



DEPARTMENT OF AGRICULTURE

Regional Field Office No. 02

Tuguegarao City, Cagayan

WHITE POTATO

PRODUCTION GUIDE



INTRODUCTION

White potato (*Solanum tuberosum* L.) ranks fourth among the world's major food crops and is the staple food of almost half of the world's population. Apparently potato by-products is gaining much importance due to their high nutritive value and variety of uses.

Potato production in 2006 was 69,461 tons (t) from 5,451 hectares (ha), with Benguet accounting for more than 60% of the total production. The other major producers are davao del Sur, Mt. Province, and Bukidnon. As production falls short of demand, especially in the processing types, the country imported US \$36.4 million worth of potato products in 2006 (Bureau of Agricultural Statistics (BAS), 2006).

USES AND NUTRITIONAL VALUE

Table potato is an ingredient in many dishes and salads. Processing types are made into chips, fries, and flour. It is basically fat free, cholesterol free, and low in calories. It is also a great antioxidant. Most of the vitamins in potatoes are located just below its skin.

Per 100 grams (g) of edible portion, white potato contains:

Properties	Amount
Water (g)	79.9
Energy (kcal)	78.0
Protein (g)	2.4
Carbohydrates (g)	16.8
Calcium (mg)	36.0
Phosphorus (mg)	49.0
Iron (mg)	1.1
Thiamine (mg)	0.12



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This Publication is a project of the **Department of Agriculture, Regional Field Office No. 02, High Value Crops Development Program**. It contains the most recently available and locally adaptable technical information on **White Potato** in Region 02.

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Riboflavin (mg)	0.06
Niacin (mg)	2.2
Ascorbic acid (mg)	31.0

Source; *The Philippine Food Composition Tables, 1997. Food and Nutrition Research Institute-Department of Science and Technology (FNRI-DOST).*

PRODUCTION MANAGEMENT

Varieties

The most commonly grown varieties of table potatoes are Conchita, frenze, and asterix. The best processing varieties are Atlantic, Diamant, Fina, Igorota (BSU P04), Kennebec, Montanosa, and Raja.

Planting Materials

Potato is usually cultivated by planting tubers. Purity of the cultivars and healthy seed tubers are the primary requirements for a successful crop. However, seed tuber is the costliest input in potato cultivation. The tuber seed should be disease free, well sprouted, 30-40 g each in weight, and at the right physiological age (2-3 months from harvest). Seed requirement per hectare is 1,200-2,000 kg.

To overcome the problems on costs and diseases in seed tubers, True Potato Seed (TPS) can also be used as planting material. TPS is a botanical seed developed as a result of fertilization. Most of the diseases transmissible through seed tubers are not passed through TPS. In addition, only about 200 g/ha of TPS is needed, thereby saving cost of transporting bulky plant materials and huge quantities of food material for table purposes. The TPS seedlings are grown to maturity in nursery beds to obtain seedling tubers. These seedling tubers are used as seedpieces from growing a normal potato crop the following season.

Soil and Climate Requirements

White potato can be grown in almost any type of soil except saline and alkaline soils. The most preferred are loose soils, which offer least resistance to the enlargement of the tubers. Loamy and sandy loam soils high in organic matter with good drainage and aeration are most suitable for cultivation. The soil pH ranges from 5.2-6.4 is ideal. Although a temperate crop, potato can also be grown in a wide range of climatic conditions depending on the variety. It grows best in moderately cool temperatures during the growing season. The vegetative growth of the plant is best at temperatures of 20°-24°C white tuber development is favored at 20°C.

In areas such as Benguet and Bukidnon, March-April and October-November are the best planting time. In the lowlands, the best time to plant is from November to mid-December.

Land Preparation

Prepare the land thoroughly by plowing and harrowing twice to obtain a friable soil suitable for tuber development. In acidic soils, apply lime 30 days before planting.

Planting

Planting can be done using the single-row and the double-row method.

Single-row is suitable for flat areas. It is practiced in Davao del Sur and Bukidnon. Using a carabao-drawn plow, set furrows 75 cm apart and holes 30 cm apart along the furrow.

The double-row method is appropriate for sloping areas. It is practiced in Benguet. Prepare manually 1-m wide raised beds 50 cm apart. Establish 2 rows within the bed spaced 30 cm apart. The distance between holes and along the furrow is 30 cm.

For both planting methods, the total plant population per hectare is 44,444. Apply fertilizer in holes, add chicken manure, and cover with a thin layer of soil. Place the tuber over the thin layer of soil and cover with 5 cm thick soil.

Fertilization

The general fertilizer recommendation for potato production is 120 kg/ha N, 240 kg/ha P₂O₅ (Phosphorus Pentoxide), and 240 kg/ha K₂O (Potassium Oxide). However, proper fertilization should be based on soil analysis. Apply chicken manure during the land preparation at a rate of 5 t/ha to contribute 60-100 kg NPK and micronutrients. Also apply 14-14-14 at 3-5 bags/ha as basal fertilizer. Apply the remaining N and K requirements during hilling up. Excess nitrogen delays maturity, promotes skinning, and blackspot bruising. In areas where bacterial wilt is a problem, early hilling up is necessary to prevent root injury.

Irrigation

Irrigation is very important as potatoes have a shallow and sparse root system. Initial light irrigation is appropriate at 5-7 days after planting. Subsequent irrigation is given at 7-15 days interval depending upon the climatic condition and soil type.

Weeding and Hilling Up

The potato crop develops a canopy in about 4 weeks after planting. Weeds must be controlled by this time to gain competitive advantage for the crop. Perform weeding, hilling up, and sidedressing simultaneously 1 month after planting. Subsequent weeding can be done sparingly depending on weed population.

Pest and Disease Management

The major pests of potatoes include cutworms, thrips, aphids, mites, leafminers, and potato tuber moth. Encourage the presence of natural enemies such as braconids and predaceous ground beetles.

Cutworms – Spray biological insecticides such as *Bacillus thuringiensis* and Nuclear Polyhedrosis Virus (NPV). Collect NPV-infected cutworm larvae and store in the freezer for later use. These can be macerated then diluted at 12 infected larvae/6 L water. Fully grown larvae due to NPV infection hand with their head down, holding on with the abdominal pro-legs. Pheromones are also effective. If

needed spray with insecticides such as fipronil, fenvalerate, MIPC, and permethrin following the recommended rates.

Thrips – Spray with soap solution (4 tbsp soap/16 L water). If needed, spray with oxamyl, cepermethrin, or fipronil following the recommended rates.

Aphids – Spray with hot pepper (100 g macerated hot pepper per 16 L water) and soap solution. If needed spray with cypermethrin, fenvalerate, deltamethrin, or other recommended chemicals following product labels.

Mites – Spray with soap solution. Use appropriate miticides such as methiocarb following the recommended rates.

Leaf miner – Intercrop with beans, onions, or other vegetables and maintain low weed population along alleys. If needed, spray with cyromazine, cartap hydrochloride following the recommended rates. Alternate different products of recommended pesticides to prevent development of pesticide resistance.

Tuber moth – Hill up adequately to cover the tubers. For seed pieces, dust with fine wood ash or carbaryl.

Diseases

Late blight – Use mancozeb, chlorothalonil, and metalaxyl, following the recommended rates, in rotation. Compost tea showed good activity against late blight when enriched with selected microbial antagonists. To prepare compost tea, soak ½ sack (15 kg) of mature compost in a ¾ drum (200-L capacity) of water for 5-7 days. Dilute the tea to 20 parts water and spray on the plants. Avoid too much nitrogen fertilization.

Bacterial wilt – Use clean planting materials. Plant potato in well-drained soils. Practice crop rotation.

Viruses – Rogue infected plants. Control aphids which are insect vectors of viruses.

Harvesting

Harvest at full maturity for longer storability. Most potatoes mature at 75-90 days after planting or when 80% of the leaves of the

total plant population become yellow. Dehaulm or vine-kill to reduce skinning and bruising during harvest, and shrinkage during storage. Cut the foliage (dehaulm) at 5-10 cm from the ground level 5-7 days before harvest to harden the skin of tubers. Harvesting is done by manual digging of the tubers using a spading fork or any pointed instruments. Do not expose tubers in sunlight to prevent greening.

Grading

Classify potato according to size based on diameter and weight as follows:

Size	Diameter (cm)	Weight (g)
Large	7.5 and above	301 and above
Medium	4.0-7.4	181-300
Small	3.0-3.9	90-180

Source: Philippine National Standards (PNS) for White Potato. Department of Agriculture-Bureau of Agriculture and Fisheries Product Standards (DA-BAFPS), 2007.

COST AND RETURN ANALYSIS PER HECTARE

Items	Amount (P)
VARIABLE COSTS	
Labor (250/man-day[MD])	2,500
Clearing (20 MD)	5,000
Bed preparation (20 MD)	5,000
Manure application (10 MD)	2,500
Seed preparation (2 MD)	500
Planting (6 MD)	1,500
Sidedressing (2X) (4 MD)	1,000
Weeding/hilling up (12 MD)	3,000
Irrigation (10 MD)	2,500
Spraying (10x) 20 MD)	5,000

Vine killing (2 MD)	500
Harvesting/hauling (20 MD)	5,000
Cleaning/sorting (20 MD)	5,000
Miscellaneous (e.g. hauling, Repairs, etc.)	2,500
Subtotal	41,500

Materials

Items	Amount (P)
Seeds (1,500 kg)	20,000
Organic Fertilizer (100 bags)	20,000
Fertilizer	
14-14-14 (3 bags)	3,900
0-0-60 (4 bags)	10,000
Fungicides (4 packs)	1,400
Insecticides (2 bottles)	1,700
Fuel and oil	5,000
Packaging materials	3,500
Miscellaneous (e.g. pail, Gloves, etc.)	2,500
Subtotal	P 68,000
Grand Total	P 109,500

Gross Income

Regular Season (at P20/kg with 20t/ha yield)- P 400,000.00
 Offseason (at P30/kg with 13t/ha yield) - - - - P 390,000.00

Net Income

Regular season - - - P 400,000.00 - P109,500.00 = P 290,500.00
 Offseason - - - - - P 390,000.00 - P109,500.00 = P 280,500.00

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