PRACTICAL ACTION
Technology challenging poverty

GUNDRUK

PICKLED LEAFY VEGETABLE

Gundruk is particularly popular in Nepal. The annual production of *gundruk* in Nepal is estimated at 2,000 tons and most of the production is carried out at the household level. *Gundruk* is obtained by fermenting and drying leafy vegetables (saag) to produce a sour brownish black product.

It is served as a side dish with the main meal and is also used as an appetiser and can be made into a soup.

Gundruk is an important source of minerals particularly during the off-season in rural areas when the diet consists of mostly starchy tubers and maize which tend to be low in minerals.

Figure 1: Preparing leafy vegetables. Photo: Practical Action Nepal.

Raw material preparation

In the months of October and November, during the harvest of the first broad mustard, radish, spinach and cauliflower leaves, large quantities of leaves accumulate - much more than can be consumed fresh.

Processing

These leaves are allowed to wilt for one or two days and then shredded with a knife or sickle.

The shredded leaves are tightly packed in an earthenware pot and warm water (at about 30°C) is added to cover all the leaves. The pot is then kept in a warm place. After five to seven days, a mild acidic taste indicates the end of fermentation and the *gundruk* is removed and dried, traditionally by the sun.

This process is similar to sauerkraut production except that no salt is added to the shredded leaves before the start of *gundruk* fermentation. The ambient temperature at the time of fermentation should be about 18°C.

Figure 2: The leaves are packed into earthenware pots. Photo: Practical Action Nepal.

Pediococcus and *Lactobacillus* species are the predominant micro-organisms during *gundruk* fermentation. During fermentation, the pH drops slowly to a final value of 4.0 and the amount of

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acid (as lactic) increases to about 1% on the sixth day. It has been found that a disadvantage with the traditional process of *gundruk* fermentation is the loss of 90% of the carotenoids, which help to produce vitamin A, probably during sun-drying. Improved methods of drying might reduce the vitamin loss. The *Sasto* solar dryer has been developed in Nepal for use in rural areas.

Once processed the dried gundruk can be kept in airtight containers for several months.

How to make gundruk flow diagram

Leafy vegetables	
⇓	
Wilt	One to two days
⇓	
Shred	
⇓	
Placed in earthen pot	The leaves need to tightly packed
⇓	
Cover the leaves	Cover the leaves with warm water and straw
⇓	
Ferment	The pot is kept warm in the sun and by a fire by night.
⇓	
Add warm water	To keep the pot warm
⇓	
Dried	Product dried on mats in the sun

References and further reading

- *Chiuri (The Butter Tree of Nepal)* Practical Action Technical Brief
- *Kawal: Fermented Green Leaves*, Practical Action Technical Brief
- *Traditional Foods: Processing for Profit* by P. Fellows, IT Publications, 1997
- *Fermented Fruit and Vegetables: A Global Perspective* by M. Battcock & S. Azam Ali FAO, 1998, http://www.fao.org/docrep/x0560E/x0560E00.htm

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