



# 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.



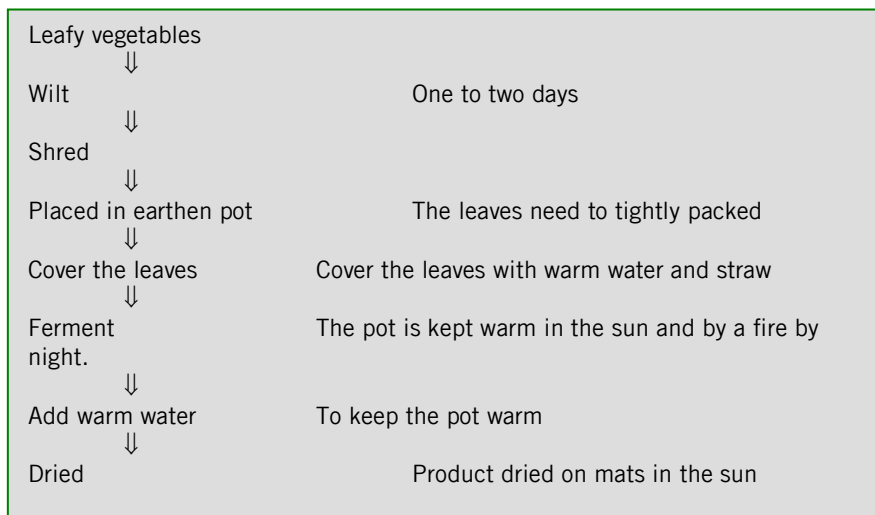
Figure 2: The leaves are packed into earthenware pots. Photo: Practical Action Nepal.

*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

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



### 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, Practical Action Publishing, 1997
- [Fermented Fruit and Vegetables: A Global Perspective](#) by M. Battcock & S. Azam Ali FAO, 1998
- [Pickles](#) a selection of Practical Action Technical Briefs

Practical Action Nepal  
 Pandol Marga, Lazimpat  
 P O Box 15135, Kathmandu  
 Nepal  
 Tel: + 977 1 444 6015 / + 977 1 209 4063  
 Fax: + 977 1 444 5995  
 E-mail: [info@practicalaction.org.np](mailto:info@practicalaction.org.np)  
 Website: [www.practicalaction.org/nepal](http://www.practicalaction.org/nepal)

Practical Action  
 The Schumacher Centre  
 Bourton-on-Dunsmore  
 Rugby, Warwickshire, CV23 9QZ  
 United Kingdom  
 Tel: +44 (0)1926 634400  
 Fax: +44 (0)1926 634401  
 E-mail: [inforsew@practicalaction.org.uk](mailto:inforsew@practicalaction.org.uk)  
 Website: <http://practicalaction.org/practicalanswers/>

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