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Benefits of millet based beverages and their traditional way of processing and utilization: A review

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Abstract

Millet is a varied group of inconsequential seeded grasses that are broadly grown up as cereals for human food all over the world. Millets are historically and largely consumed in parched and semi-dry regions. Because of their high nutritional value and high protein, essential fatty acids, dietary fibre, B-Vitamin, and mineral content, they are used to treat illnesses such as diabetes, high blood pressure, thyroid, cardiovascular, and celiac disease. Millets also provide nutraceutical benefits in the form of antioxidants. Millets have historically been fermented and malted into a variety of goods. Some probiotic drinks are made from finger and foxtail millet and can be bought as functional foods. They provide health benefits from millet malt as well as probiotics. Millets are used to make traditional drinks such as Malt, Mangisi, Jandh, Burukutu or Pito, and Tongwa. These should be incorporated into the diet.

Keywords: Millet processing, millet beverage, traditional millet drinks, nutritional benefits

Introduction

Millets are a category that belongs to extremely varied tiny seeded grasses that are commonly farmed as cereal crops helps in human sustenance all over the world. They are not classified as a taxonomic group, but rather as a functional or agronomic group. The arid/dry land regions of the world traditionally eat millets as a primary diet. They are produced on roughly 17 million acres in India, producing 18 million tonnes annually and making about 10% of the nation's total grain production. They are nutri-cereals, which are noted for their high nutritional content and high protein, fat, dietary fibre, B-Vitamin, and mineral content, including calcium, iron, zinc, potassium, and magnesium. They contribute to the improvement of conditions including reduced blood sugar levels (diabetes), controlled blood pressure, thyroid, cardiovascular, and celiac disorders (Dayakar *et al.*, 2017) ^[1]. These are gluten-free, alkaline-forming grain. And also high in phytochemicals and micronutrients, which play dynamic roles in the body's immunological system. Millets offer nutraceutical characteristics in the form of antioxidants that protect human health by lowering blood pressure, lowering the risk of heart disease, preventing cancer and cardiovascular disease, diabetes, and decreasing tumor instances, among other things (Batool *et al.*, 2022) ^[16]. Other health advantages include extending the time interval between stomach emptying and providing roughage to the gastro intestine. (Sarita, E. S., & Singh, E. 2016) ^[2]. Nutri-cereals are a better choice than cereal grains such as rice and wheat because they contain more nutrients such as complex carbohydrates (Low GI), proteins with balanced amino acids, dietary fibre, good-quality invisible fat, and noticeably higher amounts of micronutrients such as calcium, potassium, magnesium, iron, manganese, zinc, B complex vitamins, and bioactive phytochemicals. (Poshadri *et al.*, 2023) ^[11]. It is showed in earlier results that they are having good source of phenolic acids, phytates and tannins which are the anti-nutrients which help in reducing the risk for colon and breast cancer. It is showed that phenolic in millets are effective in preventing the cancer initiation and progression *in vitro* (Chandrasekara A, *et al.*, 2012) ^[12]. Millet has historically been transformed into a range of products by fermentation and malting. But throughout time, a paradigm change was place, giving rise to fresh commercially available goods. Although millet has been used in a variety of goods, its main culinary applications are still limited to traditional customers, and it is still relatively underutilised (Adebiyi *et al.*, 2016) ^[8]. Researches showed that probiotic drink produced from finger and foxtail millet was provided as functional food. They offer health advantages from millet malt as well as probiotics

In certain studies it is mentioned that cooked malt was treated with *Lactobacillus acidophilus* bacteria and *Lactobacillus bulgaricus* bacteria and nurtured at 37 °C for 4, 5, and 6 hours. The beverage is made using sugar and kept in a refrigerator (4 °C). Sensory assessment was used to choose the optimal fermented period, and the sample fermented for 6 hours had the maximum acceptance. Probiotics dramatically reduced both reducing and non-reducing sugars (Mali *et al.*, 2020) [3]. Sorghum and finger millet were used by way of the basic materials for three flavoured ready-to-drink drinks. For colour and flavour, dried desiccated coconut, carrot, and cocoa powder were utilised. Consumers found optimised drinks agreeable, as evidenced by an overall acceptability score of 7 or higher on a 9-point hedonic scale (Bembem & Agrahar-Murugkar, 2020) [4]. Millets have been proven to be outstanding homes of insoluble dietary fibre, lipids, and minerals, having values ranging from 9.3-56.7 mg/g, 11.5-31.7 percent, and 2.1-8.0%, respectively. Linoleic and oleic acids, the most abundant unsaturated fatty acids found in all millet species. Millets were also shown to be high in phenolic acids, both permitted and restricted. Kodo millet has the greatest levels of free and bound phenolic (Bora, P., Ragae, S., & Marcone, M. (2019) [5]. An ambil-like fermented milk beverage based on pearl millet (PM) was the beverage that can compete with carbonated beverages (Nakade & Swapnil, 2022) [6]. Processing grains and millets has an important role in their use as diet. Petty millets can be ingested by making flour of rice from them, germination, roasting, popping, salty ready-to-consume grains, gruels, and fermented items. Millet grains are hard seed coat grains, thus their processing begins with husk removal. (Jaybhaye *et al.*, (2014) [14]. Two Types of millets are noticed Naked and husked grains. Naked grains comprise three varieties of grains that lack the stiff, indigestible husk that some millets possess. Ragi, Jowar, and Bajra are examples of millet varieties. After harvest, these millets do not require processing. They may be utilised immediately after being washed. Husked grains are some millets like Foxtail millets, kodo millet, and little millets are the second kind of millets. The seed coat on a few varieties are indigestible. When they are prepared to be food, the husk on them needs to be taken off. Millets contain a wide range of micronutrients, including iron. They additionally require longer to digest, which prevents the blood sugar increase associated with rapidly digested foods. Including millets in your diet can help you manage your diabetes. The probiotic drink made with barley, finger millet, moth bean and coconut milk received the highest sensory rating scores, followed by those made with water, soymilk, and almond milk. A probiotic bacteria called *Lactobacillus acidophilus* was added to drink concoctions as an inoculant (Chavan *et al.*, 2018) [7]. Sorghum's phenolic components are mostly made up of phenolic acids, 3-deoxyanthocyanidins, and condensed tannins. (Xiong *et al.*, 2019) [13]. Germination and fermentation improved the overall nutritional properties of millets, but excessive dehulling, polishing, and milling reduced dietary fibre and micronutrients. (Gowda *et al.*, 2022) [15].

Millet drink or beverage

Millet based drinks are alcoholic or non-alcoholic beverages can be made by fermentation and non-fermentation process. Traditionally fermented millet foods and beverages.

1. Malt: Traditional malting consists of three major

operations: soaking, germination, and drying by high enzyme activity. Malt from pearl millet and sorghum is a historic practise in Africa, where malt is utilised in the creation of lactic acid and alcoholic fermented drinks, as well as infant nourishment. It causes significant biochemical changes in the millet grain that are advantageous.

- 2. Mangisi:** A naturally fermented sugary and tangy beverage created by finger millet. This mash is then combined with water. For 80 minutes, the mixture is steadily heated. Almost to the point of boiling. The end result is a delicious mash. (Masvusvu).
- 3. Jandh:** Jandh is a somewhat acidic and sweet Nepalese beverage and alcoholic drink. It's a kind of beer. It is a finger millet fermentation product. (Either koko or Marua). It is occasionally supplemented with a tiny quantity of wheat or maize. It is also cooked and served on banana leaves. The starting culture is dusted over the boiling and cooled seeds (Murcha). The seeds are well mixed before being placed in a mound and let to ferment.
- 4. Burukutu or pito:** These are made together by fermentation process, a brownish suspension or liquor from malted or germinated single cereal grains such as millet or a blend of millet grains.
- 5. Togwa:** togwa is a lactic acid fermented beverage consumed in Africa. It is usually made from maize flour and finger millet malt (Amadou *et al.*, 2011) [9].

Methodology

From 2013 through 2023, some review articles and write-ups were used to collect data on millet beverages, processing techniques, and health effects through the internet. Data was acquired via seeking out via internet and web browser and literature related topic on such as Google scholar, Research Gate, science direct and Krishikosh. In order to discover the proper research articles, the literatures were also sensibly checked. Search criteria for relevant research papers included phrases such as "millet beverage," "importance of millets," "traditionally made beverages and processing," and so on.

Conclusion

To Recognized the processing of millet-based drinks according to traditional culture in Africa and Nepal, as well as the advantages of certain millets utilised in production. According to a study of the literature, fermented, non-fermented, and probiotic beverages have all proven to be beneficial in terms of nutrition and absorption. Millets provide a number of health benefits, including anti-diabetic, hypo cholesterolemic, and other chronic disease prevention. People are unaware of the advantages of millets drinks, which may be consumed by people of any age and in various forms such as probiotic beverages, fermented drinks, and malt. Some beverages include a high concentration of gut-healthy bacteria, and constitute gluten-free, and are a rich source of calcium. As an outcome, in order to know the processing and development of millet-based beverages, some value addition and modification should be practised according to community need.

A public awareness campaign highlighting millet characteristics and health advantages is required.

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