

KADUU (PUMPKIN) PROCESSING TECHNOLOGY - VIBRANT ECONOMY FOR TINY INDUSTRIES AND SMALL AND MARGINAL FARMERS

Prof (Dr) Jai Singh (ARS)

M. Tech Ph D , IIT KGP

Former Director, ICAR – CIPHET, Ludhiana

Mob: 8958463808 E – Mail : jsingh.sre@gmail.com

ABSTRACT

Pumpkin, derived from species genus [*Cucurbita pepo*](#). varieties [*Cucurbita maxima*](#) and *Cucurbita moschata* .It is grown for vegetable, food, industrial and recreation purposes. Pumpkin is a [cultivar](#) of a [squash plant](#) . It is native to North America. It is also named as squash or winter squash . In India it is known as KAADUU / KAADOO / KASHIFAL, etc. Pumpkin is known to be originated from the word *pepon* . French adopted this word as *pompon* which was changed by British to *pumpion*. Commonly it is round in shape with smooth, slightly ribbed skin, and deep yellow to orange [carotenoid](#) pigments coloration including [beta-cryptoxanthin](#), [alpha](#) and [beta carotene](#), all of which are [provitamin A](#) compounds converted to [vitamin A](#) in the body. . The thick shell contains seeds and [pulp](#). Generally, pumpkin weighs between 3 and 8 kilograms . Weight of variety *C. maxima* reaches over 34 kg (75 lb).

Principal Nutrients:

In a 100-gram amount, raw pumpkin provides 110 kilojoules (26 kilocalories) of food energy and is an excellent source (20% or more the [Daily Value](#), DV) of provitamin A [beta-carotene](#) and [vitamin A](#) (53% DV). [Vitamin C](#) is present in moderate content (11% DV), but no other [nutrients](#) are in significant amounts (less than 10% DV. Pumpkin is 92% water, 6.5% [carbohydrate](#), 0.1% [fat](#) and 1% [protein](#) .

Popular Food Uses

Pumpkins are very versatile in their uses for cooking. Most parts of the pumpkin are edible, including the fleshy shell, the seeds, the leaves, and even the flowers. In United States and Canada, pumpkin is a popular [Halloween](#) and [Thanks giving](#) staple. Ripe pumpkins are boiled, steamed and mashed to eat as such or to prepare soup. It can also be roasted for snacks. It is also used for sweet dishes; a well-known sweet delicacy is called *halawa yaqtin*. In [India](#), pumpkin is cooked with butter, sugar, and spices in a dish called *kadu ka halwa*. Pumpkin is used to make [sambar](#) in [Udupi cuisine](#). Pumpkin leaves and flowers are eaten in various forms. Seeds are roasted for snacks. Numerous recipes are popular.

Industrial Uses:

Pumpkin powder , Puree, Pectin, Seed oil , cakes, biscuits, jams, soup , roasted seed namkeen, chips, flakes, cubes, noodles, snacks, chocolate, candy, appetizers, breads, wedges and dietary supplements for animals and fishes, etc .

Folk medicine :

Pumpkin possesses the medical function of lowering blood glucose, lowering cholesterol, deworming, intestinal worms and preventing cardiovascular diseases. Organic pumpkin seed oil also contains a kind of bioactivator, named as androgen, can cure and prevent urinary system diseases and prostate hyperplasia. It's an ideal ingredient for food, pharmaceutical and healthcare industries.

This presentation is prepared on the bases of information available at various sources. The product – wise processes and technologies have been explained in detail

Key Words: Kaduu, pumpkin, pumpkin foods, pumpkin foods - snacks, pumpkin dietary supplements, pumpkin folk pharmaceuticals, Pumpkin industrial products – pectin, butter, powder, sauces, soups , pumpkin health care products.

INTRODUCTION

In India, Pumpkin, is a low input and low commercial value crop. But it can be categorized and developed as a moderately high value cash crop because there is evidence of village Nauh, District Bharatpur, Rajasthan in bringing prosperity to the small farmers through pumpkin cultivation. In this villages, about 2,000 bighas of land has been taken up for cultivation of pumpkin (*Cucurbita pepo*) . Production is about 10 to 15 quintals per bigha. The village cumulative profits range from Rs.70 lakh to 75 lakh a year just from cultivation only. The income and employment in the area can be further augmented through processing technologies. Now the demand for pumpkin has been increasing over for its use in in vegetables, Industrial products like butter, powder, flakes, sauces and sweets as well as for its pharmaceuticals, health care and cosmetics applications , anti-parasitic, anti-inflammatory and diuretic properties.

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Food Uses

Pumpkins are very versatile in their uses for cooking. Most parts of the pumpkin are edible, including the fleshy shell, the seeds, the leaves, and even the flowers. It is eaten all over the world in various forms such as vegetable, soup, puree, sauce . roasted snacks, cakes, ice cream, sweet dishes In United States and Canada as popular Halloween and Thanks Giving staple. In the [Middle East](#), pumpkin is used for sweet dishes; a well-known sweet delicacy is called *halawa yaqtin*. In South Asian countries such as [India](#), pumpkin is cooked with butter, sugar, and spices in a dish called *kadu ka halwa*. Pumpkin is used to make [sambar](#) in [Udupi cuisine](#) In [China](#), the leaves of the pumpkin plant are consumed as a cooked [vegetable](#) or in soups. In [Australia](#) and [New Zealand](#), pumpkin is often roasted in conjunction with other vegetables. In [Japan](#), small pumpkins are served in savory dishes, including [tempura](#).

Pumpkin leaves :

Pumpkin leaves are a popular vegetable . In [Kenya](#) they are called seveve, in [Zambia](#), they are called *chibwabwa* and are boiled and cooked with [groundnut](#) oil. In [China](#), the leaves are consumed as a cooked [vegetable](#) or in soups.

Uses in Pharmaceuticals:

Pumpkins have been used as folk medicine by [Native Americans](#) to treat intestinal worms and urinary ailments, In Germany and southeastern Europe, seeds of *C. pepo* are used as folk remedies to treat irritable

bladder and [benign prostatic hyperplasia](#). In China, [C. moschata](#) seeds are used in [traditional Chinese medicine](#) for the treatment of the parasitic disease [schistosomiasis](#) and for the expulsion of [tape worms](#). Scientific research in many countries shows that pumpkin is anti-inflammatory, analgesic. It is good for liver, kidney, low blood pressure, maternal lactation, etc. Pumpkin pectin proved to be effective for peptic ulcer. Pumpkin powder found effective on the treatment of diabetes.

Industrial Uses: Pectin, Seed oil

Different types of recipes such as [cornbread-stuffed pumpkin](#), cakes, biscuits, jams, soup, roasted seed namkeen, chocolate, canned recipes such as Cream soup, spice cake, beat, cup cakes, cookies, bread, scones, whisk, pudding, cheese cake, whoopee, yogurt whisk, etc.

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Canned pumpkin is recommended by veterinarians as a dietary supplement for dogs and cats that are experiencing certain digestive ailments . The high fiber content helps to aid proper digestion. Raw pumpkin can be fed to poultry, as a supplement to regular feed, during the winter to help maintain egg production, which usually drops off during the cold months.

Pumpkin Seed Oil:

Pumpkin seed oil has very high edible value as it is rich of nutrients. Besides omega-6 series of unsaturated fatty acids, it contains phytocholesterol, carotene, various vitamins, and mineral elements. It possesses the medical function of lowering blood glucose, lowering cholesterol, deworming and preventing cardiovascular diseases. Organic pumpkin seed oil also contains a kind of bioactivator, named as androgen, can cure and prevent urinary system diseases and prostate hyperplasia. It's an ideal ingredient for food, pharmaceutical and healthcare industries .

[Pumpkin seed oil](#), a thick oil [pressed](#) from roasted pumpkin seeds, appears red or green in color depending on the oil layer thickness, container properties . Pumpkin seed oil contains [fatty acids](#), such as [oleic acid](#) and [alpha-linolenic acid](#). When used for cooking or as a salad dressing, pumpkin seed oil is generally mixed with other oils because of its robust flavor. In cooking it is considered a delicacy in traditional local cuisines such as for pumpkin soup, potato salad or even vanilla ice cream

Salted pumpkin seeds

Pumpkin seeds, also known as *pepitas*, are edible and nutrient-rich. They are about 1.5 cm (0.5 in) long, flat, asymmetrically oval, light green in color and usually covered by a white husk. Pumpkin seeds are a popular snack that can be found hulled or semi-hulled at most grocery stores. These seeds are a good source of [protein](#), [magnesium](#), [copper](#) and [zinc](#).

Processing Technology for Flavored Pumpkin Seed Snacks .

Select good conditioned graded pumpkin seeds, bake these at 100 degree centigrade temperature for six hour. Decoat the seeds before or after baking. Fry the decoated seeds at 160 degree centigrade temperature for 300 seconds. Now add 4 % sugar, 0.2 % citric acid, 0.8 % rose essence or any other flavor.

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PUMPKIN SAUCE PROCESSING TECHNOLOGY

Sauce is a popular complementary foods in the community. Sauce is one of the flavoring ingredients are often used in various foods by most people. Containing pumpkin as an antioxidants combined with the habits of the people who often use the sauce for seasoning food then their correlation between the two, will be very beneficial in improving public health. Pumpkins sauce can reduce the tomatoes dependent, especially anticipate when the tomatoes got the expensive price.

Suace is prepared taking 60 parts of pumkin flesh / puree and 40 parts tomato with the beta-carotene (228ug/100 g), water content (77.77%), ash (3.30%), vitamin C (0.26 mg/g); total acid titration (1.4%), total dissolved solids (13.97%), crude fiber (1.34%), viscosity 53.280 cps; L 40.93: a 17.8, b 16.2 and pH 4.31. The hedonic organoleptic test gave the most preferred colour, aroma, taste, viscosity and general level of good properties.

Pumpkin Powder Processing Technology by Drying

Harvest pumpkins at full maturity. Wash in clean water. Wipe out the surface water , peel , cut in to small pieces , remove the seeds and flesh and shred in to further small pieces . Soak shredded pumpkins into clear water for an hour. Take out the material from water and let the extra water to drip down. For sun drying, spread it on a clean surface and cover with gauze. After proper drying the material can be crushed in to fine powder.

For hot air drying , spread the shredded pumpkins on the dryer plate in thin layer and allow to bake at 60 to 80 degree centigrade temperature for about 8 – 10 hours. All equipment , apparatus , packing material , soft and

hard material coming in contact with the product must be disinfected before use. Now crush the product in to fine powder. The powder need to be further sterilized at 80 degree centigrade temperature for two hours before packing. Pack the product in sterilized packs

Pumpkin Powder Processing Technology by Roasting

Cut the pumpkin into quarters by first cutting it in half and then halving the halves. Scrape out the seeds and stringy mess.



Place the pumpkin pieces on a cookie sheet with the skin side up. This will help to retain moisture as the pumpkin pieces roast.



Roast in the oven at 350 Deg F for 45 minutes or until the pumpkin pieces are fork-tender as shown in picture. The skin of roasted pumpkins gets

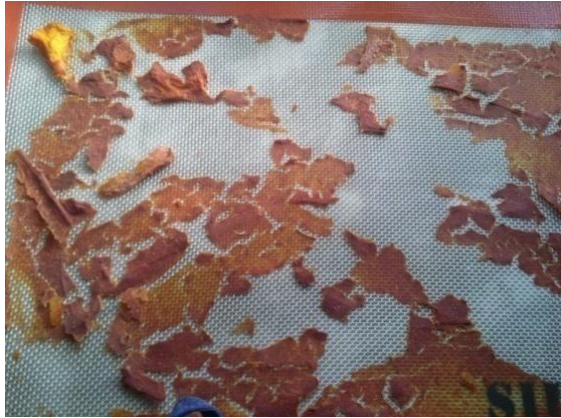
soften and withered. Now allow the pumpkin to cool and then peel away the skin. Blend the roasted pumpkin into a blender or food processor. Add 1 tablespoon of water to each batch to obtain a smooth consistency. Obtain wet puree.



Dehydrate the Puree

Spread out the obtained puree evenly onto a tray of dehydrator and dehydrate for about 12 hours. The tray bed can either of mesh liner or the solid liner. However, the solid liner is preferred. See the dehydrated puree on tray of the dehydrator. This process can be accomplished in the oven also at 170 Deg C temperature for about 6 hours.





When the puree has fully dehydrated dried, it would look and feel like a thin crispy wafer. Peel away the wafers and pulverize the pieces in blending machine into tiny little bits / powder.



Pack the dehydrated pumpkin bits or powder in sterilized air-tight containers. In addition to a longer shelf-life, dehydrated pumpkin takes up much less storage space.

Rehydration and Cooking of Pumpkin Flakes or Powder

Dehydrated pumpkin for almost all recipes as pumpkin puree, cookies, bread, cheesecake, pancakes, ice cream and smoothies.

For rehydration take two parts of boiling water for ½ part of dehydrated pumpkin. Stir the mixture up well and allow it to sit for at least 20 minutes. It will be fully rehydrated for use.

