The Complete Book on Onion & Garlic Cultivation with Processing (Production of Onion Paste, Flakes, Powder & Garlic Paste, Powder, Flakes, Oil)
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The Complete Book on Onion & Garlic Cultivation with Processing (Production of Onion Paste, Flakes, Powder & Garlic Paste, Powder, Flakes, Oil)

"Onion and garlic are the spice commodities used for flavouring the dishes. These are considered as valuable medicinal plants offer variety of medicinal properties. Onion & garlic are important commercial crops with versatile applications. The demand for the processed products is increasing day by day due to its convenience to handle and use. Onion & garlic can be processed into a wide variety of products. As per the estimate, approximately 6.75% of the onion produced is being processed. Besides fulfilling the constant demand of domestic population, India exports 13 to 18 lakh tons of onion annually worth around Rs. 2200 crores of foreign exchange revenue. Similarly in case of garlic, the production increased from 4.03 lakh tons to 12.26 lakh tons.

Proper placement of onion & garlic products (like; onion pickle, onion chutney, onion paste, garlic oil, garlic paste, garlic powder, garlic flakes, onion flakes, onion powder) in the departmental stores, super markets, shopping malls backed-up by publicity is the key to success. It is also possible to have tie-up with exclusive restaurants, star hotels, renowned caterers for their regular requirements.

This handbook is designed for use by everyone engaged in the onion & garlic products manufacturing. The book explains manufacturing process with flow diagrams of various onion & garlic products and addresses of plant & machinery suppliers with their photographs.

Major contents of the book are varieties of onion, onion production, onion dehydration, types of garlic, garlic growing, garlic dehydration, onion pickle, onion chutney, onion paste, garlic oil, garlic paste, garlic powder, garlic flakes, onion flakes, onion powder, pest species and pest control of garlic and onion, integrated weed management, packaging, product advertising and sales promotion, marketing etc.

It will be a standard reference book for professionals, entrepreneurs, food technologists, those studying and researching in this important area and others interested in the field of onion & garlic products manufacturing.

"
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The onion (*Allium cepa*), also known as the bulb onion or common onion, is used as a vegetable and is the most widely cultivated species of the genus *Allium*. This genus also contains several other species variously referred to as onions and cultivated for food, such as the Japanese bunching onion, the Egyptian onion, and the Canada onion. The name “wild onion” is applied to a number of *Allium* species but *A. cepa* is exclusively known from cultivation and its ancestral wild original form is not known, although escapes from cultivation have become established in some regions. The onion is most frequently a biennial or a perennial plant, but is usually treated as an annual and harvested in its first growing season.

**Nutrition per Serving of Onions**

Onions are a source of vitamin C, potassium, dietary fiber and folic acid. They also contain calcium, iron and have a high protein quality. Onions are low in sodium and contain no fat.

Onions are low in calories (50 kcal/100 g) yet add abundant flavor to a wide variety of foods. Onion is known for its nutritional value and for the utility as herbal medicine in our country. It has moderate amounts of protein, fat, fibre and good amounts of calcium, phosphorous and potassium, vitamin C and B. Apart from onion as such even the stalk is edible. The stalk contains good amount of carotene and iron. Onion has both glucose (reducing sugar) and sucrose (non-reducing sugar). The pungent taste of onion is due to volatile oil Allyl-propyl-disulphide present in it. The proximate composition and energy values of raw and dehydrated onion are shown in Table.

Onions contain significant amount of a flavonoid called quercetin. Although quercetin is available in tea and apples, earlier research proved that absorption of quercetin from onions is twice that from tea and more than three times that from apples. Onions are stimulant and mild counter irritant. Crushed raw onion can be applied on the forehead to get relief from headaches. Red small onions can be used as an expectorant. Eating raw onions help to reduce cholesterol levels because they increase levels of high-density lipoproteins. It is advisable to include raw onions in the salads daily. It helps in controlling coronary heart disease, thrombosis, and blood pressure. This use of onion is controversial. There are conflicting reports about this property.

**Varieties of Onion**

**Yellow Onions or Brown Onions**

These popular, all-purpose onions comprise 87% of the U.S. onion crop. The best type of onion for caramelizing, cooking brings out this variety’s nutty, mellow, often sweet, quality. Also referred to as Brown Onions, these are probably equally as common as the white varietal. They function in almost exactly the same way, with one exception: Many cooks contend that yellow onions are best for caramelizing, and as such are called for in many classical French recipes. (However, this may very well be due to the fact that they were simply the most abundant when France was establishing itself as a culinary heavyweight.)

**Red Onion**

Typically the next most common onion at the market, Red Onions actually contain less sugar than their yellow & white brothers. Because of this, they are a no-no for caramelizing; not to say you can’t caramelize them, but the result will not be as sweet as with the yellow or white. Red onions, however, stand up surprisingly well when grilled, especially when sliced into thick rings. Simply brush with oil, sprinkle with salt and pepper, and let them go about 3-5 minutes on each side. They’re a great addition to summer salads!

**White Onion**

Although they comprise only 5% of U.S. onion harvest, white onions are an all-purpose onion. They are commonly used in white sauces, pasta salad, potato salad, and in Mexican and Southwestern cuisine. But they’re an all-purpose onion, and they work in any recipe that calls for onions. They are a best bet when sweating onions or sauteing them for a sauce or stew. If a recipe does not specify what kind of onions to use, you’re always safe going with white. However, as a spring/summer onion, white onions do not have as
long a shelf life as other varieties.

Sweet Onions
Maui, Vidalia and Walla Walla onions are sweet onion varieties named after the areas in which they’re grown. While previously available only during spring and summer, they are now more widely available.

Phases of Growth
Onions are cool season plants. They have 3 distinct phases of growth and the switch from one to the next is triggered by environmental factors. It does not work to plant onions at a random date in the year without taking account of these environmental factors. Success depends on understanding what this crop needs. The main text of this information sheet is written by a Piedmont grower, with variations for Appalachian and Tidewater regions included in the tables and sidebars.

Vegetative Phase
To grow large onions it is important to produce large healthy roots and leaves before the vegetative stage gives way to the bulbing stage. Each onion leaf represents one ring of the future onion bulb. The larger the leaf, the larger the ring becomes. If plants are small when bulbing starts, only small bulbs are possible. Cool weather with adequate irrigation encourages heavy leaf growth.

Bulbing Phase
Bulbing is initiated when the daylight length reaches the number of hours critical for that variety. Temperature and light intensity are also factors that determine when vegetative growth stops and bulbing starts. It takes a temperature of 60°F, or even 70°F to trigger bulbing. The rate of bulbing is more rapid with high light intensity and increased temperature. The optimum temperature for rapid bulb development is 75-85°F.

It’s important to grow varieties that are suitable for the latitude of your farm. The further north you are, the longer the number of daylight hours you have in summer. Onion varieties are often described as Northern / Long Day and Southern / Short Day. The dividing line between short day (south of 35°) and long day (north of 38°) varieties is around 35-36-37° latitude. Hence neither one is ideal for us at 38°N. Nowadays there are also Intermediate Day types.

Climatic Requirements
Onions require cool conditions during the early months, with an optimum between 12°C and 24 °C for good vegetative growth. Generally, the longer this period and the better the vegetative growth before bulbing, the better the yield. The plants can tolerate much heat during the later stages of development, when higher temperatures are more favourable.

High temperatures - daily means of 25 °C to 27 °C - accelerate the bulbing process and are preferred from the start of bulbing onward. Low temperatures of 8 °C to 13°C near bulbing time retard development of the bulbs and can trigger bolting. The last month or so before bulb maturity (drying) should be dry.

Soil
Onions prefer fairly rich, moist but well drained soil with plenty of organic matter and loose, crumbly tilth. Soil pH should be 6.0-6.5; acid soil should be limed to bring pH into this range. Onions require about 145 lb nitrogen per acre over the growing season, and may need some supplemental organic N, especially on soils with lower organic matter and

Irrigation
Most of the onion roots occur in the top 300 mm of soil. It is important to keep this rooting zone fairly moist throughout growth. Moisture stress during bulb formation and development may seriously reduce yields. However, no irrigation should be applied for the final three or four weeks before maturity, to allow the bulbs to cure properly.

Weed Control
The onion is a slow-growing small plant which is easily overgrown by weeds. Good weed control practices
are thus important. For seedbeds or direct seeded lands, select fields which are relatively weed-free, possibly making use of the stale-seedbed technique - using paraquat or glyphosate to kill emerged weeds on lands ready prepared for planting. The use of herbicides is the most efficient weed control measure. Weed competition with the newly emerged or transplanted onion seedlings, for the first two months of growth, can

**Garlic**

*Allium sativum*, commonly known as garlic, is a species in the onion genus, *Allium*. Its close relatives include the onion, shallot, leek, chive, and rakkyo. With a history of human use of over 7,000 years, garlic is native to central Asia, and has long been a staple in the Mediterranean region, as well as a frequent seasoning in Asia, Africa, and Europe. It was known to Ancient Egyptians, and has been used for both culinary and medicinal purposes.

Garlic (*Allium sativum L.*), belonging to the Alliaceae family, is a frequently used ingredient in gastronomy. Garlic has also been used as a traditional medicine for a variety of biological effects, such as increasing stamina, aiding digestion to prevent diarrhea and worm infestation, and treating heart disease, arthritis, and fatigue. Recently, numerous studies have shown garlic to possess a wide range of bioactive effects, including antioxidant, antimicrobial, anticancer, antihypertensive, hepatoprotective, and insecticidal properties. Although the bioactive properties of garlic are related to antioxidant polyphenolic and bioactive sulfur compounds, when garlic is crushed or damaged, some of these bioactive sulfur components produce a strong pungent odor, which are associated with an unpleasant body and breath odor in consumers. The garlic preparation processes are important factors when choosing a garlic supplement because of the various biologically active compounds of garlic present and consumer acceptance. Several garlic products, such as dehydrated garlic powder, garlic essential oil, garlic oil macerate, and aged garlic extract have been introduced to the market and are currently available.

**Properties of Garlic**

When crushed, *Allium sativum* yields allicin, an antibiotic and antifungal compound (phytoncide). Fresh or crushed garlic also affords the sulfur-containing compounds allicin, ajoene, diallyl polysulfides, vinylthiins, S-allylcysteine, and enzymes, B vitamins, proteins, minerals, saponins, flavonoids, and Maillard reaction products, which are not sulfur-containing compounds. Furthermore, a phytoalexin (allixin) was found, a nonsulfur compound with a y-pyrone skeleton structure with antioxidant effects, antimicrobial effects, antitumor promoting effects, inhibition of aflatoxin B2 DNA binding, and neurotrophic effects. Allixin showed an antitumor promoting effect *in vivo*, inhibiting skin tumor formation by TPA and DMBA initiated mice. Analogs of this compound have exhibited antitumor promoting effects in *in vitro* experimental conditions. So allixin and/or its analogs may be useful compounds for cancer prevention.

**Types of Garlic**

Beautiful garlic braids decorate many kitchens. Some are adorned with peppers or dried flowers while others sport a country ribbon. But garlic’s role in the kitchen shouldn’t be limited to wall decor. With a peel and a chop, garlic adds an aroma and flavor that few ingredients can match. This modest herb enlivens a kitchen, enchanting at least three of our senses.

Garlic plays the role of star or supporting cast member equally well, whether it’s used in appetizers, main courses, side dishes, drinks, or even desserts.

*Allium sativum* has two subvarieties: softneck and hardneck. The two types have similar healing properties because they belong to the same species, but they differ in flavor, clove size, shelf life, and use.

1. **Softneck Garlic**

Softneck garlic is the type you’ll most likely see in the produce section of your grocery store. Its name comes from the multilayered parchment that covers the entire bulb, continues up the neck of the bulb, and forms a soft, pliable stalk suitable for braiding. Its papery skin, or sheath, is a beautiful creamy white color.
Softneck garlic typically has several layers of cloves surrounding the central portion of the garlic bulb. The outermost layer’s cloves are the stoutest; the cloves of the internal layers become smaller closer to the center of the bulb. Of the several types of softneck garlic, two are most abundant:

**Silverskin garlic.** This easy-to-grow variety has a strong flavor and stores well when dried — it will last nearly a year under the right conditions. The Creole group of silverskin garlies has a rose-tinted parchment.

**Artichoke garlic.** Artichoke garlic has a milder flavor and may have fewer and larger cloves than silverskin. You can store it as long as eight months. Artichoke garlic may occasionally have purple spots or streaks on its skin, but don’t confuse it with purple stripe garlic, a hardneck variety that has quite a bit of purple coloring.

2. Hardneck Garlic

Unlike softneck garlic, hardneck varieties do not have a flexible stalk. When you buy this type of garlic, it will typically have an extremely firm stalk protruding an inch or two from the top of the bulb.

Hardneck garlic sends up scapes from its central woody stalk when it is growing. A scape is a thin green extension of the stalk that forms a 360-degree curl with a small bulbil, or swelling, several inches from its end. Inside the bulbil are more than 100 tiny cloves that are genetically identical to the parent bulb beneath.

**Rocambole.** This variety has a rich, full-bodied taste. It peels easily and typically has just one set of cloves around the woody stalk. It keeps for up to six months.

Diseases of Garlic

Garlic can be a very easy-to-grow herb in the garden, however it is also prone to several diseases. These include, but are not limited to: Basal Rot (Fusarium culmorum), White Rot (Sclerotium cepivorum), Downy Mildew (Peronospora destructor), Botrytis Rot (Botrytis porri) and Penicillium Decay (Penicillium hirsutum). Most of the major garlic diseases are soilborn, so proper site assessment and yearly rotations are crucial in maintaining a healthy garden of garlic.

In addition to these diseases, garlic is also subject to damage by several genera of nematodes. There are a few physiological disorders of garlic that may alarm the homeowner, but are of generally little consequence to the ability to grow or store garlic.

**Downy Mildew:** The symptoms of downy mildew are quite distinct: a whitish, furry growth will appear on the leaves, along with yellow discoloration. It can kill younger plants and stunt the growth of older ones. Diseased leaf tips and other tissues will eventually collapse. Bulbs in storage will have a blackened neck, be shriveled, and outer scales will become water-soaked. Some bulbs may sprout prematurely.

**Penicillium Decay:** Seed clove decay often results in stunted, wilted, and yellowing plants. It can also reduce growth. The fungus may sporulate on diseased cloves, appearing as a bluish-green mass. Planting infected bulbs spreads Penicillium decay. Infection in the field, however, can occur through the basal plate. Average summer high temperatures in upstate New York are ideal for the growth of this fungus.

Garlic Growing

Garlic (Allium sativum) is a hardy perennial member of the onion family. Garlic is probably native to Central Asia but has long been naturalized in southern Europe and throughout the world. GARLIC (Allium sativum L.), otherwise known as bawang, is one of the more popular cultivated Alliums. It is mainly used as a condiment for flavouring meat, fish and salads, in fresh and dehydrated forms. It is also known to lower blood sugar and cholesterol levels. Its many other health-promoting attributes have resulted in medicinal pills, drinks and powders based on garlic extracts.

Climate

Garlic needs a cold winter, a moist spring and a warm, reasonably dry November and December. For these reasons, garlic grows well in Tasmania, Victoria and the cooler parts of New South Wales. The cold triggers germination, as well as ensuring that biting flavour, so make sure not to store your garlic in the fridge!

Land Preparation
A 1-ha production area requires 1,000 kg garlic seed pieces. With thorough tillage, the land is prepared 4-6 weeks before planting. The field is plowed 2-4 times at 7 days interval to improve soil texture. The use of tractor driven implement requires 1-2 plowing and harrowing operations while an animal-drawn harrow needs 4 passings.

Soil/Nutrients
Garlic requires reasonably fertile soil and grows best in a well-drained soil with plenty of organic matter. The pH of a typical vegetable garden, 6.0-7.0, is ideal for garlic. Garlic grows well in most soils, but dislikes wet ‘feet’. If you have poor draining soils you may be best growing your garlic in raised beds or even pots. If you have some clay, make sure you raise your garden beds at least 100mm. At Southern Harvest, we have a clay loam topsoil that quickly changes to a light clay. Before planting we add 10-20mm of compost, kelp and a dusting of ag-lime and blood and bone.

Soil Fertility
Garlic is a high-value crop. Give it your best ground. Garlic is a heavy feeder. It needs full sun and a full range of available nutrients. If you want recommendations on which nutrients are needed, ask for the recommendations for onions when you send a soil sample to a soil testing laboratory. A pH of 6.8 to 7.2 is ideal: many nutrients are tied up in soils that are more alkaline or more acidic.

Planting
Garlic does not produce true seed but is propagated by planting cloves, which are the small bulb lets or segments making up the garlic bulb. Each bulb usually contains a dozen or more cloves; each clove is planted separately.

Plant Development
Matured garlic cloves planted in the fall go through a dormant period. Garlic cloves requires a period of 6-8 weeks of cool weather after planting to undergo vernalization by low winter temperatures. With adequate moisture and lower temperature, roots emerge and leaves sprout, and the plant goes through a period of vegetative growth.

Mulching
Mulching conserves moisture, moderates soil temperatures and inhibits weeds. It also shelters rodents and attracts deer and elk. All these factors need to be considered in deciding whether or not to mulch. Mulching can even out the soil moisture between rains and irrigation cycles. It is not recommended in wetter climates where excess water can be a problem for garlic.

Weed Control
Good weed control is essential in garlic production. Alliums are poor competitors; weeds can cut garlic yields in half, and lower the quality of the crop. Planted in the fall and harvested in the mid-summer of the next year, garlic will be in the ground nine months. It is therefore vulnerable to competition from winter and summer annual weeds. Weed competition, even early in the growth of the crop, can reduce yields. In addition to reducing yield and quality, weeds also interfere with mechanical harvesting equipment.

Onion Pickle
Pickling is preserving a food with acid and salt. The key to safe pickling is making sure that the acid is high enough to kill any microorganism that can lead to spoilage and illness.

Onion Pickle Manufacturing Process
1. Select good quality onions of 20-25 mm diameter.
2. Remove bulb neck and bottom-end.
3. Blanch for 1-2 minutes in boiling water.
4. Cool immediately in cold water for 5 minutes.
5. Peel onions carefully without bruising the surface and wash thoroughly under running water.
6. Prepare 1 litre of brine solution for 1 kg of peeled onion as follows - 500 ml of boil and cooled water,
500 ml white vinegar and 80 g salt, mix thoroughly.
7. Pickle the onion sets in the brine for 24-36 hours.
8. Drain pickling solution.
9. Prepare 1 litre of new brine solution for 1 kg of onion - 500 ml of boiled and cool water, 500 ml white vinegar, 60 g salt, 0.5g citric acid and 0.3 g ascorbic acid. Mix thoroughly and bring to boil.
10. Place the onions in pre-sterilised jars (up to ¾ level of jars) and pour the hot brine solution ensuring that all onions are covered with the brine leaving a headspace (empty space) of 5-10 mm below rim of the jar.
11. Seal the jars with their pre-sterilised dry caps (caps immersed in boiling water for 2-3 minutes).
12. Pasteurise the jars in a pasteuriser for 10 minutes at 85°C or in boiling water for 10 minutes.
13. Allow to cool, label and keep in a dry place away from sunlight.

Onion Paste

Onion is one of the important ingredients of curries used by almost all household in the world. Onion paste is one of the item, is manufactured and preserved having high market demand. Basic Onion Paste is a modern Indian recipe for a classic base of slow-cooked onions that is typically used to flavour curries in curry restaurants. Onion paste is usually used to provide thick, gravy like consistency to a dish. So, if you want a dish that has gravy in it, using onion paste would be a good idea.

There are two types of onion pastes that you can use, if you are using fresh onion paste, that is. One would be a paste that you would have to make by grinding the raw onions, after peeling off their skin. The other onion paste involves an elaborate process. Finely slice the onions into half-rings. Deep fry these onion rings in oil till they turn crispy and golden brown in color. After draining them out of the oil, grind these golden brown onions into a fine paste. You can then use this paste to enhance the taste of some of your dishes. After frying the onions to this level, the taste of the onion changes automatically. This particular taste will not go well with all the dishes. You will have to be very selective about which dish you add this paste too. Also, please keep in mind that as it is deep fried, the paste is also very heavy, rich, and filling. The dish that you will add this paste too will also need to be the same.

As for ready made paste, it would be highly advisable to avoid using ready made pastes as they contain preservatives, which are required to ensure that the pastes do not get spoiled. But these preservatives change the basic taste of the onion.

Garlic Oil

Garlic is one of the important bulb crops grown and used as spice and condiment throughout India. It possesses a high nutritive value and medicinal property. Allicin, the principle of garlic has antibiotic properties. The plant is a small herb and produces a group of small bulbs called cloves covered with a thin skin. The seed stalks bears both seeds and bulblets in the same head. However, seed is seldom used for propagation as the cloves are more commonly used.

Oil is one of the three major classes of food substances; the others are protein and carbohydrates. Garlic oils are naturally occurring esters of glycerol and fatty acids that have commercial uses, some oils are called trimester examples are triglycerides or simple glycerides. The physical and chemical properties of garlic oils are determined to a large extent by the type of fatty acids in the glycerides. In all commercially important glycerides, the fatty acids are straight chain and nearly all contain even number of carbon atoms.

Garlic oil is a kind of essential oil that is extracted from garlic by steam distillation. It is volatile. The medicinal part of garlic is allicin (Dipropenylsulfide -oxygen - easter) which exists in garlic oil. The effective part of garlic oil is 1500 times more that of ordinary fresh garlic. Therefore, garlic oil has become the most popular and natural healthcare products worldwide for years. Some of the uses of garlic oil are as follows

Manufacturing Process

The stepwise process of garlic oil requires following operations:
- Removal of undesired material
- Washing
- Peeling
- Crushing of bulbs
- Steam distillation
- Inspection and analyzing
- Packing and dispatching

Garlic Paste
Garlic paste is one of the essential parts of daily Indian cooking. It's really time saver if it's made in bulk, which would last longer without freezing it. Garlic Paste is mainly used as a condiment in various food preparation and also serves as a carminative and gastric stimulant in many medicine preparations. As a condiment, it is used for flavouring mayonnaise and Tomato Ketchup sauce, Salads, meat sausages, chutney, pickles, Biryani, Fried Rice, etc.

Manufacturing Process of Garlic Paste
Take peeled garlic and put it in the autoclave. Add 1 Part garlic by weight and 0.5 part of demineralised water. Heat the product at 110°C for 5 minutes. Then the mass of the product is concentrated by vacuum evaporator. Concentrated garlic product content about 70%. Soluble solids which are used as garlic paste. Check the quality of the product and then pack in the glass bottle for storing and marketing. Yield will be 20% of the basic weight of garlic.

Garlic Powder
Garlic Powder means garlic in powder form. Powder form means moistureless or dehydrated form. In other words, Dehydrated Garlic is in flour form.

Dehydration is defined industrially as drying by artificially produced heat under carefully controlled conditions of temperature, humidity and airflow. The term applied to all dried product regardless to the method of drying.

The garlic powder is manufactured by many large scale and small scale food processing units in India. A sizeable amount of dehydrated garlic is exported to other countries. The dehydrated garlic powder is used in flavoring of many food products and in Ayurvedic medicines.

Uses of Garlic Powder
1. Tomato soups are flavoured with the addition of garlic powder.
2. Canned soups and meat products use garlic powder for flavoring purposes.
3. In sausages, hamburger and salami, the dehydrated garlic powder is added to give the typical flavour of garlic.
4. Certain salad dressings also use garlic powder.
5. Garlic powder is also used in Ayurvedic medicines, which are for digestion trouble, throat trouble and for coughs and bad colds.

Manufacturing Process of Garlic Powder
Garlic bulbs are broken into individual cloves by passing between rubber-covered rollers which exert pressure to crack the bulbs without cruding the cloves. The loose “papery shell” is removed by screening and aspiration. The cloves are then sliced or pressed between rolls to form flakes. The slices or flakes are dried in tunnel driers or continuous belt drier.

The dried slices are transferred to the drying bins. Belt dryer can also be used where slices are automatically sped on a continuous stainless steel perforated belt. The temperature of the air at the inlet is about 6 percent in about 6 hours of drying. After drying the pink skin that adheres to the fresh clove can be removed by screening and air aspiration.

Onion Flakes
Onion flakes are pieces of onions which have been chopped and then dehydrated. They can be used as an onion replacement in various recipes, and they are especially useful for people who are camping, as they are lightweight and easy to handle.

To make onion flakes, onions are simply chopped and then allowed to dry, either in the sun, in a dehydrator, or in an oven on a low setting. As the onions dry out, they shrink dramatically, and the pieces do indeed look like flakes once the drying process is finished. The dry flakes can be stored in an airtight container for six months to a year before use, and they can be used to replace regular onions in recipes, or they made be added to dressings, soups, marinades, and rubs.

As you might imagine, onions do lose some of their flavor and pungency when they are dried to make onion flakes. As a result, they do not make a perfect substitute for fresh onions, but they are acceptable in many dishes. Generally, around a tablespoon of flakes can be used to replace each small onion called for in a recipe, and you can also add onion powder, if you want a bit more flavor.

Properties of Onion Flakes
1. These are crispy and palatable food.
2. These contents moisture less than 5%.
3. These should have good flavour.
4. These are lighter.
5. These can be store at room temperature.
6. Self life of the product in the packet will be more than one year.
7. These are easily transportable.
8. Onion flakes has very good agreeable flavour.

Uses of Onion Flakes
1. Potato flakes and onion flakes can be used for ready to eat food.
2. Potato flakes can be reprocessed also.
3. Potato flakes & onion flakes can be used in the preparation of different variety food ingredients like - Namkeen, Mixed cereal foods etc.
4. Onion flakes are used in the food ingredients for flavour enhancer.
5. Onion flakes and potato flakes are largely used in the hotels, parties, restaurant etc.

Onion Powder

Onion is one of major bulb crop grown in India which presently attracting attention of all persons due to rise in prices. The price is directly related to supply-Demand of the commodity. An Indian farmer normally pays more attention to grow those crops which are fetched very good market prices during last season. To get the very good prices during present season, many farmers switch to grow Onion crop due to which supply in the market increases many fold and market glut fetches very low prices to farmers commodity such as onions. To stabilize the prices of fruits and vegetables and reduce the post harvest losses, drying of onion in form flakes and onion powder is adopted.

Uses of Onion Powder

Bloody Maty Drinks
Onion powder is an ingredient for Bloody Mary cocktails and non-alcoholic mixes. These drinks are made by combining vegetable juice, lime juice, Worcestershire sauce, Tabasco sauce, bitters, garlic powder, celery salt, black pepper, salt and onion powder together. Vodka is added to make a Bloody Mary mix alcoholic. Some drink makers dip the rim in a special seasoning to add extra flavor. This seasoning can be made with a combination of onion powder, garlic powder and celery salt.

Dressings
Onion powder is a common ingredient in dressings. Dressings are usually oil-based or creamy liquid toppings that add flavor to salads. Russian salad dressing recipes are made of onion powder, tomatoes,
olive oil, lemon juice, honey, paprika, horseradish powder and garlic cloves. These ingredients are blended together into a smooth topping. A simple dressing with minimal ingredients can be made by mixing onion powder, lemon juice, olive oil and parsley.

Manufacturing Process of Onion Powder

The fresh onions are pilled and then washed with medicated water containing 10 ppm chlorine. Washed onions then sent for cutting through conveyer belt. The onion chips are loaded on the Stainless Steel Dryer Belts through conveyer belt system. The automatic dryer belts ensure the required dehydration without affecting the taste of the onion. The material after the first round of drying are sent for bin dryers to reduce the moisture content. After the bin dryers the material goes to air conditioned rooms where in it is passed through huller machine to grade the material by size i.e. flakes, powder, chips etc. The final product is then passed through Auto Sortex and Metal Detector to ensure desired quality product. The material is then sealed in air tight bags to preserve it properly. Secondary packing of corrugated boxes is provided on buyer’s request.

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NIIR PROJECT CONSULTANCY SERVICES
106-E, Kamla Nagar, New Delhi-110007, India.
Tel: 91-11-23843955, 23845654, 23845886, +918800733955
Mobile: +91-9811043595
Email: npcs.ei@gmail.com ,info@entrepreneurindia.co
Website: www.entrepreneurIndia.co