- [5]. Tiwari M. Ayurveda: the secrets of healing. Delhi: Motilal Banarsidass Publishers, India; 1995
- [6]. Hardy, G., 2000. Nutraceuticals and functional foods: introduction and meaning. Nutrition(Burbank, Los Angeles County, Calif.), 16(7-8), pp.688-689.
- [7]. Chauhan, B., Kumar, G., Kalam, N. and Ansari, S.H., 2013. Current concepts and prospects of herbal nutraceutical: A review. Journal of advanced pharmaceutical technology & research, 4(1),
- [8]. Zhao, J. and Nutraceuticals, N.T., 2007. Phytonutrients, and Phytotherapy for Improvement of Human Health: A perspective on Plant Biotechnology Application. Recent Patents on Biotechnology, 1, pp.75- 97.
- [9]. Chandra, S., Saklani, S., Kumar, P., Kim, B. and Coutinho, H.D., 2022. Nutraceuticals: Pharmacologically active potent dietary supplements. BioMed Research International, 2022
- [10]. Li, H., Wang, Z. and Liu, Y., 2003. Review in the studies on tannins activity of cancer prevention and anticancer. Zhong yao cai= Zhongyao cai= Journal of Chinese medicinal materials, 26(6), pp.444-448.
- [11]. Saklani, S., Chandra, S. and Mishra, A.P., 2011. Evaluation of antioxidant activity, quantitative estimation of phenols, anthocynins and flavonoids of wild edible fruits of Garhwal Himalaya.
- [12]. Journal of Pharmacy Research, 4(11), pp.4083-4086.
- [13]. Mirmiran, P., Houshialsadat, Z., Gaeini, Z., Bahadoran, Z. and Azizi, F., 2020. Functional properties of beetroot (*Beta vulgaris*) in management of cardio-metabolic diseases. Nutrition & metabolism, 17, pp.1- 15.
- [14]. Sharma, K.D., Karki, S., Thakur, N.S. and Attri, S., 2012. Chemical composition, functional properties and processing of carrot—a review. Journal of food science and technology, 49(1), pp.22-32.
- [15]. Paikra, B.K. and Gidwani, B., 2017. Phytochemistry and pharmacology of *Moringa oleifera* Lam.
- [16]. Journal of pharmacopuncture, 20(3), p.194.
- [17]. Ahmad, A., Alghamdi, S.S., Mahmood, K. and Afzal, M., 2016. Fenugreek a multipurpose crop: Potentialities and improvements. Saudi Journal of Biological Sciences, 23(2), pp.300-310.
- [18]. Variya, B.C., Bakrania, A.K. and Patel, S.S., 2016. *Emblica officinalis* (Amla): A review for its phytochemistry, ethnomedicinal uses and medicinal potentials with respect to molecular mechanisms. Pharmacological research, 111, pp.180-200.
- [19]. Al-waeli, S.K., Alasadi, M.H. and Abbas, R.J., 2021, November. Effect of Supplementing Beetroot (*Beta Vulgaris Rubra*) Powder and Its Aqueous Extract on Productive Performance of Growing Geese. In IOP Conference Series: Earth and Environmental Science (Vol. 923, No. 1, p.012028). IOP Publishing.
- [20]. Bichi, M.H., Agunwamba, J.C., Muyibi, S.A. and Abdulkarim, M.I., 2012. Effect of extraction method on the antimicrobial activity of *Moringa oleifera* seeds extract. Journal of American Science, 8(9), pp.450-458.
- [21]. El-Belghiti, K. and Vorobiev, E., 2005. Modelling of solute aqueous extraction from carrots subjected to a pulsed electric field pre-treatment. Biosystems Engineering, 90(3), pp.289-294.
- [22]. Sushma, N. and Devasena, T., 2010. Aqueous extract of *Trigonella foenum graecum* (fenugreek) prevents cypermethrin-induced hepatotoxicity and nephrotoxicity. Human & experimental toxicology, 29(4), pp.311-319.
- [23]. Cohen, E. and Saguy, I., 1983. Effect of water activity and moisture content on the stability of beet powder pigments. Journal of Food Science, 48(3), pp.703-707.
- [24]. Fikselová, M., Šilhár, S., Mareček, J. and Frančáková, H., 2008. Extraction of carrot (*Daucus carota* L.) carotenes under different conditions. Czech Journal of Food Sciences, 26(4), pp.268- 274.
- [25]. Momin, R.K., Ahire, P.P. and Kadam, V.B., 2011. Determination of ash values of some medicinal plants of genus *Sesbania* of Marathwada region in Maharashtra. International Journal of Drug Discovery and Herbal Research (IJDDHR), (Oct/December), pp.193-195.
- [26]. Silva, J.S., Splendor, D., Gonçalves, I.M.B., Costa, P. and Sousa Lobo, J.M., 2013. Note on the measurement of bulk density and tapped density of powders according to the Europe