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HERBAL RESIDUE CAN BE USED AS NUTRACEUTICALS

***Kavita Sharma, Saba Pathan and Bushra Tamboli**

Maharashtra, India.

***Corresponding Author: Kavita Sharma**
Maharashtra, India.

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ABSTRACT
The aim of this study was to review on the herbal residue can be used as nutraceuticals. **Foeniculum vulgare** is a popular and recognized herbaceous, aromatic, annual, biennial and perennial plant and belongs to the family of Apiaceae. Fennel oil is an essential oil that has several application in various industries. It is produced from fennel seed by using simple distillation is used because of it is thermal stability, high recovery, simplicity in process and low energy requirement. The unwanted substance left behind after the process of extraction can be used as a nutraceuticals. The left over substance (marc) consist of some nutritional composition like moisture content, crude fibre, carbohydrates, proteins, fats, ash content, vitamin c and some electrolyte minerals. Nutraceuticals is applies to the products that are isolated from herbal products, dietary supplements, specific diets, and processed foods. . As this plant has highly medicinal property therefore, it is highly recommended plant for researchers to developed therapeutic formulations for treatment of many diseases. The marc is enriched with nutrients and used in food processing also. Nutraceuticals may be used to improve health, delays the aging process, prevent chronic diseases, or support the structure or function of the body.

KEYWORDS: Fennel oil, Nutraceuticals, Simple distillation.

INTRODUCTION
Nature is full of numerous supernatural fragrances, which have their magical and are pleasant to our senses. Fennel is one of them, generally known as Saunf (**Foeniculum vulgare Mill**) family Apiaceae (Umbelliferae)[1] is a group of annual, biennial or perennial herb. It is widely cultivated throughout India up to 1830 m and sometimes found wild.[2-3] Moreover, this plant has been investigated extensively for several medicinal and therapeutic activities and has been reported for possessing carminative, flavouring, antioxidant, antibacterial, antifungal and mosquito repellent properties.[4-6]

The main component of fennel oil is anethole and anise oil. Fennel oil contains of 50-60% anethole[7], while anise oil contains for about 80-90% anethole.[8] The fennel oil quality is determined by the amount of anethole content. The fennel oil has a better quality if it has higher content of anethole.[8]

Fennel oil is an essential oil that has several applications in various industries. Fennel oil is produced from fennel seed by using simple distillation. Its widespread use necessitates its cost-effective extraction and separation. In this work various extraction methods, that is distillation, Soxhlet extraction, Simple maceration and Percolation have been used for this purpose; however simple distillation shown to be a promising technique for the operation, because of its high recovery, process simplicity, thermal stability and low energy requirement.

Need of today is to develop more prominent methods for the standardization and quantification of the biological active compounds for better efficacy, quality and safety of herbal drugs. The present study provides the pharmacognostic evaluation i.e. anatomical and microscopic characteristics, physico-chemical properties, preliminary phytochemical screening, and thin layer chromatography (TLC) fingerprinting profiles for this plant. of Foeniculum vulgare.

MATERIALS AND METHODS
The distillation method in which steam with a certain amount of moisture is sprayed on the plant material placed on the grid in a similar system to water distillation and steam transfer of the essential oils is known as steam distillation. Steam distillation is essentially a process of distilling plant material with steam generated by a boiler. In this method, the material is placed on a perforated plate above the steam inlet. It is easy to control how much steam is generated in the steam generating mechanisms. Furthermore, since the steam generator is outside of the distillation unit, the ambient temperature at which the material to be distilled is located is kept below 100° C and the occurrence of impairments due to the

heat effect can be prevented or reduced. The biggest problem of the steam distillation is the vapor pressure and the degradation which can occur when the flow rate is high.[9]

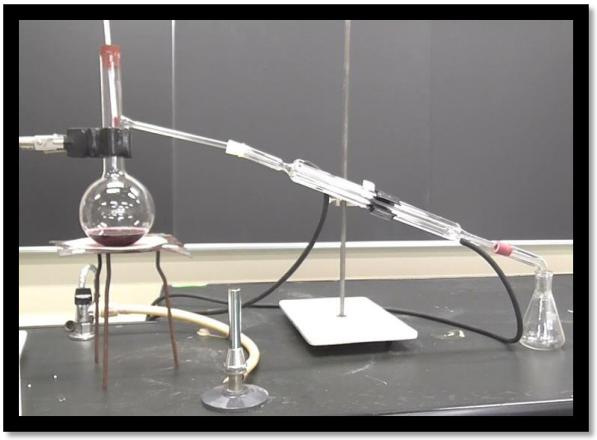

Fig: Simple distillation (Set-Up of Extraction of Fennel Oil).

- **Nutraceuticals**

INTRODUCTION

Nutraceuticals is a term derived from "nutrition" and "pharmaceutics." The term is applied to products that are isolated from herbal products, dietary supplements (nutrients), specific diets, and processed foods such as cereals, soups, and beverages that other than nutrition are also used as medicine.[10] Nutraceuticals are products, which other than nutrition are also used as medicine. Nutraceuticals may be used to improve health, delay the aging process, prevent chronic diseases, increase life expectancy, or support the structure or function of the body. A nutraceutical product may be defined as a substance, which has physiological benefit or provides protection against chronic disease. Nowadays, nutraceuticals have received considerable interest due to potential nutritional, safety and therapeutic effects. In the US, the term "nutraceutical" products are regulated as drugs, food ingredients and dietary supplements. Nutraceuticals, in contrast to pharmaceuticals, are substances, which usually have not patent protection. Both pharmaceutical and nutraceutical compounds might be used to cure or prevent diseases, but only pharmaceutical compounds have governmental sanction.

The word is a portmanteau of the words "nutrition" and "pharmaceutical", was coined in 1989 by Stephen L. Defelice, founder and chairman of the Foundation of Innovation Medicine. Nutraceuticals are products derived from food sources that are purported to provide extra health benefits, in addition to the basic nutritional value found in foods. Depending on the jurisdiction, products may claim to prevent chronic diseases, improve health, delay the aging process, increase life expectancy, or support the structure or function of the body.[11]

The Reasons for Shift Towards Nutraceuticals Are[12,13,17-21]

- Nutraceuticals cover most of the therapeutic areas, such as anti-arthritic, cold and cough, sleeping disorders, digestion and prevention of certain cancers, osteoporosis, blood pressure, cholesterol control, pain killers, depression and diabetes.
- Health care provider recognize the fact that our heavily processed food supply coming from crops grown with chemical fertilizers, pesticides, herbicides, and often genetically modified seeds, lacks sufficient nutrients necessary for optimum Health.
- Economically challenged patients, People believing more in prevention than a cure.
- Increasing numbers of consumers, concerned about healthcare costs.
- Dissatisfied with pharmaceutical agents in promoting health, are turning to nutraceuticals to improve their health and prevent chronic disease.
- Nutraceuticals show an ample scope to flourish in future as therapeutic agents with preventive and curative properties.
- 2q2q2223/ People who have chronic diseases and have found no solution in allopathic medicines.
- Nutraceuticals are quickly replacing pharmaceuticals in prevention and management of acute and chronic health problems.

With few exceptions, the U. S. Food and Drug Administration (FDA) has not approved nutraceuticals for health benefits or disease prevention; nonetheless, the manufacturers of nutraceuticals have been touting them as health-promoting agents.

CATEGORIZING NUTRACEUTICALS[14,15]

They can be classified on the basis of their natural sources, pharmacological conditions, as well as chemical constitution of the products. Most often they are grouped in the following categories: dietary supplements, functional food, medicinal food, pharmaceuticals.

The food sources used as nutraceuticals are all natural and can be categorized as

- Carbohydrates & Fiber
- Fat & Essential fatty acids
- Protein
- Vitamins
- Minerals like Macro minerals& Trace minerals
- Water and Other nutrients like Antioxidants, Phytochemicals & Intestinal bacterial flora Recombinant nutraceuticals.

Chemical Composition

Foeniculum vulgar is a medicinal herb that is used all around the word as spice. The mandate of current study was to explore the nutritional worth of fennel seed because of its easily availability and mostly use. The raw materials were analyzed for the proximate like moisture, fat, protein, fiber, ash & NFE and mineral profile. The composition profiling of Foeniculum vulgar indicated moisture, protein, fat, fiber, ash and nitrogen free extract

as 6.24±0.24, 9.38±0.39, 9.76±0.34, 18.21±0.73, 12.97±0.51 and 43.44±1.82%, respectively. Moreover, Foeniculum vulgar contained appreciable amount of minerals especially potassium 852.45±33.25 mg/100 g followed by calcium 580.6±24.39 mg/100 g, manganese 211.35±7.40 mg/100 g, sodium 16.21±0.65 mg/100 g and iron 9.72±0.38 mg/100 g whereas zinc was found only in minute quantities.

The monitored contents of fennel seed (vitamin and mineral profile) are: dietary fibre 5.75 to 7.59 g/kg, Ca 56 to 363 mg/kg, K 4,241 to 5,851 mg/kg, Mg 82 to 389 mg/kg, Na 77 to 512 mg/kg, dry matter 61 to 75.8 g/kg, weight of pseudobulb 199 to 383 g, nitrates 650 to 3,767 mg/kg, vitamin C 87 to 347 mg/kg (Koudela and Petříková, 2008). According to the proximate analysis fennel seeds contain carbohydrate, crude protein, fiber, ash, fat, moisture as 56.35, 23.19, 17.51, 10.50, 9.96 and 7.27% respectively. Total phenolic compounds in fennel seeds are about 7.55 mg GAE/g. The percentage of fennel seeds essential oil is 1.1%. Dominant fennel essential oil compound is trans-anethole (92.2%), followed by cineole (4.09%), fenchone (1.2%), a-pinene (0.26%), anisaldehyde (0.95%) and limonene (0.085%) (Faten et al., 2011).

RESULTS AND DISCUSSION

We demonstrate our results by the marc obtained after the extraction of essential oil by simple distillation. In this work, we evaluated the moisture content, protein, carbohydrates, fats, fibres, ash content, vitamin c and some electrolyte minerals, etc.

CONCLUSION

Foeniculum vulgare is a plant that has a broad range of chemical components and has several pharmacological actions. As this plant has highly medicinal property therefore, it is highly recommended plant for researchers to developed therapeutic formulations for treatment of many diseases. According to the research, we conclude that the marc of the *Foeniculum vulgare* can be used as a nutraceuticals and the production of various nutraceuticals. The marc is enriched with nutrients and used in food processing also. Further studies should be focussed on the development of nutraceuticals formulations of *Foeniculum vulgare marc* which involve in pharmacological actions.

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