

## Extraction of apricot kernel oil in cold desert Ladakh, India

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Apricot (*Prunus armeniaca* L., Rosaceae) is the most important fruit crop of cold desert of Ladakh. Oil extracted from the sweet kernel is used for edible purpose while that of bitter kernel has religious, cosmetic and medicinal values. The oil is popular as body oil or massage oil, is known to relieve backache and joints ache. With the advancement of technology the cumbersome traditional method of oil extraction is slowly declining. However, the oil extracted by the traditional method is still being preferred due to its distinct smell. This paper describes the ancient traditional method of apricot kernel oil extraction still being practiced in some parts of Ladakh.

**Keywords:** Apricot, Ladakh, medicinal, *Prunus armeniaca* L., Oil

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Apricot (*Prunus armeniaca* L., Rosaceae) is the most important fruit crop of cold desert of Ladakh. It covers 54% (707 ha) of total area under fruit crop in Leh district with the approximate annual yield of 2,956 MT/yr fresh fruit. Due to highly perishable nature, nearly 85% of the fruit is dried to extend its availability throughout the year<sup>1</sup>. The fruit crop is a major source of livelihood and is deeply associated with the tradition and culture of the region<sup>2</sup>. Apricot, locally known as *Chuli*, is broadly classified in Ladakh region into two categories based on taste of the kernel. Fruits with bitter kernel are called *Khante* meaning bitter, while those with sweet kernel are called *Nyarmo* meaning sweet. Sweet kernel is mainly consumed without processing as an important source of dietary protein, oil and fibre. Analysis of bitter apricot kernel of Ladakh region showed that the kernel is a rich source of oil (up to 54.21%), protein (17.75-22.56%), carbohydrate (21.16-35.26%), crude fibre (0.84-4.71%) and dietary fibre (6.03-22.24%)<sup>3</sup>. Apricot kernel oil is a rich source (94.4%) of unsaturated fatty acids rich in oleic acid (66.2%) and linoleic acid (28.2%)<sup>4</sup>. Oil extracted from the sweet kernel is used for edible purpose either in pure form or mixed with walnut oil. A spoonful of oil is mixed with finely ground roasted barley flour, salted tea and sugar to prepare a local dish called *Phemar*, which is served to guests and during festive occasion like

marriage ceremony. The bitter kernel is used for extraction of oil which has religious, cosmetic and medicinal values. Even today, the oil is used as hair oil and is known to relieve backache and joints ache. The oil is popular as body oil and massage oil and is known for its ability to penetrate the skin without leaving an oily feel. Applying warm apricot oil mixed with a pinch of common salt on chest is known to give relief to patients with acidity.

Due to its medicinal value, there is an unprecedented demand for the oil in recent years. Apart from its use by the locals, the large number of army deployed in the region and the increasing number of tourists visiting the region takes apricot oil as a valuable gift of Ladakh to their ailing members. To cater to the ever increasing demand for the oil extracted by the tedious traditional method, a majority of the people has now adopted the less cumbersome modern mechanical extraction method. This has resulted in the decline in the ancient method of oil extraction. However, the oil extracted by the traditional method is still being preferred by the locals as well as those visiting from outside the region. It possesses a distinct smell which is absent in the one extracted by modern method. Consumers are increasingly aware of this property and therefore demanding oil extracted by traditional method which is expected to be safe and health promoting. Due to this reason, oil extracted by traditional method fetch 50-100% higher price in the local market than the one

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extracted by modern method. Due to superiority of the oil quality and the declining use of the time tested ancient method, the traditional method of apricot kernel oil extraction as practiced in Ladakh is documented.

### Methodology

Ladakh region is situated in trans-Himalaya and comprises of Leh and Kargil district. Leh district is situated between 32°N to 36°N latitude and 75°E to 80°E longitude at an altitude ranging from 2,900 m to 5,900 m amsl. Area measuring 45,110 km<sup>2</sup> having 116 villages is divided into 6 blocks. The study has been conducted in fruit growing area of Khaltsi block located in the North-west of the district<sup>1</sup>. Elderly and experienced villagers in Khalsi block of Leh district were selected on account of their rich experience in fruit growing and processing. Rapport building process has been established by communicating with the villagers in local dialect and staying in the village for several days. Data pertaining to the study were collected by combination of discussion with the villagers and on-spot observation of the method practiced by the villagers.

### Results and discussion

A step wise method (Flow chart) of traditional method of apricot kernel oil extraction from collection of fresh fruit to packaging of oil is as follows:

#### (a) Fruit collection and separation of seed

Apricot fruit ripe on the trees and in most cases the branches are shaken with a long stick for the fruit to fall on the ground. Fruits are collected from the ground and the fleshy part is separated by pressing with hand for drying purpose. The separated seeds are collected separately.

#### (b) Softening of seed shell

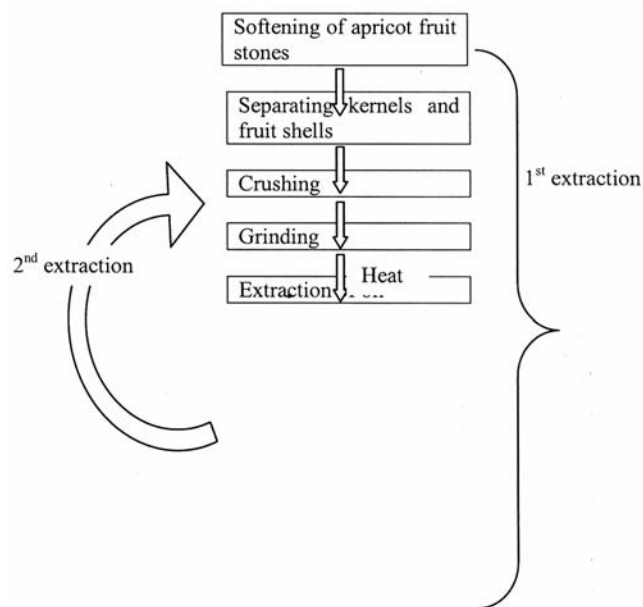
The hard seed is softened by immersing in water for 10-20 minutes to ease breaking the hard shell. The broken shell is used as firewood during the subsequent oil extraction process.

#### (c) Separation of kernel

A handful of the hard shell seed is placed on a flat stone and the shell is broken with a stone which fits into the palm. The kernel is separated from the broken shell (Fig. 1).

#### (d) Crushing of kernel

The kernel is crushed to powdered form using community pestle and mortar. Depending on the number of household in each village, the number



Flow chart of extraction process of oil

of pestle and mortar locally known as *rThun* varies from 1-5. On an average 35 households share a single *rThun*. The mortar is made of hard stone of approximately 30 cm diameter and 30 cm depth while the hammer shape pestle is of walnut or apricot wood with a long handle (Fig. 2). The use of the *rThun* is generally based on first come first use basis. To mark that the community facility is occupied for its use by a household, a handful of apricot kernel is placed in the mortar and covered with a large stone. After use of the *rThun*, it is cleaned and the large stone is placed on the mortar to keep it free from dust.

#### (e) Grinding of kernel

The crushed apricot kernel is further grind to fine powdered on a flat or slightly curved hard stone of approximately 60 cm long and 30 cm width locally know as *Tal-tsig* (Fig. 3). A palm fit stone is used to grind the crushed apricot kernel into a paste form.

#### (f) Extraction of oil

A slightly curved stone locally known as *Ton-tsig* having a cup shape groove at one end is heated on fire (Fig. 4). The temperature of *Ton-tsig* is maintained to an extent that the bare hand can be touched without burning sensation. The temperature is regulated either by slowing the fire or by adjusting the height of the *Ton-tsig* from the fire by using stones. The ground paste is doughed thoroughly with bare hand on the heated stone.



Fig. 1–Separation of kernel from broken shell; Fig. 2–Crushing of kernel in the mortar with hammer; Fig. 3–Grinding of kernel; Fig. 4–Extraction of oil.

During the process, a handful of water is sprinkled on the dough which enables easy extraction of oil. It is popularly believed that the art of sprinkling water for oil extraction was observed by chance by a newly wed bride who was weeping while extracting apricot kernel oil. The drop of tears in the dough was found to ease oil extraction and since then this art is inherited. The extracted oil gets collected in the cup shaped groove at the opposite end of the *Ton-tsig* which is transferred to a vessel with a spoon.

Oil extraction is done twice by crushing the dried dough in pestle and mortar and the whole process is repeated. On an average 1 kg of apricot kernel yield 350 ml of oil. Apricot oilseed cake obtained as the by-product is used for various purposes. The oilcake obtained from sweet kernel is used as eatable as such while that of bitter kernel is mixed and boiled with local dishes like *Thukpa* and *Chan*. The oilseed cake is also fed to the animals and also used for preparing a bowl shaped support for weaving wool locally called *Pakor*. It is considered that the oilseed cake obtained from the bitter kernel by the modern mechanical method is toxic to the animals and not used as animal feed.

### Conclusion

Traditional method of apricot oil extraction produced superior quality oil with a distinct smell. It is preferred by the consumers as compared to the one extracted by the modern mechanical method. There is an efficient utilization of the by-products such as the hard shell and the oilseed cake in the traditional method while the same is not applicable in the modern extraction method. There is a need to preserve this art and pass on to the younger generation.

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### References

- 1 Anonymous, *Statistical Hand Book for the Year 2005-06*, (District Statistical & Evaluation Agency, Ladakh Autonomous Hill Development Council, Leh, Government of Jammu & Kashmir, India), 2006.
- 2 Dwivedi S K, Singh R & Ahmed Z, *Apricot in Ladakh*, [Field Research Laboratory (DRDO) Leh Ladakh, India], 2007.
- 3 Dwivedi D H & Ram R B, Chemical composition of bitter apricot kernels from Ladakh, India, *Acta Hort (ISHS)*, 765 (2008) 335-338.
- 4 Gandhi V M, Mulky M J, Mukerji B, Iyer V J & Cherian KM, Safety evaluation of wild apricot oil, *Food Chem Toxicol*, 35 (1997) 583-587.