

## Indigenous knowledge in agriculture with particular reference to Black cumin (*Nigella sativa*) production in Iran

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The term indigenous knowledge, traditional knowledge and ethno science have been used interchangeably to describe the knowledge system of an ethnic rural group that has originated locally and naturally. Indigenous knowledge is an essential cultural and technological element of human societies. It is unique to a particular culture and acts as the basis for local decision making in agriculture, health, natural resource management and other activities. It is embedded in community practices, institutions, relationships and rituals. Indigenous people view the world they live in as an integrated whole. Their beliefs, knowledge, arts and other forms of cultural expression have been handed down through the generations. Food production in these societies is focused more on long term sustainability rather than on short term yield increase and hence, enhanced biodiversity. This helps to reduce ecological and economic risks, promotes diet diversity and allows proper temporal and spatial distribution and utilization of resources. An attempt was made to review the indigenous knowledge associated with agriculture with an emphasis on black cumin production in Iran. First, technological, socio – economic and cultural aspects were considered in a context of a production system and then a case study was performed in some areas with a long history in black cumin production. Based on the analysis of the data obtained and comparison made with the conventional scientific finding, production practices were identified and recognized.

**Key words:** *Nigella sativa*, Culture, indigenous knowledge, ethno science, Iran

Recent years have seen the emergence of environmental considerations as a crucial factor in agricultural technology design, development and performance. In the context of sustainable agriculture, indigenous knowledge which deals with the farmers adaptive strategies to the natural, physical and socio-economic environments of an agro ecosystem, has gained prominence (Bonny and Voliebenstein 2001). It is estimated that there are 190 million indigenous people in Asia, some 70 million live in India and 30 million in South-East Asia (Bengwayan, 2003). Indigenous people view the world they live in as an integrated whole. Their beliefs, knowledge, arts and other forms of cultural expression have been handed down through the generations. This type of knowledge is unique to a particular culture and society. It is the basis for local decision making in

agriculture, health, natural resource management and other activities. It is embedded in community practices, institutions, relationships and rituals and is essentially a tacit knowledge that is not easily codifiable. Indigenous knowledge provides the basis for problem- solving strategies for local communities, especially the poor and is an underutilized resource in the development process (World Bank, 1998). These practices are virtually always more "low- tech", using relatively plentiful and cheap labor more intensively than relatively scarce and expensive capital and are based on low input and inexpensive approaches (Altieri, 1955; 2003).

Indigenous knowledge is adapted to the natural, social and cultural environments and also to the immediate needs for the local communities, hence, their strong ecological

and participatory nature.

### **Traditional Agriculture and Indigenous Knowledge**

About 60 percent of the world's cultivated land is still farmed by traditional and subsistence methods and this type of agriculture has benefited from centuries of cultural and biological evolution that has adapted to its local condition (Gliessman, 1998). Basically production in traditional agriculture is based on sustainability in long terms rather than maximizing the yield in short terms (Koocheki, 1994; Koocheki, 1996). Maintaining sustainability of production on marginal and low input lands and increasing the biodiversity in order to reduce the economic risk and facilitate a better distribution of labor temporarily and spatially, are the foundation of traditional agriculture. Most of traditional agro ecosystems have evolved in the center of diversity of agriculture crops and therefore they are rich not only in terms of local races and genotypes but also in farming practices, cultures of food production and food consumption habits and order social, technical and cultural identities (Koocheki, 1996).

### **Traditional Systems of Black cumin Production in Iran**

Agriculture has a long history in Iran and it has been evidenced (Koocheki, 1996) that farming first evolved simultaneously with domestication of goat and sheep in western part of Iran about 10000 years ago. Farmers managed their traditional agro ecosystems for centuries based on sustainability of yield with reliance on locally available resources. Black cumin production as a system has a long history in Iranian agriculture and it has evolved a unique technical and socio-cultural entity in black cumin growing communities and particularly in Fars, Khorasan, Qazvin provinces which are the main black cumin growing area of the country. Therefore, black cumin production system in Iran can be viewed from the following prospect:

#### **1. Technology.**

Water scarcity in arid area of Iran is the main constraints for crop production. To overcome this problem farmers have developed two unique methods of underground water extraction called Qanat (in local language) and wells. These traditional

methods of water provision were adjusted to harsh and hostile environmental conditions (Koocheki, 1996). Although black cumin is a low water demanding plant (These are generally short-lived annuals, typical of disturbed soils or natural communities of semi-arid areas, with a dominance of therophytes), primary irrigations and particularly the early and latest ones are very crucial to timeliness of flower emergence and therefore, availability of water along the growing season is very important. Nutrient requirements of black cumin were provided by animal manure and this is still a normal practice, despite an easy access to chemical fertilizers, thus production of black cumin could be regarded as "organic" (Koocheki, 1994).

#### **2. Socio- Economic and Cultural**

Labor requirements for production practices and processing were provided by the families, hired persons or in some cases sharecropping. The latter feature of traditional agriculture was based on strong socio-economic incentives. Culturally, black cumin has been a constant ingredient of many Iranian cuisines and inclusion of black cumin in confectionery (cookie), pickles and some foods has been regarded prestigious (Filippo et al. 2002). Nigella is used to flavour meat and vegetables dishes, pickles, is a minor ingredient in curries, fruit pies and other confections and in sauces, vinegar and alcoholic beverages. Crushed seed is commonly mixed with dough or sprinkled on bread before baking, which produce dark grey to almost black loaves (Filippo et al. 2002).

#### **Cultivation and Harvesting of Black cumin**

The cultivations required for umbelliferous crops are suitable for nigella. Nigella is propagated by seed, or can be sown in seedbeds and transplanted, but as this is difficult and mortality high, seed should be sown it is to grow. A seed rate of 20- 30 kg ha<sup>-1</sup> in 25- 40 cm rows and spacing of about 15 cm between plants is common. Nigella is not usually irrigated, as a crop is commercially unprofitable if it can not be grown on available rainfall. Time of application and amount of water can affect the rate of plant growth, maturity, and essential oil yield and constituents. Nigella is sometime intercropped with barley and wheat in Iran. Plants are cut either by hand or reaper/ binder when the majority of pods are mature, turning yellow but

not fully ripe, as pod shatter easily. Yield of nigella is normally low, often only a few hundred kilogrammes ha<sup>-1</sup>, and reflects the generally poor standards of husbandry, subsistence cropping systems, scattered farming, use of unimproved varieties and lack of integration. It has been demonstrated that Good Agro- technological Practices (GAP) can produce high yield and desirable quality of nigella (Filippo et al. 2002; Henle, 1996; Paroda, 1993).

## CONCLUSION

To conclude, traditional knowledge of farmers are important in nigella production and processing and there are divers type of practices, which could be recognized, documented and if necessary modified to new technologies. However, it must be born in mind that traditional knowledge like any other phenomenon is in a constant state of change and as each generation matures, skills perceived as immediately useful are gained while others with lesser perception of immediate value my be lost. Thus the body of traditional knowledge is never static but rather dynamic in its shape and substance. Finally, although indigenous knowledge has originated quite independently of (and not in competition with) science, and generally also quite indepent of western culture, these two should be seen as two systems of knowledge that can supplement, rather than compete, with each other (World Bank, 1998).

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