

Button Mushroom: An efficient substitute to confectionary industry for management of hypovitaminosis D

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Introduction

Due to adoption of lethargic lifestyle vitamin D deficiency or hypovitaminosis D has posed a global threat. Multiple studies reported that 70-100 % of Indians across all age categories either lack sufficient vitamin D or are deficient for this fat-soluble micronutrient. The most effective population-based strategy for achieving vitamin D sufficiency is fortifying staple foods with vitamin D. A lack of vitamin D often results in infections as tuberculosis, cardiovascular diseases, diabetes, cancer, and bone-related diseases such as osteoporosis and rickets. It has low sugar content, lipid levels, absence of cholesterol, and presence of a higher proportion of polyunsaturated fatty acids i.e. PUFAs (Srivastava et al., 2023). Further, the natural sources of vitamin D are extremely rare, and the majority of them are non-vegetarian. Among the vegetarian meals, button mushrooms may provide a fair supply of vitamin D and a concentrated source of ergosterol, a precursor to vitamin D₂ (Urbain et al., 2011). The presence of this precursor is the key player for suggestive role of button mushroom in hypovitaminosis D as it converts in the presence of UV-B or sunlight into its active vitamin D form.



Fig. 1: Packaged button mushroom and trial conducted for developing button mushroom cookies

Button Mushroom: Future nutri-superfood

Agaricus bisporus (figure 1) belonging to the kingdom fungi is widely consumed all around the world due to their taste, edibility, and nutritional benefits. It comprises of various micronutrients including both vitamins and minerals. Mushrooms have a moisture

content of 86.5-94.5% (Desayi et al., 2013). They are perishable in nature and as a result, the moisture loss can cause them to deteriorate quickly at room temperature. However, the nutritional value and usefulness of cereal-based products can be enhanced by the addition of mushrooms. Cookies are the common sweet bakery delicacy. Cookies made with food sources rich in bioactive components will turn out to be an efficient solution to satisfy dietary requirement while parallelly supporting good health. Hence, the use of mushrooms in bakery requires further study due to the rise in demand for bakery goods with higher nutritious content (Desayi et al., 2013). With high levels of polyphenols, ergothioneine, vitamins, minerals, and polysaccharides, it is regarded as a beneficial food for health associated aspects. *A. bisporus* possess certain beneficial therapeutic properties such as anticancer, anti-aromatase, antibacterial, immunomodulatory, anti-inflammatory, and antioxidant activity (Liu et al., 2013). In addition to increasing fiber and mineral content and improving functional qualities, edible mushrooms have the potential to be employed as a functional ingredient in food products. Apart from its high protein content (18-35%), mushrooms also have low fat and calorie content, as well as high mineral and dietary fiber content with polysaccharides such as β -glucans. Button mushrooms account for 73% of the commercial mushroom market in India; oyster mushroom output is second, with a share of 16%; the remaining 11% is made up of milky mushrooms and paddy straw (Dhillon et al., 2023).

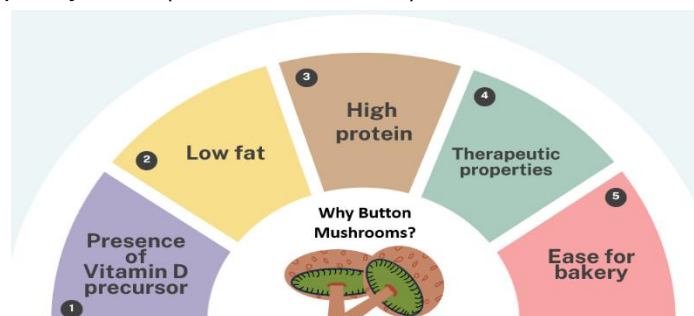


Figure 2: Reasons for suggesting button mushrooms for bakery industry for management of hypovitaminosis D

There is a significant increase in the requirement of nutritionally fulfilling healthy diet not only for daily regular diet but also for the treatment of certain chronic disease and persistent infections. Experts from all around the world are discovering that mushrooms are healing foods high in nourishment. Clinical trials conducted globally by the world health organization (WHO) and the National Institute of Health (NIH) have demonstrated the therapeutic capabilities of button mushroom. Since mushrooms are a significant natural source of both medicine and food, the Food and Drug Administration (FDA) has officially designated them as "healthy foods" (Sinha et al., 2021).

Vitamin B, riboflavin, niacin, pantothenic acid, ergo sterols, and minerals including copper, potassium, and selenium are all found in mushrooms. In addition, mushrooms have a variety of medicinal properties such as antibiotic and enzyme inhibitor that support human health (Beelman et al., 2003). Studies revealed that mushroom is a powerhouse of nutrition and utilization in the form of value-added products can be a boon for health and food processing sector especially baked products which are in high demand among all the sections of the society. Biscuits are readily consumable, affordable, and easy dietary items that adhere to essential digestion and dictation principles. In India, these are growing in popularity among the rural and urban inhabitants alike. Protein content in these baked goods ranges from 6–7%. Biscuits are considered advantageous for nutritional enrichment in feeding programs because of their extended shelf life. Due to its high nutritional content, biscuit consumption has increased recently in the majority of countries. Due to their high and significant protein content (20–40% dry weight basis), vitamins (especially vitamin B–complex), and minerals, mushrooms offer a lot of promise as a bakery base material good (figure 2). Thus, mushrooms can be powdered after processing i.e., drying and powdering for utilization as a fortifier in baked goods such as breads, biscuits and other confectionary items.

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