# Development and Evaluation of Preservative Free Natural Onion Powder

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## Abstract

Onion is used as a major flavouring agent that infuses the vegetable preparation with aroma and taste. Besides this it is a good source of protein, carbohydrate, fibre, sugar, fats, vitamin B6 and C, potassium, flavonoids and trace minerals. The present research involves development of onion powder which is free from preservatives maintaining its natural properties. The onions powder was dried to remove moisture and to avoid caramelization. After the sensory evaluation and proximate analysis, the onion powder was containing 18.43% moisture content, 82.57% of solids that included 0.253g ash value, 0.63 gm crude fat, 1.32 g protein, 14.23g carbohydrates expending 64.20741 Kcal of energy per 100 gm.

**KEYWORDS:** Caramelization, flavonoids, trace minerals, ash value, crude fat

## INTRODUCTION

Onion with the scientific name Allium cepa(Suleria, Butt, Anjum, Saeed, & Khalid, 2015) is believed to be originated somewhere in East.(Food and Agriculture Organisation, 2015)

The growth of onions depends upon certain specific growth conditions. The soil should be free of stones, well-irrigated, appropriate sunlight is required and also the drainage system should be adequate. In addition to this, nitrogen, phosphorus, and potassium should be adequately present in soil. Onions grown under dry conditions will have an increase in pungent flavors. Temperature has important role in onion development. In hotter conditions, the more sulphur compounds will be produced, leading to a more pungent flavour.(Kiple & Conee, 2001)

Both, the raw and mature bulb stage of onions are edible, and are used as vegetable and spice.(Bindu & Podikunju, 2015).The genus Allium includes garlic, onions, shallots, leeks, and chives.(Nicastro, Ross, & Milner, 2015)This vegetable is often referred to as the queen of kitchen. Onion is used in different foods with a variety of other vegetables and is an indispensable part of many kitchens. Onions are added in food, not only for taste, but also for its aroma and health improving properties as well.

China and India are the two leading countries in the world in terms of onion production. The climatic conditions of these countries favor onion crop as it can survive diverse climatic ranges from tropical to temperate. Onions can be grown on all types of soil such as sandy loam, silt loam and heavy clay soils.(National

Horticulture Board, 2018)In India, this is one of the most commonly eaten vegetable. Not only in salads, but onion is an indispensable part of other vegetable dishes as well. It is used in many forms, for example, powder, flakes, pickles, etc.Studies have shown that the onions are rich source of carbohydrates, minerals, potassium, iron, and vitamin C. (NND, 2011)

**Pharmacological activities**

Onion is multipurpose food plant that is used as traditional Indian spices. It is widely used in treatment of many ailments. Researches proved that onions do have ability to kill some forms of bacteria, viruses, parasites, and some fungi.

In medicinal science, the anti-hypertensive, hypoglycemic, anti-thrombotic, anti-hyperlipidemic, anti-inflammatory and antioxidant potential of the onions have been well established in the literature.

Griffith et al in their work "Onions—A global benefit to health" have emphasized on thechemical composition of onions and the associated benefits of the individual compounds. These chemical compounds include flavonoids and the Alk(en)yl Cysteine Sulphoxides (ACSOs).The high levels of phenolic compounds, impart the antioxidant properties as well as the anticarcinogenic properties effects against different degenerative pathologies (cardiovascular and neurological diseases, dysfunctions based on oxidative stress)(Griffiths, Trueman, Crowther, Thomas, & Smith, 2002)The studies have revealed that there is a correlation between the onion peel and the usually discarded parts of the onion in the kitchen, and their anti-carcinogenic properties.(Gawlik-Dziki et al., 2015)(Burri SCM, Ekholm A, Håkansson Åsa, Tornberg E, 2017)

**Phytochemistry**

Onion is a good source of protein, carbohydrates, water, fiber, sugar and fats. Onions are also containing vitamin B6 and C, potassium, flavonoid quercetin and trace minerals. They contain sulphur compounds such as allyl propyl disulphide that contribute pungent odour.(Dini, Tenore, & Dini, 2008) The onion also contains many phytoconstituents, like flavonoids, terpenoids, phytoestrogens, carotenoids, minerals, and volatiles compounds. Onion also contains polyphenols and vitamins.(Sonia Jose and K. Krishnakumar, 2017)

Many researchers have worked to find out the health benefits that can be reaped by using onions. They have found that onions exhibit antimicrobial, (Whitmore BB, Naidu AS. , 2000), antihistaminic (Dorsch, 1991) and cholesterol-lowering properties too. (Lanzotti, 2006)(Mitra, Shrivastava, & Rao, 2012).

**Traditional and nutraceutical values**

Onions are used in chutney, salads and soup. In curries and gravies onions are used as a thickening agent. In many parts of the world, especially in Northern India, Onions are used as a pickle by dipping in vinegar.Onions are used cooked along with other vegetables and are considered to be an important ingredient of many other vegetable dishes. These are either cooked or eaten raw as salad. Traditionally, the application of onion juice on the scalp, is advised in many cultures. The onion juice application on the face has been proved to enhance the growth of scalp hair and lightening the freckles. Its use in daily diet restores zinc deficiency. (Sonia Jose and K. Krishnakumar, 2017)The two major flavonoid groups present in onions are anthocyanins and flavanols. The red/purple color in the onions is attributed to the

anthocyanins' presence in some varieties (one such example is commercially grown variety, Red Baron) and quercetin and its derivatives give the yellow color to flesh and brown color to the skins of many other varieties (Leighton T, Ginther C, Fluss L, Harter WK, Cansado J, 1992)(Griffiths et al., 2002)The Sulphur compound named Allyl-propyl-disulphide present in the onion gives it a pungent smell. Cis-and trans-3, 5-diethyl, 1,2,4-trithiolene are two sulfur compounds recently identified in onions. (National horticultural Research and Develeopment Foundation, 2018)

**Dehydration of onions**

The main aim of dehydrating a vegetable is to produce its concentrated form and to increase the shelf life without affecting its flavor and its properties. Nowadays, it is common to get the powder form of various spices in the market. These have been prepared at a commercialized scale. Dehydration of onions makes it easier to export, import without causing any damage to it. The main reason behind a food product getting spoiled is the water content it contains which acts as a support medium for the micro-organisms growth. The dehydration makes the same product water free and enhances the shelf life of the product. There are many ways of dehydrating the onions. For example, sun drying, convective air drying, microwave dying, freeze-drying, Infra-red drying, vacuum drying, oven drying and osmotic drying.(Mitra et al., 2012)

## RAW MATERIALS AND METHODS OF PREPARATION

Red onions were first oven dried for 4 hours at 100 deg. C so as to eliminate approx. 98% of the moisture. To avoid caramelization and retaining the natural color and aroma, after 4 hours the batch was transferred to a box containing 1000 W bulb for further drying for 2-3 hours. The dried sample was then ground into grain onion powder. For assuring further moisture elimination to 100% the grain onion powder sample was dried in1000 W bulb heat for 30 minutes. Finally, this sample was ground into fine powder and strained by fine sieve. (Diagram 1) This onion powder is 100% organic, vegan, is totally preservative free, and has natural color, flavor, and aroma.

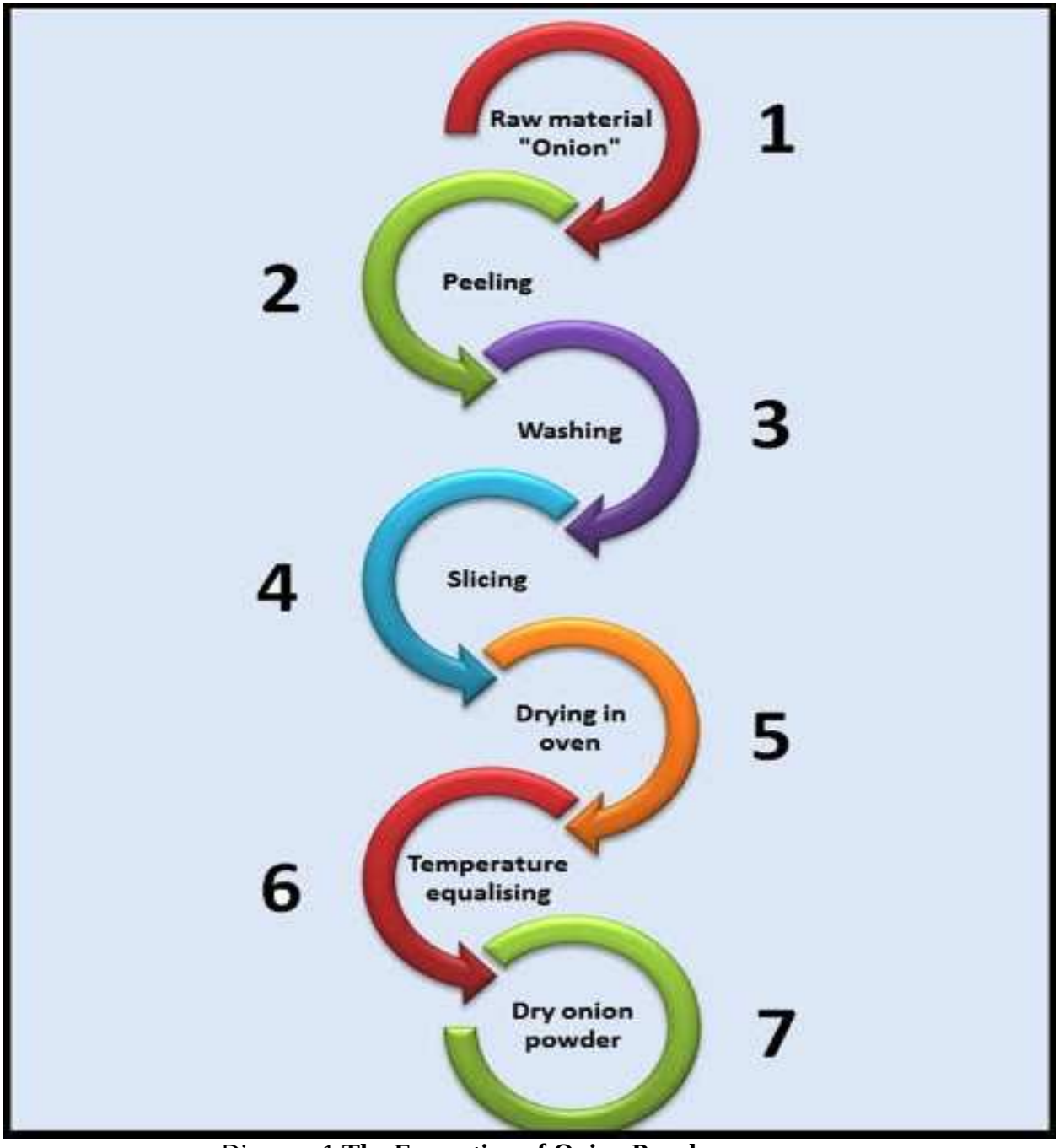


Diagram 1.**The Formation of Onion Powder**

Onion powder easily absorbs water upon contact, so it needs to be kept airtight always and if the moisture content reaches 4-5 per cent, then the onion powder is subjected or have tendency to form lumps.

But when kept in airtight container, or package, the shelf life is almost one year.

**BIOCHEMICAL ANALYSIS**

After the sensory evaluation and proximate analysis, the onion powder was containing 18.43% moisture content, 82.57% of solids that included 0.253g ash value, 0.63 gm crude fat, 1.32 g protein, 14.23g carbohydrates expending 64.20741 Kcal of energy per 100 gm.

## CONCLUSION

Onion powder can be produced commercially, as well as on small scale for home use. Various types of methods are used for the preparation of onion powder, which ultimately helps to dehydrate the onions, and drying process is implemented to convert the onions into powder form. It can be observed that onion powder is much stronger in flavour as compared to the fresh onion. Onion powder can be used in a variety of foods and dishes as seasoning, or a meat-rub; in sauces, soups & salad dressings and can also be used in many other recipes of burgers.

Also, the onion powder can be used as a substitute of the raw onions without compromising on the flavor and without any additional preservative requirement.

## LIMITATION

The further evaluation studies need to be conducted on large scale to ascertain the taste experiences of customers with onion powder vs raw onion.

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