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Nutraceutical Properties of Asafoetida

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ABSTRACT: *Ferula asafoetida* is a flavouring ingredient that is used in a variety of spice blends. The entire plant is consumed raw as a vegetable. Asafoetida is a therapeutic and nutritious oleo-gum resin with a strong, persistent, and sulphurous odour. For years, asafoetida has been used as a spice and a traditional remedy. Relaxant, neuroprotective, memory boosting, digestive enzyme, antioxidant, antibacterial, anticancer, anti-obesity, and antagonistic effects have all been discovered in recent investigations. This review successfully covers asafoetida pharmacological and clinical investigations.

KEYWORDS: Asafoetida, antioxidant, pharmacological, review

I. INTRODUCTION

Nutraceutical is any non-toxic food extract supplement that has scientifically proven health benefits for both disease treatment and prevention. DeFelice, director of the Foundation for Innovation in Medicine, is the one who coined the term “Nutraceutical” (Cora J Dillard *et al.*, 2000). Spices are esoteric food aides that have been used as flavouring and colouring agents and as preservatives for thousands of years. Spices have been used in the traditional medicine for a long time. Recent decades with the advancement in pharmaceutical and chemical technologies have led to more active study on the medicinal property of these spices (Sharma Ruchi *et al.*, 2017). These studies showed various potentials of spices (digestive stimulant action, hypolipidemic effect, anti-diabetic influence, anti-lithogenic property, antioxidant potential, anti-inflammatory property, anti-mutagenic, and anti-carcinogenic). These potential had possible use as therapeutics in treatment of various diseases. (srinivasan 2005)

Asafoetida (*Ferula assa-foetida*) has many medicinal properties including antifungal, anti-diabetic, anti-inflammatory, anti-mutagenic and antiviral activities. It is used in traditional medicines for the treatment of asthma, gastrointestinal disorders, intestinal parasites, etc. A wide range of chemical compounds including sugars, sesquiterpenecoumarins and polysulfides have been isolated from this plant. (MiladIranshahyet *et al.*, 2011)

II. NUTRACEUTICAL PROPERTIES OF ASAFOETIDA

2.1. Antimicrobial activity

Antimicrobial compounds have more therapeutical values without any side effects in plant source that are associated with artificial antimicrobials (VikasShrivastava *et al.*, 2012). *Ferula asafoetida* has wide ranging of antimicrobial property and also household use (RichaBhatnager *et al.*, 2015). Extraction of asafoetida were performed to detect bacterial and fungal strains (VikasShrivastava *et al.*, 2012)

2.1.1. Antibacterial activity

Antibacterial drugs are obtained from microbial source due to development of resistance among bacteria (Turker AU and Usta C., 2008). Antibacterial activity was evaluated against *Bacillus subtilis*, *Staphylococcus aureus*, *Klebsiella pneumonia*, *Escherichia coli* by agar disc diffusion method (Patil *et al.*, 2015). This method carried out assay for antibacterial effect. The organic extracts of *F. asafoetida* performed activity against both gram-positive and gram-negative bacteria and high yielded inhibitory zone of 4 to 16 mm diameter compare with aqueous extracts (VikasShrivastava *et al.*, 2012). Bioactive compounds of this plant assessed the formulation of antimicrobial agents for the treatment of many bacterial infection which is mainly related to the digestive system. *F. asafoetida* has wide ranging of antibacterial activity because it resulted good inhibitory zone against the tested strains of bacteria (Richa Bhatnager *et al.*, 2015). The crude extraction sample have been tested to a preliminary screening for antimicrobial activity against *S. aureus* and *E. coli*. It resulted less effective against *S. aureus* and *E. coli*. compare with



Pseudomonas aeruginosa and also gave no inhibition zone against *A.niger*. So, this crude sample is less efficient against *B.subtilis* and *A.niger* (Vikas Shrivastava et al., 2012)

2.1.2. Antifungal activity

(Uzma Sitara et al., 2008) accounted that antifungal activity of asafoetida against *Aspergillus niger*, *Candida albicans*, *Candida cylindracea*, *Candida tropicalis*, *Candida blank*, *Candida krusei*, *Candida glabrata*, and *Saccharomyces cerevisiae* by disc diffusion method. Asafoetida oil exhibited this activity against all fungal strains, but strong in *C.tropicalis*, *C.albicans*, *S. cerevisiae*, and *A.niger*

P. Angelini et al., (2009) demonstrated that asafoetida oleogum-resin extract killed *T.harzianum* strains in Apiaceae oyster mushroom cultivation and also inactivated *Pleurotus spp.* mycelium growth. Asafoetida inhibited to prevent against tumor cell. Now a days, synthetic fungicides are used to control green mould and also gives effects on food: carcinogenicity, teratogenicity, high and acute residual toxicity, longer degradation and side-effects in humans (Roller S., 2003). *Blastocystis sp.* counts and viability was decreased by oil and powder of asafoetida. This extraction of asafoetida has depended on the degree of the inhibitory action. The low concentration of asafoetida resulted complete inhibition of *Blastocystis* growth. It also prevented *Blastocystis sp.* infection as a natural alternative phytomedicine (Deeb, HK et al., 2012).

2.2. Anti-helminthic activity

The parasitic intestinal worm is destroyed by vermifuges (stunning) or vermicides (killing). Anti-helminthic drugs contained various chemical constituents such as tannins, poly-phenolic compounds, tannins, essential oils, flavonoids, and terpenoids. And providentially, these compounds are found in asafoetida (Shah, BN, 2010). These drugs depended on dose manner. The standard drug at 100 mg/mL was compared with extraction resin of asafoetida. This extraction examined with paralysis and also compared with piperazine citrate at higher concentration. This result showed more significance than the standard drug. Rohit Gundamaraju (2013) studied that the phytochemical screening of this activity on *P. Postuma* resulted strong and high significant.

2.3. Anti-diabetic activity

The mechanism of asafoetida action included the regularization of blood glucose. It has proved that the effect of asafoetida on the secretion function of the pancreas resulted of their direct correlation with the cell membrane. (Foster DW, 1994). Yarizade et al., (2017) studied in-vivo process that the mechanism of asafoetida extract inhibited α -glucosidase and DPP-IV which increased the blood glucose. This extraction showed fewer side effects than drugs and well known the mechanism of action. Finally, the study concluded that the extraction of asafoetida controlled the blood glucose level and recommended to treat T2DM. Ahmed sabe abu-zaiton (2010) resulted that the asafoetida extracts rebuilt pancreatic β cells and had controlled the effect in alloxan-induced diabetic rat model. The process improved insulin level, decreased blood glucose level.

2.4. Anticancer property

Ferula have the active compounds which are used in the prevention of cancer. *Ferula asafoetida* as a species for its anti-cancerous activity which roll to treat cancer disease and harmful effects had little which is normal in the allopathic treatment of cancer (Utsav Nigam, Siddharth Sachan 2013). Galbanic acid (GA) is obtained from ferula species which is organically active sesquiterpenecoumarin. This compound can be development of prostate cancer cells through falling androgen receptor abundance (Hodagudarzi et al., 2015). The presence of Galbanic acid (GBA) inhibited the HIF-1 activation during hypoxia and normoxia in tumour cells. The Hypoxia Inducible factor -1 (HIF-1) induced the adaptation of hypoxic tumours in low oxygen environment. The HIF-1 α and HIF-1 β mRNA expression in hypoxia and normoxia is down-regulated by the GBA. Recent studies show that GBA inhibits the expression of HIF-1 by down-regulation and also by increasing the expression of EGFR by degradation in normoxia. This showed the potential anti-cancer property of Galbanic acid. (Syeda Sarah Abbas et al., 2015)

2.5. Antifertility action

Antifertility drugs are used to prevent pregnancy and abortifacient to endow pregnancy which include contraceptives and abortifacients. The contraceptive action was verified by *Ferula asafoetida*. The resin of *Ferula asafoetida* is extracted with methanol. This resin had improved and the pregnancy in 80% of rats and daily dosage of resin was 400 mg/kg on day's 1-10 post-corium. They studied the experiment of anti fertility activity in the resin of *Ferula asafoetida* with methanol. On account of the study, uterotrophic activity and estrogenic activity was identified by inability to induce premature opening of vagina and cornification of vaginal epithelium at the contraceptive dose (G. Keshri et al., 1999).



2.6. Memory improving Activity

Manifestations of loss of memory are the primary symptom in most of the people affecting from Alzheimer's disease around the world. Vijayalakshmi *et al.*, (2012) evaluated the effect of the asafoetida extraction on learning and memory in rats. In this study, concluded that chronic administration of asafoetida in both active and passive avoidance assay could be prevented and treated the learning impairment and memory deficit induced by D-galactose and NaNO₂ in adult male mice. Some species of *Ferula* were traditionally used for enhancing memory or treatment of neurological disorders (Millard Iranshahy *et al.*, 2011). This study showed that asafoetida has protective and treatment effects on impairment of memory induced by D-galactose and NaNO₂ in mice.

2.7. Hypocholesterolemic effect

Serum cholesterol levels were lowered for 3–6h by administering 3g asafoetida and equivalent amount of its essential oil in healthy subjects provided butter fat. The observation had been reported with rats feed 1.5% asafoetida powder in a 1% cholesterol diet. Liver cholesterol levels were significantly lower in the asafoetida group. Absorption of nutritional cholesterol in rats maintained on 2% dietary asafoetida along with a high-cholesterol diet was significantly decreasing with accompanied higher excretion of cholesterol and bile acids (Krishnapura Srinivasan 2013).

III. CONCLUSION

In this study, provide the information about medicinal properties of asafoetida. Spices possess several medicinal properties and enhance sensory quality of foods. The consumption of spices improve quality of life and best option to stay natural. These nutraceutical properties are beneficiary and also have the potential of possible therapeutic application in various diseases. The above study is used to formulate drugs for various types of diseases with minimal side effect and cost effective. Currently, the research is going on to treat the cancer and HIV by using nutraceutical properties from spices.

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