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DIETO-HERBAL APPROACH OF OBESITY IN UNANI SYSTEM OF MEDICINE- A REVIEW

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ABSTRACT

Obesity (*Simne mufrit*) is a complex disorder which presents with number of risk factors in almost all age groups throughout the world. Plant origin drugs have played a vital role in prevention and treatment of diseases since ancient time. In Unani system of medicine there is treasure of plant origin drugs having highest diversity in their properties both in dieto and herbal therapy, which can reduce body weight and prevent diet induced obesity. These are cost effective and free from toxic effects when compared with chemically synthetic drugs. There are several herbs which are used in preventing and treating obesity such as Gilo, Papaya, Coccinia, Gurmar, Turmeric, Onion, Vinegar, Malabar tamarind, Sandroos and many others which reduces body weight, total cholesterol and play a significant role in prevention of obesity and its related metabolic disorders. This review highlights and discusses about the herbs recommended for the management of obesity in diet as well as in drug therapy.

KEYWORDS: Diet; herbs; Obesity; Simne mufrit; Unani medicine.

INTRODUCTION

Simne mufrit (obesity) is a medical condition in which excess body fat accumulates to such an extent that it may have an adverse effect on health, leading to reduced life expectancy and increased health problems. Body mass index (BMI) is a measurement which defines people as over weight (pre-obese) if their BMI is between 25 to 30 kg/m^2 and obese when it is greater than 30kg/m^2 and extreme obesity greater than 40 kg/m^2. Obesity increases the

likelihood of various diseases, particularly heart disease, type II diabetes, obstructive sleep apnea, certain types of cancer, and osteoarthritis.[1]

The world health organization has described obesity as one of today's most neglected public health problem, affecting every region of the globe. Obesity is gradually becoming a major public health problem both in children and adolescents in India.[2] WHO also projects that by 2015 approximately 2.3 billion adults will be having overweight and more than 700 million will be of obese.[3]

The food and drug administration has approved several medications for treatment of obesity. These falls in 2 categories, centrally acting drugs which suppress appetite e.g. phentermine and sibutramine and peripherally acting drugs which reduce fat absorption eg; Orlistat.[4] But the long term use of these drugs has been reported for several adverse effects, like Orlistat have been reported to results in loose stools, oily spotting, faecal urgency, flatus and the potential for malabsorption of fat soluble vitamins, whereas side effects of Sibutramine includes dry mouth, constipation and insomnia, the nor adrenergic effect of the drug can also increase heart rate and blood pressure.[5]

Hence, the people are moving towards the Traditional System of medicine for a safe and effective treatment in the management of obesity and to avoid the side effects produced by modern drugs.[6]

Unani *Usoole Ilaj* of *Simne mufrit*[7]

According to Unani physicians, basic principles of treatment is

- One should modify the diet according to disease condition.
- If the diet fails to treat the condition then start with single drug therapy.
- When single drug therapy too fails then start with compound formulations and with regimental therapies.

Based on above principles of treatment it is classified into 4 types

1. *Ilaaj bil ghiza* (Dietotherapy).
2. *Ilaaj bil dawa* (Pharmacotherapy by both *Mufrad dawa* (single drugs) and *Murakkab dawa* (compound formulations).
3. *Ilaaj bil tadbeer* (Regimental Therapies) and
4. *Nafsiyati ilaaj* (Psychotherapy).

In this paper we are discussing in detail about *Ilaaj bil ghiza* (Dietotherapy) and *Ilaaj bil dawa* (Pharmacotherapy).

***Ilaaj bil ghiza* (Dietotherapy)**

1. *Carica papaya* Linn.

Carica papaya Linn. is popularly known as papaya, belonging to the family Caricacea. It is rich in antioxidants, Vitamin A and C and also a good source of fiber which acts as laxative. It contain enzyme called 'Papain' which helps to breakdown protein in the body.

In a study, the antiobesity effect of aqueous fruit extract of carica papaya in three different doses (200, 400 and 600 mg/kg body weight) was evaluated. Obesity was induced by administering high fat Cafeteria diet for 45 days. The results showed that there is significant decrease in BMI, body weight, organ weight of liver, kidney and spleen in treated groups than in HFD group animals. Serum Glucose, TG, TC, LDL-C and VLDL-C were significantly decreased while HDL-Cholesterol was elevated in the treated groups in a dose-dependent manner as compared to the HFD group. Elevated hepatic TG, TC, free fatty acid and phospholipids levels were also significantly reduced in the treated groups.[8]

2. Ananas Comosus

Pineapple or Anannaas belongs to family Bromoliaceae. It is a rich source of Vitamin B1 and C, it contains minerals like manganese. The stem and core of pineapple contain an enzyme called Bromolein which helps in breakdown of proteins, increases digestion, improves immunity, and has anti-inflammatory, anti-thrombolytic, diuretic properties. Bromelain breaks down proteins in the digestive track and stimulates muscular contraction in the intestine. Pineapple contains high amount of fiber and water in it which gives feeling of satiety.[9]

3. Brassica oleracea capitata

Brassica oleracea capitata also known as cabbage, patta gobi**.** It belongs to family Brassicaceae, is a good source of beta carotene, vitamin C & fiber with very low calories. It is a cruciferous vegetable, and has been shown to reduce the risk of colorectal cancers. As it is rich in fiber, raw cabbage has shown to cure stomach ulcers. It is a good source of Antioxidants which helps to reduce inflammation, provide cancer protection, and boost brain function. It lowers cholesterol level so it is a natural and effective cholesterol reducer. Cabbage prevents bile to absorb fat after a meal and lowers the overall amount of cholesterol

in the body. It contains Glucosinolates which is a sulfur-based compound that have anti-carcinogenic properties.[10]

4. Psidium guajava

Psidium guajava belongs to family Myrtaceae. It is a very common fruit known as pink guava or *Amrood*. It is a rich source of Vitamin C, Pro-vitamin A, Vitamin B, Pectin, Calcium, Phosphorus, Potassium, Beta-carotene & lycopene. Being very high in roughage with no cholesterol and less digestible carbohydrates, it reduces appetite very easily thus helps in weight loss.

In a study, it was found that Pink guava puree significantly decreased body weight, systolic blood pressure, blood glucose, TC levels, TG, LDL-C levels for all treated groups. HDL-C levels showed an increase in the treated group as compared to control. The result showed that pink guava puree had anti-obesity properties and high enzyme activities.[11]

5. Campari tomato

Tomato is a very common fruit which belongs to family Solanaceae. Fruit pectin and other edible fibers in tomato are easy to produce satiety feel, helping to absorb redundant fat and excrete together, and so reducing food fat intake. Edible fibers also help to promote motility of stomach and intestine, reducing constipation.

A study was Conducted on previously developed a diet-induced obesity model of zebrafish (DIO-zebrafish) that develops visceral adiposity, dyslipidemia, and liver steatosis. Results showed that “Campari” tomato, which suppressed increase of body weight, plasma TG, and lipid droplets in livers of DIO-zebrafish. Campari tomato decreased srebf1 mRNA by increase of foxo1 gene expression, which may depend on high contents of b-carotene in this strain.[12]

6. *Allium cepa* Linn.

Onions or Pyaz dashti (*Allium cepa* L.) are widely used in the food industry for its nutritional and aromatic properties. According to a study, the ethyl acetate extract of onion (EEO) showed potent inhibitory effects on animal fatty acid synthesis (FAS), and could induce apoptosis in FAS over-expressing human breast cancer MDA-MB-231 cells. The results suggest that the apoptosis induced by EEO occurs via inhibition of FAS. Also found that

EEO could suppress lipid accumulation during the differentiation of 3T3-L1 adipocytes, which was also related to its inhibition of intracellular FAS activity.[13]

7. *Cyamopsis tetragonaloba*

Cyamopsis tetragonaloba (Guar gum) is a fiber from the seed of the guar plant, it normalizes the moisture content of the stool, absorbs excess liquid in diarrhea, and removes constipation. It is recommended in the treatment of diarrhea, irritable bowel syndrome (IBS), obesity, diabetes, hyperlipidemia and atherosclerosis. It decreases the fat absorption through intestines. Guar gum swells in the intestine, causing a sense of fullness hence it decreases appetite and helps in weight reduction. A study was conducted on reduction of cholesterol by guar gum in rat model. Results suggested that guar gum was effective as hypocholesterolemic agent and prevents hypercholesteromia in hypercholesteromic rats.[14]

8. *Garcinia gummigutta*

Garcinia gummigutta also known as Garcinia cambogia or Malabar tamarin, belongs to the family Guttifera which occurs in evergreen, shola forests of Western Ghats in India. It is a rind of a fruit, contains an active ingredient HCA-Hydroxycitric acid which inhibits Adenosine triphosphate citrate lyase and used in treatment of obesity as it prevents fat storage and decreases appetite. In a double blind randomized study it was found that the G cambogia treated group had significantly reduced visceral, subcutaneous, and total fat areas compared with the placebo group (P<0.001). No severe adverse effect was observed at any time in the test period. There were no signs of a rebound effect from week 12 to week 16.[15]

9. Apple Cider Vinegar

Apple cider vinegar contains potassium, pectin, malic acid, calcium, ash and acetic acid and also various vitamins such as Vit. C, E, A, B1, B2 and B6. It also has some beneficial minerals such as selenium, manganese, copper, zinc, sodium, potassium, phosphorus, magnesium, iron and calcium.

A study was published in the Clinical Nutrition on apple cider vinegar weight loss. Participants were given different dose of vinegar concentrations with a portion of white bread at breakfast. Scientists found that higher levels of vinegar concentrations drew a milder metabolic response. In other words there was a lower insulin spike as vinegar dampened the effect of glucose release into the blood stream. The participants who consumed the highest amount of vinegar also registered the highest satiety levels. The scientists concluded that

fermented and pickled products containing acetic acid had the potential of dampening insulin spikes as well as increase satiety levels after eating a meal.[16]

10. Rubusidaeusaspberry

Raspberry fruit (Vitaceae) contains Raspberry ketone (RK), which regulates adiponectin a protein to regulate metabolism it breaks the fat from the cells. A study has been conducted on Raspberry ketone on diet induced obesity in mice For six weeks. This study demonstrated that RK stimulated the metabolism of white and brown adipose tissues and inhibited small intestinal absorption of dietary fat by suppressing pancreatic lipase activity. As an agent effective in preventing both fat and sugar induced obesity, RK might exert its anti-obesity effect via an increase of nor epinephrine induced lipolysis in white adipocytes and an enhancement of thermogenesis in Brown Adipose tissue (BAT).[17]

***Ilaj bil Dawa* (Drug Therapy)**

Ilaj bil dawa is of 2 types

1. Tinospora cordifolia

Tinospora cordifolia is commonly known as Gilo or Guduchi, belongs to the family Menispermaceae. Its leaf is widely used as anti-diabetic and anti-pyretic drugs. Chemical constituents present in it are terpenoids, alkaloids, lignans, steroids etc. A study was carried out to investigate the effect of petroleum ether extract of *Tinospora cordifolia* stem on obesity in rats using cafeteria diet for 40 days and anti-psychotic drug (sulpride)-induced obesity for 28 days in male wistar rats. The extract administered (50 and 100mg/kg, p.o), results showed significant decrease in body weight, serum cholesterol, glucose and triglycerides; and significant increase in HDL-cholesterol.[18]

2. *Alpinia Galanga*

Alpinia galanga or Kholanjan, a rhizomatous herb, belongs the family Zingeberaceae, is widely used for the treatment of rheumatoid arthritis, inflammations, cough, asthma, obesity, diabetes etc. In a study, the ethanolic extract of *Alpinia galanga* was administered 400mg/kg along with Cafeteria diet daily for 6 weeks. Results showed that the extract produced inhibition of increase in body weight and parametrial adipose tissue weight induced by cafeteria diet, without change in food intake. There was significantly decrease in serum lipid Profile and liver weight. The extract also produced inhibition in *in vitro* pancreatic lipase

activity. The results obtained were comparable with that of sibutramine and found the plant extract to be more effective in reducing obesity.[19]

3. Gymnema sylvester

Gymnema sylvester popularly known as *Gudmar booti* is a woody climber of Asclepiadaceae family, found in the Deccan Peninsula and western India. The active compound of this plant is a group of acids termed as gymnemic acids. A study was carried out on Hexane extract from the leaves of *Gymnema sylvestre* in Sprague dawley rats by inducing obesity with High high fat Cafeteria diet. The extract was administered with the dose of 150 and 250mg/kg body weight in test groups. There was a significant reduction in BMI, body weight, serum cholesterol, triglycerides and LDL-c, whereas, significant increase in HDL-c level in Hexane extract treated groups.[20]

4. Coccinia indica

Coccinia indica commonly known as Kundru, Unani name kanduri, belongs to family cucurbitaceae. In a study, the anti obesity activity of fruit extracts i.e. alcoholic (ALFCI) and aqueous (AQFCI) was explored in Cafeteria diet (CD) and Atherogenic diet (AD) induced obesity in female rats. The result showed that both ALFCI and AQFCI with medium (200 mg/kg) and high doses (400 mg/kg) exhibited a significant ($P<0.01$) anti obesity activity by reducing the body weight, food intake, organ and fat pads weight and serum Glu, Cho, TG, LDL and VLDL cholesterol levels with an increased HDL levels.[21]

6. Boerhaavia diffusa roots

Also called as Punarnava root belongs to Nyctagenaceae family. A study demonstrated that Punarnava Root extract exhibited a significant anti-obesity and hypolipidemic activities by reducing body weight, visceral fat pad weight as well as lipid profiles, liver and kidney marker enzyme levels in high fat diet induced obesity rodents.[22]

7. *Glycerrhiza glabra* Linn.

Glycerrhiza glabra Linn. Commonly known as liquorice and belongs to family Fabaceae and it is known as Aslussoos in Unani. An experimental study was conducted with dried powder of ethanolic extract of Liquorice (*Glycerrhiza glabra*) on male wistar rats for 8 weeks. The result found that there was significant decrease in body weight, visceral adipose pad weights and Lee's index, serum TC, TG and glucose levels. Hence Licorice has anti-obesity activity, partly was mediated by decreasing dietary fat absorption from the intestine.[23]

8. *Apium graveolans* Linn.

Apium graveolans Linn. known as *Tukhme karafs* in Unani, belongs to family Apiaceae. An experimental study was conducted on ethanolic extract of Apium graveolans in adult male albino rats. The result showed, a significant decrease in body weight, serum total cholesterol, Triglycerides, LDL-C and significant increase in HDL-C in ethanolic extract treated groups.[24]

9. *Bauhinia purpurea*

Bauhinia purpurea is abundantly available in India, used in Dropsy, Rheumatism, Septicaemia because of its analgesic and anti-inflammatory properties. Bark, leaves and roots are medicinally used. Methanolic extracts of *Bauhinia purpurea* (MEBP) were evaluated for their anti-hyperlipidemic and antiobesity efficacy in high fat diet (HFD) induced obesity rats in two different doses. In the result they reported that MEBP significantly reduced the body weight total cholesterol (TC), triglycerides (TG) and low density lipoproteins (LDL) while the high density lipoproteins (HDL) was increased in a dose dependent manner.[25]

10. Itrifal Sagheer

Itrifal Sagheer consists of 3 herbal drugs namely Halela (*Termanalia chebula*), Balela (*Termanalia bellerica*) and Amla (*Emblica officinalis*).A study which evaluated the herbal formulation in obese subjects showed that the body weight, BMI, waist and hip circumference was found to be reduced when compared with the placebo subjects. Gallic acid is a phenolic compound of *Itrifal sagheer* which is selected as a bioactive marker due to its easy availability, and its anti-obesity recorded property. [26]

11. *Curcuma longa* Linn.

In a study, the antiobesity and antidiabetic effect of curcuminoid from *Curcuma longa Linn*, piperine from *piper nigrum* and quercetin from *Allium cepa (CPQ)* was evaluated. Results revealed that the obese rats treated with CPQ showed in marked decrease in plasma glucose, triglycerides, total cholesterol and LDL with a concomitant increase in plasma HDL in High fat diet combined with low dose STZ-induced diabetic rats. In addition, pre-treatment with combination consisting of "Curcumin with piperine and quercetin" (100mg/kg) once daily for 28 days had a potent increasing effect on serum glutathione and catalase activities, along with, elevating pancreatic SOD activities compared to diabetic group.[27]

12. *Safoofe Muhazzil*

It is a Unani formulation consists *nankhawa* (ptychotis ajowan) seed, *marzanjosh* (Origanumma jorana) stem, *tukhme badiyan* (Foeniculum vulgare Mill) seed, *Zeera siyah*(Carum carvi) seed, *Luk maghsool* (Coccuslacca), *bura armani* (Armenian bole) and *berg suddab* (Ruta graveolans Linn.) leaf, has been used by Unani scholar in the treatment of obesity. According to a study, *Safoofe Muhazzil* significantly prevented the increase in percentage of body weight, lee's index, lipid profile, insulin and Leptin levels as compared to standard pellet group and other groups. The study provides evidence for anti-obesity effect of *Safoofe Muhazzil*.[28]

13. *Piper nigrum* Linn.

It belongs to the family Piperaceae. Commonly known as Black pepper and in Unani it is named as *Filfil siyah*. It is a branched climbing perennial shrub. It is cultivated in the hot and moist parts of India, Ceylon and other tropical countries. Piperine is the active principle found in this plant. Piperine supplementation at 40mg/kg body weight significantly ($P< 0.05$) reduced the body weight, levels of plasma total cholesterol, low density lipoprotein (LDL), very low-density lipoprotein (VLDL) and the activity of 3-hydroxy 3-methyl glutaryl coenzyme A (HMG CoA) reductase in the liver, heart and aorta, VLDL and significantly ($P < 0.05$) elevated the levels of plasma and tissue lipoprotein lipase (LPL) and plasma lecithin cholesterol acyl transferase (LCAT) in high fat diet fed male wistar rats. Simultaneous supplementation of piperine significantly ($P<0.05$) enhanced fecal excretion of bile acids and neutral sterols implying that piperine can prevent the accumulation of plasma lipids and lipoproteins significantly by modulating the enzymes of lipid metabolism.[29]

14. *Zingeber officinalis*

Zingeber officinalis (Zanjabeel) is a rhizomatous perennial herb belongs to the family Zingeberaceae. The phytochemicals, gingerol and shogaol increase the metabolic rate and thus help to "burn off" excessive fat and also suppress the absorption of calorie dense dietary fats from the intestines. Aqueous extract of *Zingeber officinale* at 0.4 ml/kg body weight showed significant decrease in plasma glucose and cholesterol in rats fed with 99% growers mash and 1% cholesterol. Same results were obtained when rats were subjected to an aqueous extract of *Hibiscus Sabdariffa* and *Z. officinale* at 1ml/Kg body weight.[30] Ethanolic extract of ginger lowered serum triglycerides, lipoproteins, phospholipids as well as serum and tissue cholesterol. In addition, rats receiving ginger extract with cholesterol showed a lower degree

of atherosclerosis. Ginger extract consumption reduced plasma cholesterol, inhibited LDL oxidation and attenuated development of atherosclerosis in atherosclerotic, apolipoprotein E-deficient mice.[30]

15. *Polygonum aviculare* Linn.

It is commonly called as Knot grass which belongs to family Polygonaceae. It is traditionally used as Diuretic, astringent, insecticide and anti hypertensive. According to a study, administration of PAE *(P. aviculare* ethanol extract) to HFD (High fat diet)-induced obese mice showed significantly reduced body weight gain, adipose tissue weight, adipocyte size, and lipogenic gene expression as well as serum triglyceride, leptin, and MDA levels. Furthermore, PAE inhibited 3T3-L1 adipocyte differentiation. These results suggest that PAE exerts antiobesity effects in HFD-induced obese mice by suppressing lipogenesis in white adipose tissue and through its antioxidant properties. The antiobesity effects of PAE support its potential as a therapeutic or a source of therapeutic substances; its low toxicity in mice and its historical use for other indications in humans indicate it may be safer than antiobesity pharmaceuticals currently available.[31]

16. *Embelica officinalis*

Emblica officinalis is from Euphorbiaceae family commonly known as Amla, contains ascorbate (Vit-C), flavonoids, tannins, which plays a vital role in scavenging free chemical groups. A study was conducted to know the efficacy of Ayurvedic herbal formulation of *Emblica officinalis* in experimentally induced hypercholesteremic rats. The result showed lesser fragmentation of DNA in *Emblica officinalis* treated group when compared to the high cholesterol diet group. *Emblica officinalis* alone treated group is comparably similar to that of normal group. Histopathological study of thoracic aorta of *Emblica officinalis* treated group showed decrease in atherogenicity as compared to untreated high cholesterol diet fed rats.[32]

17. *Trigonella foenum* Graecum.

Fenugreek belongs to family Fabaceae. In Unani it is named as *Hulba*. Fenugreek seeds have been shown to have Hypoglycaemic and anti-cholesterolaemic actions. A clinical study was conducted on FG seeds powder which was first extracted with Hexane to remove lipids then with ethyl alcohol to remove Saponins. and were divided into 3 groups, Patients were directed to take before lunch and dinner for 20 days. Blood samples were collected to estimate the lipid profile. Results showed a significant changes in between the groups. Serum

cholesterol, triglycerides and VLDL levels were significantly decreased when compared to normal control group.[33]

18. *Hibiscus sadabariffa*

Hibiscus is known as Gule Gudhal in Unani which belongs to family Malvaceae. Hibiscus acid and its 6-methyl ester were respectively isolated as active principles from 50% methanol and acetone extracts of rosella tea. In a study aqueous extract of dried calyces of H. sabdariffa at 0.8 ml/kg body weight showed significant decrease in plasma glucose and cholesterol in rats fed with 99% growers mash and 1% cholesterol. Same results were obtained when rats were subjected to an aqueous extract of Hibiscus sabdariffa and Zingiber officinale at 1ml/kg body weight. Extracts of Hibiscus Sadabariffa and Z.officinale, apart from being hypocholesterolemic and hypoglycemic, control blood sugar especially in those prone to diabetes mellitus.[34]

19. *Commiphora mukul*

It is also called as Guggul and Balsam odendrom, in Unani it is called as *Muqil*, Mukul belongs to family Burseracea. It is a Oleo-gum-resin which contains Guggulosterone, Sessanin, Camphorine, mainly used to lower cholesterol level. Guggul is known for treatment of obesity and associated lipid disorders. It has recently come into prominence as an effective treatment for high blood cholesterol. It contains resins as lipid soluble steroids including gugulusterones E and Z.[35]

20. *Sandroos (Trachylobium hornnemannianum* Hayne.)

Sandroos (Trachylobium hornnemannianum) is an important resin which is obtained from Sal tree, botanically known as 'Shorea robusta', belongs to the family Leguminosae. It is abundantly found in forests of Africa, Australia, Spain and India. A study was conducted to evaluate antiobesity activity of *Sandroos* in Cafeteria diet induced obesity in rat model in two different doses (Single and double) and compared with standard drug Orlistat and Cafeteria diet induced animals groups and plain control groups. The result showed a significant (P<0.01) decrease in food intake, body weight, RBS, lipid content, adipose cell size, fat pad weight, triglyceride (TG), total cholesterol, LDL and VLDL concentration in test drug treated groups. Highly significant (P<0.001) effect was observed in single dose treated group, where as the findings of double dose treated group were near to plain and standard control groups. Significantly (P<0.01) increase in body temperature, locomotor activity and HDL was

observed in *Sandroos* treated groups with no side effects. No significant difference was found in the results of male and female rats in all the groups.[36]

Along with the dieto-herbal treatment various modification in lifestyle are also required for control of obesity as well as diseases associated with obesity. Following are some important points which should be kept in mind

- Food consumed should not be spicy, oily and fatty.
- Alcoholism and smoking can cause various complications in person with excessive fat.
- Red meat should be avoided.
- Regular exercise of 30-45 min to be done, exercise should include cardio, Aerobics, Walking, Yoga etc.
- Try to live free from stress and be optimistic in life.
- Eat green salads along with tomatoes and leaves of mint as they can easily burn excess fat.
- Drink cabbage juice or eat cabbage as it is very beneficial for controlling obesity.
- Fruits like papaya, apple, and carrot must be taken as they are helpful in relieving from obesity.
- Luke warm water must be taken after every lunch and dinner as it helps in proper burning of excess fat.

CONCLUSION

We have covered only 30 plants in this review. Many more plants and herbs are used in Unani system of medicine which have effect not only on obesity but on every possible disorder related to obesity. It remains for the modern scientists to give scientific validation for the herbs claimed for therapeutic activity to make use of herbal potential in a more productive way. So I emphasize Unani line of therapy after considering comparatively more serious side effects involved in allopathic approaches to correct obesity. In most cases the chemical synthesis of plant derived compounds is not economically feasible due to their high complex structures. Natural herbs are easily available and cost effective.

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