

ANTI DIABETIC PROPERTIES OF COMMON SPICES FOUND IN NORTH INDIAN KITCHENS

SANJIVE KUMAR^{a1} AND MANISH KUMAR SRIVASTAVA^b

^{ab}Department of Chemistry, K A P G College, Allahabad, Uttar Pradesh, India

ABSTRACT

Anti-diabetic compounds are those which have properties to treat diabetes. Cumin, Coriander, Black Cumin, Fennel, Fenugreek, Clove, Cinnamon, Turmeric, Curry leaves, Nutmeg, Asafoetida are the common spices used in north Indian Kitchens. These spices have several medicinal applications in ayurvedic system of medicine. The above studies showed the anti-diabetic properties of these spices, which are proved by several scientific studies.

KEYWORDS: Diabetes, Anti-diabetic, Spices

Spices are very important part of Indian food. In North Indian Kitchens several types of spices are used like Cumin, Coriander, Black Cumin, Fennel, Fenugreek, Clove, Cinnamon, Turmeric, Curry leaves, Nutmeg, Asafoetida etc. Spices provide colour, taste, flavour and aroma to the food materials. In addition these spices have several medicinal properties. These spices are widely used in the traditional methods of medicines and also the part of several preparations used to treat different diseases in India. Diabetes is a very common disease and it is growing day by day. It is mainly of three types- Type-1, Type-2 and Gestational diabetes. There are several drugs in market to manage diabetes but they have several side-effects also. There are several spices that are used by traditional system of medicine to treat diabetes. The aim of present study is to review the anti-diabetic property of common spices used in Indian kitchens.

METHODOLOGY

In the current study first the spices commonly used in North Indian kitchens were recognized with the study of nearby kitchens. In the next step the literature related to these spices are collected with the help of organized search. The searches were performed using various data base including PubMed (<http://www.ncbi.nlm.nih.gov/pubmed>), Scopus (<http://www.scopus.com>), Scirus (<http://www.scirus.com>), Science Direct (<http://www.sciencedirect.com>), Google Scholar (<http://www.scholar.google.com>).

ANTI-DIABETIC PROPERTIES OF SPICES

Coriander

Coriandrum sativum is a very common spice crop of India. It is commonly known as dhania in Hindi and Coriander in English. It belongs to family Umbelliferae. Its

leaves as well as seeds are used as spices in Indian kitchens. It has several medicinal properties. A study showed that coriander seeds ethanol extract decreased serum glucose in streptozotocin-induced diabetic rats and increased insulin release from the beta cells of the pancreas (Eidi et al. 2008). Another study showed that Coriander has significant hypoglycaemic activity in type-2 diabetic patients (Waheed et al. 2006).

Cumin

Cumin (botanical name- *Cuminum cyminum*) belongs to family Apiaceae. It is commonly known as Jeera in Hindi. Its seed are very popular spice used in almost every dish of north Indian kitchens. It is the main constituent of several ayurvedic medicines used to enhance digestion. A study showed that treatment of streptozotocin-diabetic rats with methanoic extract of cumin for 28 days caused reduction in blood glucose (Jagtap et al. 2010). Another study showed that cumin seeds powder decrease the level of fasting glucose and cholesterol in type-2 diabetes patients (Andallu et al. 2007).

Black Cumin

Black cumin is obtained from the seeds of plant *Nigella sativa*. It is a flowering plant of Ranunculaceae family. It is also known as black caraway in English and Kalonji in Hindi. It is a very common spice of pickles in Indian kitchens. A study proved the anti diabetic property of the ethanol extract of its seeds by stimulating the release of insulin (Rchid et al. 2004).

Fennel

Fennel (*Foeniculum vulgare*) is an herb belongs to family Apiaceae. It is commonly known as Saunf in hindi. Its seeds are used as a spice in Indian kitchens. It is commonly used as mouth freshner. A study showed that

¹Corresponding author

methanol extract of fennel seeds decrease blood glucose in glucose loaded mice (Monalisa et al. 2015). Another study proved that aqueous extract of fennel seeds have anti diabetic activity in streptozotocin-induced diabetes in male albino rats (Anitha et al. 2014).

Clove

Cloves are flower bud of tree *Syzygium aromaticum*. It is commonly known as laung in hindi. It is a very common spice used in Indian kitchens. It is an aromatic plant having several medicinal properties. A study shows that ethanol extract of cloves has potential as a functional food ingredient for the prevention of type 2 diabetes in mice (Kuroda et al. 2012).

Fenugreek

Trigonella foenum-graecum is an herb of Fabaceae family. Its seeds are used as spice in Indian kitchens. It is commonly known as methi in hindi and Fenugreek in english. It was used to decrease blood glucose in traditional system of medicine. A study showed that fenugreek seeds mucilage and spent turmeric improve the level of fasting sugar 26% and 18% respectively in streptozotocin-induced diabetic rats (Sureshkumar et al. 2005). Another study showed that fenugreek seeds produced a significant fall in fasting blood sugar level in non insulin dependent diabetic patients (Sharma et al. 1990).

Cinnamon

Cinnamon is a common spice obtained from the inner bark of plant *Cinnamomum verum*. It is commonly used as aromatic and flavouring agent in Indian Kitchen. It is known as dalchini in Hindi. A study showed that Cinnamon can reduce the level of fasting sugar in type-2 diabetes patients (Kirkham et al 2009). Another study showed that Cinnamaldehyde obtained from cinnamon is able to decrease plasma glucose level in Streptozotocin-induced diabetic wistar rats (Subash et al 2007).

Curry leaves

Curry leaves are obtained from the plant *Murraya koenigii*. It is a tropic tree belongs to rutaceae family. It is commonly known as curry patta in hindi and used to give flavour to food in Indian Kitchens. A study showed that curry leaves decrease the blood glucose level 21.4% in diabetic rats (Yadav et al. 2002). Another study showed that aqueous extract of curry leaves lower the blood glucose level up to 14.68% in normal and 27.96% in diabetic rabbit (Kesri et al. 2005).

Turmeric

Turmeric is obtained from the rhizomes of the plant *Curcuma longa*. It is an herbaceous plant of ginger family. It is commonly known as Haldi in Hindi. It is used as colouring agent and flavouring agent in different dishes in India. It is also used as medicinal plant in ayurvedic system of medicine. A study showed that aqueous extract of turmeric is useful to decrease blood glucose and increase haemoglobin in streptozotocin induced diabetic rats (Eshrat et al. 2002). Another study showed that a combination of garlic and turmeric can reduce plasma glucose level and also improve the lipid profile in type-2 diabetes patients (Sukandar et al. 2010).

Nutmeg

Nutmeg is a spice obtained from the seeds of plant *Myristica fragrans*. It is commonly named as jaiphal in hindi and used as flavouring agent in different food items. A study showed that the petroleum ether extract of nutmeg seeds decrease the blood glucose level also shows improvement in body weight, lipid profile and haemoglobin content in diabetic rats (Somani et al. 2008).

Asafoetida

Asafoetida is the dried latex obtained from the rhizomes or top roots of *Ferula asafoetida*. It is also known as Hing in hindi. It is used to treat several digestion related problems in ayurvedic sytem of medicine. A study proved that asafoetida extract shows protective effect in diabetes by preserving pancreatic β -cells in alloxan-induced diabetic rats (Abu-Zaiton et al. 2010).

Table 1: Scientific proves of the Anti diabetic properties of Spices

S. No.	Spice	Botanical Name	References
1	Coriander	<i>Coriandrum sativum</i>	Eidi et al. 2008 & Waheed et al. 2006
2	Cumin	<i>Cuminum cyminum</i>	Jagtap et al. 2010 & Andallu et al. 2007
3	Black Cumin	<i>Nigella sativa</i>	Rchid et al. 2004
4	Fennel	<i>Foeniculum vulgare</i>	Monalisa et al. 2015 & Anitha et al. 2014
5	Clove	<i>Syzygium aromaticum</i>	Kuroda et al. 2012
6	Fenugreek	<i>Trigonella foenum-graecum</i>	Sureshkumar et al. 2005 & Sharma et al. 1990
7	Cinnamon	<i>Cinnamomum verum</i>	Kirkham et al 2009 & Subash et al 2007
8	Curry Leaves	<i>Murraya koenigii</i>	Yadav et al. 2002 & Kesri et al. 2005
9	Turmeric	<i>Curcuma longa</i>	Eshrat et al. 2002 & Sukandar et al. 2010
10	Nutmeg	<i>Myristica fragrans</i>	Somani et al. 2008
11	Asafoetida	<i>Ferula asafoetida</i>	Abu-Zaiton et al. 2010

CONCLUSION

The above study showed that Cumin, Coriander, Black Cumin, Fennel, Fenugreek, Clove, Cinnamon, Turmeric, Curry leaves, Nutmeg, Asafoetida are the common spices used in North Indian kitchens. There are several studies which prove that these spices have anti-diabetic properties. This study is only the review of the anti-diabetic properties of spices however there is a scope of the comparative study of their anti-diabetic properties.

REFERENCES

- Abu-Zaiton A.S., 2010. Antidiabetic Activity of *Ferula asafoetida* in Normal and Alloxan-induced Diabetic Rats. P. J. B. S., **13**(2):97-100.
- Andallu B. and Ramya V., 2007. Antihyperglycemic, Cholesterol-Lowering and HDL-Raising Effects of Cumin (*Cuminum cyminum*) Seeds in Type - 2 Diabetes. Journal of Natural Remedies, **7**(1):2007.
- Anitha T., Balakumar C., Ilango K.B., Jose C.B. and Vetrivel D., 2014. Antidiabetic activity of the aqueous extracts of *Foeniculum vulgare* on streptozotocin-induced diabetic rats. I.J.A.P.B.C., **3**(2):487-494.
- Eidi M., Eidi A., Saeidi A., Molanaei S., Sadeghipour A., Bahar M. and Bahar K., 2008. Effect of coriander seed (*Coriandrum sativum* L.) ethanol extract on insulin release from pancreatic beta cells in streptozotocin-induced diabetic rats. Phototherapy Research, **23**(3):404-406.
- Eshrat H. and Hussain M.A., 2002. Hypoglycemic, hypolipidemic and antioxidant properties of combination of *Curcumin* from *Curcuma longa*, Linn, and partially purified product from *Abroma augusta*, Linn. in streptozotocin induced diabetes. Indian Journal of Clinical Biochemistry, **17**(2):33-43.
- Jagtap A.G. and Patil P.B., 2010. Antihyperglycemic activity and inhibition of advanced glycation end product formation by *Cuminum cyminum* in streptozotocin induced diabetic rats. Food and Chemical Toxicology, **48**(8-9):2030-2036.
- Kesri A.N., Gupta R.K. and Watal G., 2005. Hypoglycemic effects of *Murraya koenigii* on normal and alloxan-diabetic rabbits. Journal of Ethnopharmacology, **97**(2):247-251.
- Kirkham S., Akilen R., Sharma S. and Tsiami A., 2009. The potential of cinnamon to reduce blood glucose levels in patients with type 2 diabetes and insulin resistance. Diabetes, Obesity and Metabolism, **11**(12):1100-1113.
- Kuroda M., Mimaki Y., Ohtomo T., Yamada J., Nishiyama T., Mae T., Kishida H. and Kawada T., 2012. Hypoglycemic effects of clove (*Syzygium aromaticum* flower buds) on genetically diabetic KK-A^y mice and identification of the active ingredients. Journal of Natural Medicine, **66**(2):394-399.
- Monalisa M.N. and Rahmtullah M., 2015. Antihyperglycemic, Analgesic activity and acute

- toxicity studies with methanol extract of *Foeniculum vulgare* seeds. World Journal of Pharmacy and Pharmaceutical Science, **4**(9):198-206.
- Rchid H., Chevassus H., Nmila R., Guiral C., Petit P., Chokairi M. and Sauvair Y., 2004. *Nigella sativa* seed extracts enhance glucose-induced insulin release from rat-isolated Langerhans islets. Fundamental and clinical Pharmacology, **18**(5):525-529.
- Sharma R.D. and Raghuram T.C., 1990. Hypoglycaemic effect of fenugreek seeds in non-insulin dependent diabetic subjects. Nutrition Research, **10**(7):731-739.
- Somani R.S. and Singhai A.K., 2008. Hypoglycaemic and Antidiabetic Activities of Seeds of *Myristica fragrans* in Normoglycaemic and Alloxan-induced Diabetic Rats. Asian J. Exp. Sci. **22**(1):95-102.
- Subash P., Prabhuseenivasan S. and Ignacimuthu S., 2007. Cinnamaldehyde—A potential antidiabetic agent. Phytomedicine, **14**(1):15-22.
- Sukandar E.Y., Permana H., Adnyana I.K., Sigit J.I., Ilyas R.A., Hasimun P. and Mardiyah D., 2010. Clinical study of turmeric (*Curcuma longa* L.) and garlic (*Allium sativum* L.) extracts as antihyperglycemic and antihyperlipidemic agent in type-2 diabetes-dyslipidemia patients. International Journal of Pharmacology, **6**(4):456-463.
- Suresh Kumar G., Shetty A.K., Sambaiah K. and Salimath P.V., 2005. Antidiabetic property of fenugreek seed mucilage and spent turmeric in streptozotocin-induced diabetic rats. Nutrition Research, **25**(11):1021-1028.
- Waheed A., Miana G.A., Ahmed S.I. and Khan M.A., 2006. Clinical Investigation of Hypoglycemic Effect of *Coriandrum Sativum* In Type-2 (Niddm) Diabetic Patients. Pakistan Journal of Pharmacology, **23**(1):7-11.
- Yadav S., Vats V., Dhunnoo Y. and Grover J.K., 2002. Hypoglycemic and antihyperglycemic activity of *Murraya koenigii* leaves in diabetic rats. Journal of Ethnopharmacology, **82**(2-3):111-116.