IOSR Journal of Environmental Science, Toxicology and Food Technology (IOSR-JESTFT)
e-ISSN: 2319-2402, p- ISSN: 2319-2399.Volume 18, Issue 9 Ser. 1 (September 2024), PP 52-55
www.iosrjournals.org

Review On Potato Peels: Great Sources Of Healthy Ingredients

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Abstract:
The potato is one of the mankinds and valuable food crops. Potatoes are also fat-free, gluten-free, plant-based, affordable, and a quality carbohydrate. Since potatoes are the common vegetable in kitchen and huge quantity used per day, so like many others, we also throw potato peels into the garbage bin for disposed it. Due to high content of polyphenols and phenolic acids in potato peels it act as a strong natural antioxidant and recorded to be 10 times higher than their flesh concentration and useful to reduced hyperglycemia, oxidative stress etc. Peels of potatoes are the good source of iron, potassium, calcium and Vitamin C (ascorbic acid) is the predominant vitamin in potatoes. Also several B vitamins (niacin, folic acid, riboflavin, thiamin, and pyridoxine) are present in peels of potato. In a word potato peels are the natural source of major nutrients, vitamins. In this review paper, We mainly emphasis on the chemical compositions, nutritional values and other applications of potato peels.

Keywords:
- *Potato Peels*
- *Chemical Composition*
- *Antioxidant Properties*
- *Kitchen Waste*

Date of Submission: 05-09-2024 Date of Acceptance: 15-09-2024

I. Introduction:

The potato is one of mankind's most valuable food crops. Potato is a crop which has always been a "poor man's food" **[1]**. Potato (Solanum Toberosum L) ranks fourth among the world's crop production in volume after wheat, rice and corn **[2 & 3]**. It is first from root and tuber crops followed by cassava, sweet potato and yam **[2]**. Potatoes are available in multiple varieties to keep your meals interesting and it also come out in multiple forms to fit in cooking methods: fresh, dehydrated, frozen, and canned. The healthy nutrients in the verities of potatoes are off different. Potatoes versatility means they can easily fit into meals across various personal, cultural, and dietary preferences. Among the popular vegetables, potatoes are more energy-packed. Potatoes are also fat-free, gluten-free, plant-based, affordable, and a quality carbohydrate. They are cholesterol-free and sodium-free, with only 110 calories per 5.3oz serving. Potatoes are more energy-packed than any other popular vegetable and have even more potassium than a banana. Plus, there are potato performance recipe options to fuel your body and brain throughout the day- whether you live an active lifestyle or are competing with elite athletes.

Since potatoes are the common vegetable in kitchen and huge quantity used per day, so like many others, we also throw potato peels into the garbage bin for disposed it. The peels less potatoes are generally used in the dietary systems. If yes, then you are actually disposing off a large number of healthy ingredients. Well-known for its disease-fighting abilities, the skin of potatoes is far more beneficial to health and beauty than the vegetable itself. We all know that potatoes are rich in carbohydrates that play a key role in improving your weight. However, potato peels contain minimal amount of fat, cholesterol and sodium. This is the reason, why aloo skin can be an interesting part of your weight-loss diet plan. Read about 10 foods that aid in weight loss. Potato is rich in amino acids and other essential nutrients needed for growth and therefore has been declared the food of the future **[3]**. Potato has nutritional, health, and industrial benefits. The potato peels have more nutritional over the whole potato. Potato peel has gained attention as a strong natural antioxidant in food due to its polyphenols high content, which was recorded to be 10 times higher than their flesh concentration **[4]**. Potato peel extracts has presented as a rich source of polyphenolic antioxidants reduced hyperglycemia, oxidative stress, and overall food intake in diabetic rats when fed at 10% of their diet **[5]**. Skin-on potatoes are indicated as a good source of iron and potassium Vitamin C (ascorbic acid) is the predominant vitamin in

potatoes. Also several B vitamins are present (niacin, folic acid, riboflavin, thiamin, and pyridoxine) and potatoes can be characterized as a good source of vitamin B6 (pyridoxine). Potato peels extract ameliorated oxidative damage to human erythrocyte and rat erythrocytes membranes **[6]**.

Why Potato Peels is so Important:

The components and the chemical constituents present in potato peels having the beneficial activities such as;

- Protects against Cancer
- Boosts Immunity
- Lowers Blood Cholesterol
- Lowers Risk of Heart Disease
- Maintains Blood Sugar Levels
- Good for Skin Burns
- Lightens Dark Spots etc.

So, we can say, rather throwing the potato peels in the garbage, it can be utilized in the different physical and chemical activities and help to reduce the solid waste generation load.

Skin of Potato Nutrition:

For complete understanding of the physicochemical prosperities of potato peel, it is necessary to focus on its physical and chemical composition. The knowledge of these properties would help in developing an environmentally friendly approach for the utilization of potato peel. Potato peel contains various polyphenols and phenolic acids (*Table-1*) **[7 & 8]**, which are responsible for its antioxidant activities, whereas fatty acids and lipids showed antibacterial activities **[9]**. Potato peel also contains the following chemical components (*Table-2 & Chart-1*):

Table-1: Polyphenols and Phenolic Acids Present in Potato Peels

Polyphenols / Phenolic Acids	Amount (mg per 100 gm)
Vanillic Acid	043 mg - 048 mg
Gallic Acid	058 mg - 063 mg
Protocatechuic Acid	216 mg - 256 mg
Caffeic Acid	278 mg - 296 mg
P-coumaric Acid	041 mg - 487 mg
P-hydroxybenzoic Acid	082 mg - 087 mg
Chlorogenic Acid	753 mg - 821 mg

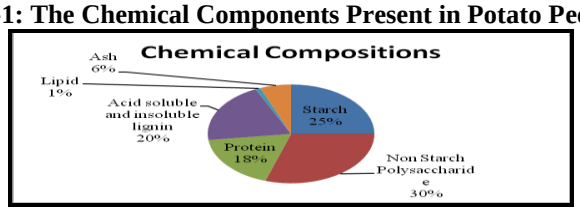
Sources: Ref. No. [07] & [08]

Table-2: The Chemical Components Present in Potato Peels (%)

Nutrients	Amount
Starch	25 %
Non Starch Polysaccharide	30 %
Protein	18 %
Acid Soluble and Insoluble Lignin	20 %
Lipid	01 %
Ash	06 %

Sources: Ref. No. [07] & [08]

Chart-1: The Chemical Components Present in Potato Peels (%)



Sources: Authors' Drawing

The lipid fraction includes long chain fatty acids, alcohols, triglycerides and sterol esters. In addition, lignin units have been found in the cell wall of potatoes. Potato peel is rich in starch (52% dry weight), but the content of fermentable reducing sugar is limited (0.6% dry weight). By eating the potato skin instead of the whole potato, you benefit from an increased wealth of the minerals and vitamins in potatoes. According to the U.S.D.A the nutritional content of potato skin (peels) is (*Table-3*);

Table-3: The Nutrients Present in Potato Peels (Per 100 gm)

Nutrients	Amount
Iron	4.0000 gm
Calcium	0.0200 gm
Potassium	0.3320 gm
Magnesium	0.0250 gm
Phosphorus	0.0590 gm
Zinc	0.0003 gm

Source: U.S.D.A

Benefits of Vitamin B:

The potato skin (peels) is the great provider of vitamins of B and C (*Table-4*), which are needed for our body with the energy needed for numerous functions involving your nerves, muscles, skin, heart and brain. By eating potato skin, you get many of the important B vitamins **[18]**, including (*Table-4*):

Table-4: Vitamins Present in Potato Peels

Name of Vitamin	Amount
Thiamine	06 %
Riboflavin	05 %
Vitamin B-6	21 %
Niacin	11 %
Folate	03 %
Vitamin B-5	10 %
Vitamin C	08 %

Source: Ref. No. [18]

However, the literature survey reveals that the vitamin B in potato skins can help reduce stress and improve your mood and it is beneficial in reducing occupational stress, increasing work productivity and decreasing absenteeism.

Utilization of Potato Peels (Skin):

The literature survey reveals that the potato skin and its extract can be used as the following purposes (*Table-5*).

Table-5: Potato Peels Used In

Sl. No.	Used For	Ref. No.
1	Potato Peels Extract used as a Natural Cosmetic Ingredient	**[10 & 11]**
2	Bio-Fertilizer from Potato Peel	**[12]**

3	Potato Peel's Charcoal used for the Removal of Heavy Metals from Waste Water / Industrial Effluent	**[13]**
4	Used as a Sustainable Source for Biotechnological Production of Bio-Fuels	**[14]**
5	Potato Peels are as a Potential Natural Source of Dietary Fiber	**[15]**
6	Used as a Antioxidant and Antimicrobial Agent	**[16 & 17]**

Source: Authors' Presentation

II. Conclusion:

Potato Peel Waste (PPW) can serve as a basis for phenol extraction, ethanol, lactic acid and enzyme (α-amylase and β-mannanase) production through fermentation, and edible film production. The potato peels waste extract has a high application potential as antioxidant in food systems. It can also prevent oxidation of lipid in oils and meat. The potato peels waste has potential as a base for fermentation reactions because of high starch content, but due to its low fermentable reducing sugar content, requires initial hydrolysis of carbohydrates. Potato peels waste can be used in food industries as dietary fiber source. The potato peels dust can be used in bakery production and replace up to 10% of flour amount without changes in sensory quality. So potato peels waste is the full of food nutrients, can be used as an alternative source of Healthy Ingredients. More research are adequate infrastructure are required for the testing the nutritional values of potato peels and industrial applications. More awareness is required for the benefit of potato peels, such that every stack holder can take part for reducing the domestic solid waste generation.

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