Preparation of wheat grass incorporated biscuits

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Abstract—Wheat grass was taken as key ingredient for preparation of value-added biscuits. When value addition is performed in any existing product or entirely new product is developed. This process called New product development. Objective: To prepare nutritional rich biscuits using wheat grass. Firstly, wheat grass was harvested, cleaned, washed and dried at 40°C for eight hours and then crushed properly transferring them to mixer to convert into powder form. The powder was then mixed at 10%, 7%, 5%, 3%, 2% (respectively named as T1, T2, T3, T4, T5) to the wheat flour that was used for biscuit preparation. On the performance of sensory evaluation, it was found that 3%T3 that is sample with combination (70:30) was most acceptable to panel having a mean overall acceptability score of 4.40. The acceptability of wheat grass biscuits decreased with increase in concentration of wheat grass incorporated. Hence sample with combination 70:30 was most favorable. The biscuit samples were then kept in air tight bags in room temperature and studied for shelf life for 6 months. The product on storage had no microbial growth and sensory score was within acceptable range.

Keywords—Preparation, wheatgrass, new product, biscuit.

I. INTRODUCTION

Biscuits are made by drying them to very low moisture content and may be elucidated as a form of confectionery.

It was described by Fayemi (1981) as a small, thin, crisp cake made from unleavened dough.

According to Okaka (1997), biscuit production can be performed as a mixture of flour and water, but may contain fat, sugar and other ingredients mixed into dough that is rested for a time and then passed to make a sheet between rollers. (Agü et al., 2007)

The consumption of cereal snacks such as biscuits (also known as cookies), wafers and short bread is very common, particularly among children. Some of the most attractive features that biscuit has are a broader consumption base, relatively long shelf life and good eating consistency (Banureka and Mahendran, 2009).

As customer demand for convenient and nutritious food products is rising, biscuits represent a fast-growing food segment as they demand higher quality food products in terms of taste, protection, comfort and nutrition (Lubna Masoodi et al., 2012)

As it is full in itself and needs no additional preparation, biscuits are considered to be the best processed convenience food ever made and are said to be one of the few universal staples. Thus, high molecular carbohydrates, vegetable proteins, and certain vitamins and minerals have become an imperative source (Ahmad and Ahmed, 2014) (Rai et al., 2011)

Biscuit and biscuit-like products have been developed and consumed by humans and manufactured hundreds if not thousands of years and their good consumed quality makes them attractive for protein fortification and nutritional improvements for the elderly and low-income groups, especially in children’s feeding programmes (Banureka and Mahendran, 2009). (Ikechukwu et al., 2018)

In addition to being ready-to - eat, easy, and cheap food items, they include digestive and dietary concepts of vital importance (Kulkarni, 1997).

They are a rich source of fat and carbohydrates, so they provide food with energy and are a good source of protein and minerals (Kure et al., 1998) (Rai et al., 2011).

However, they cannot be classified as healthy snacks because of their high levels of easily digested carbohydrates and fats, typically low levels of fibre, and only moderate levels of protein, as they are typically made from flour, butter, and sugar. People are aware of the food they eat and the advantages of eating nutritious biscuits, according to recent trends.

When taking into account the overall dietary status of underprivileged parts of the population, the development of a high-antioxidant-containing biscuit is a worthwhile challenge.

Therefore, development of new product with less cost and more benefits is required where efforts are used in making the biscuit with incorporation of wheat grass powder.

The present study was aimed to optimize the formulation of wheat grass biscuits of satisfying appearance, textural and structural attributes and to study their shelf life, physicochemical and nutritional properties because of their immense health benefits.

II. WHEAT GRASS

Wheatgrass:

- Taxonomical details
  - Kingdom Plantae – Planty
  - Subkingdom Tracheobionta – Vascular plants
  - Super division Spermatophyta – Seed plants
  - Division Magnoliophyta – Flowering plants
  - Class Liliopsida – Monocotyledons
  - Subclass Commelinidae

Keywords—Preparation, wheatgrass, new product, biscuit.
In the human diet, wheat (Triticum aestivum L.) has played an important role in the majority of nations. There is a protective contribution against chronic diseases suggested by several epidemiological studies to the diet by introducing whole grain and whole grain items (Aydos, Avci, Ozkan, Karadag, & Gurleyik, 2011). (Akbas et al., 2016)

Linn's Triticum aestivum. Commonly referred to as wheatgrass, it belongs to the Gramineae family.

Triticum is an annual and biennial grass genus. The Plants of Wheat

It consists of a much-compressed, broadly linear or linear stem or crown and numerous

In early growth phases, lanceolate leaves yield different varieties of wheat native to the Mediterranean region, Southwest Asia, and widely cultivated almost all over the world. (Chauhan, 2014)

Thousands of years ago, Indians, Greeks, Egyptians, and Chinese used plants and their reformulations to treat many diseases and nutritional deficits. (Boukhris et al., 2012; Kumar et al., 2012; Wannes & Marzouk, 2016; Shaw, Sicree, & Zimmer, 2010). Latest research into the quest for plant-based dietary supplements and medicines has shown a dramatic increase. Ayurveda has already established medicinal properties in plants (Chopra, 2003).

The uses of plants from very ancient times in the world have been discovered to cure many diseases and deficiencies. (1999 by Beecher). Blends of nutrients in the diet are essential for proper growth and maintenance of the body. Therefore, only one diet does not have all the requisite nutrients to maintain health and to deal with diseases. (B. Parit et al., 2018)

Wheat Grass can be referred as the young grass of the common wheat plant, Triticum aestivum which is freshly juiced or dried into powder form for consumption of animals and humans (Bodla, 2011)

After the germination of wheat for 6-10 days, the sprouts formed are called Wheat grass (Triticum aestivum L.) . Compounds like vitamins, antioxidants or phenolics are synthesized by plants due to changes that occur during germination and sprouting. (Kulkarni, Acharya, Nair, Rajurkar, & Reddy, 2006). Chlorophyll is the most important active component in wheatgrass (Akbas et al., 2016). It can be used inside and outside the body as a healer and has anti-bacterial properties. It is important active component in wheatgrass (Akbas et al., 2016). It can be used inside and outside the body as a healer and has anti-bacterial properties. For about 70% chlorophyll, (which is often referred to as the blood of plant life as it has functions equal to hemoglobin because both share similar structure with a difference of magnesium present in chlorophyll and iron present in hemoglobin is present in wheat grass. (Jain and Jain, 2014)

Consumption of any food product lowers the blood's excess acidity (Rashida, et al., 2014). This 70% chlorophyll-containing intake of wheat grass serves as a saver within the body and assists in disease prevention. In addition, it has been known for its medicinal value since ancient times, because the nutrients found in it help promote health and healing. Regular intake also removes toxin from the body, reduces cholesterol, increases digestion and controls blood sugar.

Chlorophyll in wheatgrass helps to repair the bloodstream as well. According to experiments performed on different species, it is claimed to be free of any harmful reactions. Red cell counts were returned to normal within 4 to 5 days of chlorophyll administration, except in those animals that were considered to be highly anaemic or low in red cell counts. It helps to neutralise toxins in the body and helps to reduce issues with blood sugar. (The Bodla, 2011)

It also plays an active role for the inhibition of the metabolic activation of carcinogens (Aydos et al., 2011). (Akbas et al., 2016). Anti-cancer and anti-aging, moreover, Antioxidant pathways have been shown (Goca et al., 2011; Gulc et al., 2012).

Antioxidants can inhibit the free use of Radicals that are commonly believed to attack biological cells are foods that contain food. To deal with this instance, antioxidants may be included in the daily diet. During normal body conditions, the scavenging mechanism will remove reactive oxygen species. In addition, carcinogenesis can result from severe conditions of oxidative stress that can Proteins, lipids, and DNA damage cells and cells (Kasai, Fukuda, Yamaizumi, Sugie, & Mori, 2000).

A number of diseases like brain dysfunction, diabetes, shock, inflammation, infertility, tumors, and cancer can result from body metabolic reactions that cause free radicals. But these free radicals and reactive oxygen species can be controlled by enzymes like superoxide dismutase (SOD) and peroxidase (Amex, 1983; Bandoniene & Murkovic, 2002; Ben-arye et al., 2002). Polyphenol antioxidants are believed to treat cancers, cardiovascular, inflammatory, and neurological disease (Bandoniene & Murkovic, 2002; Ben-arye et al., 2002).

Polyphenol antioxidants are believed to treat cancer, cardiovascular, inflammatory, and neurological disease (Bandoniene & Murkovic, 2002). A crucial role in coping with many of the diseases and complications of the Biological processes that involve many antioxidants can be carried out by plants. Due to the free radical scavenging behaviour of pro-active antioxidant agents, many health problems can be handled. An efficient therapeutic strategy for plants with high levels of components of antioxidants, i.e. There have been proposals for phenolic and polyphenolic compounds. (Parit et al., 2018)

For wheat grass therapy, several patients with chronic diseases such as asthma, atherosclerosis, Parkinson's disease, joint pains, TB, constipation, hypertension, diabetes, bronchitis, insomnia, eczema, sterility, bleeding, obesity and flatulence are recommended. In cancer care, it is also very necessary (Bodla, 2011)

Wheatgrass, which also plays a role in increasing concentrations of haemoglobin, can prevent bacterial infections. Along with vitamin A, C and E and minerals,
several amino acids are found in it. Fe, Ca, Mg, etc., including they also assist with the removal of
Liver and blood toxins and therefore aid detoxification, as well as heavy metals and cancer. It is also possible to eliminate causative agents from the body (Byers et al., 2002; Macintosh, 2008). Wheat grass also helps to cure chronic colds, flu, bronchitis, cough, cystitis, gout, rheumatism, Pressure, chronic skin and even constipation disorders, and inflammation of the mouth and throat (Byers et al., 2002; Gruenwald, Brendler, & Jaenicke, 2004; Macintosh, 2008). (Parit et al., 2018)

It is rich in minerals such as magnesium, selenium, copper, and zinc that have important nutritional and medicinal value. Chromium, beta-carotene-like antioxidants (pro-vitamin A), Vitamin E, vitamin C, anti-anemic factors such as vitamin B12, anti-anemic factors such as Steel, folic acid, pyridoxine, several other minerals and amino acids. Enzymes and acids(Chauhan, 2014)

It helps to destroy dangerous bacteria and to improve the immune system. Overall, the method makes it very clear that wheatgrass is a flexible diet. (2018-Parit et Al.) The 70 percent chlorophyll is found in wheat grass, which is chemically almost identical to hemoglobin, and both share a similar atomic structure to build their respective molecules. The main difference being that iron is the central element of hemoglobin and magnesium is the central element of chlorophyll. Wheat grass recovers the blood's alkalinity, its Alkaline mineral abundance helps minimize blood acidity and thereby promotes metabolism. Wheat grass helps to restore healthy cells and, as described earlier as a detoxificant.(Chauhan, 2014)

Wheats (Tritium aestivum) have been known to have antimutagenicity and antioxidative activity because of the presence of redox enzymes like catalase, peroxidase and other antioxidant compounds such as phenolic acids, alkylesorcinols, and aminophenols(Ashish et.al., 2012). With the aid of wheat grass, some diseases such as thalassemia & distal ulcerative colitis have been confirmed to be cured (Ashish et al., 2012)

III. PRODUCTION

One of the cereal grains that can be sprouted is wheat grass. Others that can also be sprouted include rye, oats, barley, corn, buckwheat and millet. As every other cereal crop, in a hydroponic system, planting is always carried out using only water. The two key methods of cultivation are: field and bed technique. In the former process, grass seed cultivation is carried out in well-drained, fertile soils with a strong moisture content in excess of 375 mm of precipitation and high lime content as grass is not that much resistant to drought, salinity and waterlogging (Beetz, 2002).

For seed production, heavier soil textures are best suited as reliable precipitation required for excellent seed production on lighter textured soils. As on the other side, the bed technique involves growing seeds in shallow beds made up of a mixture of soil and peat moss / vermiculite. Grain soaking is carried out before the root radicle emerges from the coat of the crop. After that, they are put on the beds. The seeds are grown in the dark at first and then exposed to them later after two or three days to light. Shallow trays are often more preferred for growing them (Zendehbad, Mehran and Malla, 2014).

However, greenhouses are used in some cases for production. With the laying of thermal tubing on top of polystyrene that is allowed to settle on the ground, the greenhouse method starts. This is the black plastic used to cover it. Thermal tubing functions so that it distributes heat from hot water heaters, which act as a root-zone heating device there. After that, a covering of compost or soil-less potting mix is laid on top of plastic about an inch thick. Soaked grains on top of the compost-mixture are spread so that each makes contact with the soil. The seeds are moistened by adequately watering it. Just before the second pair of leaves emerges, the sprouts are usually ready for harvest within a week or eight days, usually resulting in a small, lush lawn.

Harvesting is carried out either by cutting with scissors or by using a knife just above the level of the soil or with the roots pulled out. If they are removed, the second harvest is mostly carried out during the following week. For consistent harvests, some of the variables such as correct temperature, light, and humidity are critical, so careful attention is to be paid to them.

As they are very perishable, the commodity should be processed or stored soon after harvest(in German, Ogutu et.al., 2017).

Many products, such as health supplements (powders, extracts) and medicines, are currently available.

As a type of wheat grass, (tablets) are available. Since they are consumed only by people in poor health circumstances, they are not so common and thus lead to the absence of their widespread acceptance.

In addition, other reasons for its lack of market acceptance are Factors such as poor organoleptic flavour, aroma and flavour characteristics Color, for good quality, strict growing conditions Wheatgrass and the bad shelf-life of their products as well.

(2012) (Ashish et al.,)

IV. PREPARATION

1) Soaking and Germinating the Wheatgrass Seeds

The seeds should be measured and washed before they are to be soaked and germinated. Around two measures of seeds used for a 16” × 16” plate. By utilizing colander with little openings or a strainer wash the seeds in cool, clean water and place them in a dish after channeling them well. Selection of seeds need to be done that are free from pesticides and then soak them overnight. Germination is initiated by soaking of seeds. By the end of the process, sprouted small roots will emerge out from seeds.

2) Planting the Seeds

To prevent the wheatgrass roots to grow through the holes, the paper towels should be arranged in seed tray in bottom of tray. Inside the seed tray spread organic compost or put soil as even two-inch layer inside it. It should be checked that
pesticide or any other chemicals not present in pre-moistened compost or potting soil. To get benefit of wheat grass mostly organic soil should be used. The seeds should be then planted and across the top of the compost spread in an even layer. Rather than completely burying them the seeds should be slightly pressed onto the soil. There should be prevention of piling up of seeds. Sprinkling of seed tray should be done with water in such a way that each seed should get sprinkled water. To protect the seedlings from drying the seedling tray should be covered with moistened sheets of newspaper to protect the seedlings from drying.

As the seeds root themselves in the seed tray they should be damp. Sprinkling should be done every morning with water by lifting the Newspaper also noticing that water logging should not happen. Newspaper then removed after four days. Once a day sprouted grass should be watered and its direct exposure to sunlight must be avoided.

3) Harvesting the Grass

The grass can be harvested after they split and it can be done after 9 or 10 days of growth (Thammana .et al., 2016).

CONCLUSION

Wheat grass which can be referred as young grass of wheat plant has much of nutritional benefits. It reduces excess acidity in blood, prevents illness, helps in detoxification, reduces cholesterol levels, aids in digestion, balances blood sugar levels, cure inflammation and has healing action. It has anti-bacterial, anti-cancer and anti-aging properties; it is also anti-mutagenic.

It is rich in various phenolic compounds, anti-oxidants, vitamins, and minerals. It is natural and safe and can be incorporated in daily diet to boost up immunity and holds a therapeutic and nutritional value.

REFERENCES