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Salep: The Common Name of The Plant, Powder, Hot Beverage, Food Ingredient

Bitki, Toz, Sıcak İçecek ve Gıda Katkısı Olarak Salep

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ABSTRACT

Salep is a plant, and tubers of this plant consumes as powder form to produce hot beverage named also salep and as a food ingredient used as natural stabilizing agent in ice cream industry. Because of insensible collection of some salep species were in process of extinction and prohibited by the Republic of Turkey Ministry of Food, Agriculture and Livestock. The tubers of orchid species as Anacamptis pyramidalis, Dactylorhiza romana, D. osmanica var. osmanica, Himantoglossum affine, Ophrys fusca, Oph. holosericea, Oph. mammosa, Orchis anatolica, O. coriophora, O. italica, O. mascula ssp. pinetorum, O. morio, O. palustris, O. simia, O. spitzelii, O. tridentata, and Serapias vomeracea ssp. orientalis are used. The aim of this study is to review the studies done about salep.

Key words: Salep, Glucomannan, Food ingredient.

ÖZET

Salep bir bitki olup yumruları toz hale getirilerek yine adı salep olan sıcak bir içecek olan gıda maddesinin üretiminde ve dondurma endüstrisinde doğal stabilizer ajan olarak kullanılmaktadır. Bazı salep türlerinin bilinçsizce toplanması nedeniyle yok olma aşamasındadır, bu türlerin toplanması Gıda, Tarım ve Hayvancılık Bakanlığı tarafından yasaklanmıştır. Salep olarak Anacamptis pyramidalis, Dactylorhiza romana, D. osmanica var. osmanica, Himantoglossum affine, Ophrys fusca, Oph. holosericea, Oph. mammosa, Orchis anatolica, O. coriophora, O. italica, O. mascula ssp. pinetorum, O. morio, O. palustris, O. simia, O. spitzelii, O. tridentata, and Serapias vomeracea ssp. orientalis yumruları kullanılmaktadır. Bu çalışmanın amacı saleple ilgili yapılan çalışmaları gözden geçirerek bir araya getirmektir.

Anahtar Kelimeler: Salep, Glucomannan, Gıda Katkısı

1. INTRODUCTION

Salep is the common name of an orchid, powder of that plant, hot beverage and also a food ingredient. It is obtained from the tubers of orchid species as *Anacamptis pyramidalis*, *Dactylorhiza romana*, *D. osmanica* var. *osmanica*, *Himantoglossum affine*, *Ophrys fusca*, *Oph. holosericea*, *Oph. mammosa*, *Orchis anatolica*, *O. coriophora*, *O. italica*, *O. mascula* ssp. *pinetorum*, *O. morio*, *O. palustris*, *O. simia*, *O. spitzelii*, *O. tridentata*, and *Serapias vomeracea* ssp. *orientalis* (Sezik, 1984).

Orchids were cultivated and described by Chinese firstly. Confucius (551-479 BC) called the orchid the 'King of Fragrant Plants', The Greeks referred to testicles as orchids, and Theophrastus (372-286 BC) named the orchids from that word. In Europe, it is used as anti-pyretic, anti-consumption and anti-diarrheal. The Ottomans extracted 'Sahlep' from the dried tubers. Than the Arabic word became corrupted in English to Salep. Today, Salep is largely collected in Asia Minor, Germany, Greece, Afghanistan and India. It is used in Turkey for making ice-cream and beverages (Bulpitt, 2005).

Because of insensible collection of some salep species were in process of extinction and prohibited by the Turkish Ministry of Agriculture and Rural Affairs (now the Republic of Turkey Ministry of Food, Agriculture and Livestock) in 2003 (Anonymous, 2003).

After the picking of the roots or tubers of orchids, they are boiled in milk or ayran for inhibition the enzymatic activity and reduce the loss of water-soluble ingredients, then stringed, dried and ground. Salep is a good source of a stabilizer since it contains appreciable amounts of glucomannan (17.7-54.6%) and also starch (5.44-38.7%) (Tekinşen and Güner, 2010).

Glucomannans are neutral polysaccharides which act as a source of (soluble) dietary fiber. Unlike other soluble fibers, they are characterized by having extraordinarily high viscosity. Glucomannans are constructed from mannose residues as the primary sugar with glucose as the second sugar plus some acetylated residues and galactose side chains (Tester and Al-Ghazzewi, 2016)

Glucomannan is considered to be the most important constituent of salep, and bulk forming laxative. It promotes the colon for the treatment of constipation (Marzio et al., 1989). Glucomannan delays stomach emptying causes a more gradual absorption of dietary sugar, reduce the elevation of blood sugar levels after a meal. Glucomannan can also bind with bile acids in the gut and carry them out by the feces, which requires the body to convert more cholesterol into bile acids (Wu and Peng, 1997; Tester and Al-Ghazzewi, 2013)

Salep can be used as stabilizer in ice cream industry as gelatin (E441), guar gum (E412), sodium carboxymethyl cellulose (CMC) (E466), locust bean gum (carob bean gum) (LBG) (E410), carrageenan (Irish moss) (E407), xanthan (E415), alginates, sodium alginate (E401), microcrystalline cellulose (Cellulose gel) (MCC) (E460), balangu seed gum (BSG) (Bahramparvar and Tehrani, 2011).

2. PREVIOUS SALEP STUDIES

Chemical composition of salep harvested from Antalya, Kastamonu, Kahramanmaraş, Muğla, Silifke, Van were studied as regards to the contents of mucilage, starch, reducing sugar, saccharose, water and ash. The content of mucilage was 40.12, 39.88, 11.62, 44.04, 41.02, 17.62 %; starch contents were 8.40, 13.86, 19.13, 13.04, 17.70, 17.77 %; reducing sugar contents were 0.90, 1.95, 0.30, 1.01, 0.90, 0.96%; saccharose contents were 1.11, 0.76, 1.84, 1.95, 1.40, 1.23%; water contents were 12.38, 1.32, 8.62, 9.76, 10.22, 9.64% and ash contents were 9.68, 4.66, 3.59, 2.52,4.08, 2.45%, respectively (Özkan, 1991).

The effect of salep concentration on the rheological characteristics of ice cream mixes (0.5-1.5% salep content), prepared from nonfat cow's milk and sugar, was studied using a controlled stress rheometer. The time-dependent flow behavior of ice cream mix has been studied and the samples showed slightly thixotropic behavior, which increased as salep content increased (Kuş et al., 2005) .

Effect of salep as a hydrocolloid on storage stability of incir uyutması dessert was studied. Salep addition caused an important increase on viscosity and the water holding capacity (Ayar et al., 2009).

Salep samples from *Orchidaceae* species was contained 2.02% lipid. The highest fatty acid composition of the samples was: Linoleic acid 18:2ω6 (59.90%) in *Orchis italica*, palmitic acid 16:0 (33.78%) in *O. anatolica*, oleic acid 18:1 (28.65%) in *O. palustris*, stearic acid 18:0 (14.20%) in *Serapias vomeracea* ssp. *orientalis*, and myristic acid 14:0 (10.47%) in *O. anatolica*. Linoleic and palmitic acids were the most abundant unsaturated and saturated fatty acids in all parts. The total SFA (saturated fatty acid) of the studied species were between 24.67-61.24%, while the PUFA (polyunsaturated fatty acid) was 9.27-66.04%. Palmitic acid was mostly found in leaf and the major SFA as 47.29-68.83% to the total SFA content. The level of MUFA (monounsaturated fatty acid) depends on the level of oleic acid. The greatest proportion of oleic acid was found in *O. palustris*. Erucic acid was found between 0 to 1.31% in all species (Citil and Tekinsen 2011).

The mechanical and physical properties of salep-based edible film was investigated. Salep showed potential value as a carbohydrate source to form biopolymer edible films for packaging of low and intermediate water activity food products. Palmate tuber variety salep provided the required physical and mechanical properties and had a potential for use in edible film production (Ekrami and Emam-Djomeh, 2014).

A coating material made from novel hydrocolloid basil seed gum (BSG), salep, and a mixed solution of BSG and salep as well as oil origin (canola or palm olein) showed to reduce oil absorption in deep-fried potato strips. The most effective coating formulations were 0.5 % BSG and 1.5 % salep. For these formulations, maximum oil uptake reduction was 28.8 and 28.7 % for potato strips compared to uncoated samples (Karimi and Kenari, 2016).

3. GLUCOMANNAN CONTENT OF SALEP

Sezik (1984) reported that depending on the species, salep contained 7-61% glucomannan, 1-36% starch, 0.5-1% nitrogenous substances, 0.2-6% ash in the form of dry material, and 6-12% moisture.

The rheological characteristics of healthy dairy beverage containing glucomannan (salep) and galactomannans (locust bean gum, LBG and guar gum, GG) studied with steady and oscillatory shear measurements. They concluded that salep and locust bean showed similar viscoelastic behavior but guar gum had completely different rheological characteristics in milk beverage as compared with salep and locust bean gum (Yaşar et al.,2009).

Moisture content (%), glucomannan (%), starch (%), fat (%), protein (%) and ash (%) contents of palmate tuber variety salep were 15.79, 47.55, 2.30, 2.08, 3.49,7.13 and rounded-tuber salep type were 13.29, 19.37, 6.85, 2.40, 7.35, 2.80, respectively (Farhoosh and Riazi, 2007).

Chemical composition and physicochemical properties of tubera salep produced from some *Orchidaceae* species were studied. The highest glucomannan content were found in *O. italica* as 54.6 g/100g (Tekinşen and Güner, 2010).

Film-forming properties of salep glucomannan (SG) and its physical, barrier, mechanical, sorption and thermal properties, and steady and oscillatory rheological behaviors were studied. Also, galactomannan films (LBG, locust bean gum; GG, guar gum) were compared with SG films. The physical properties of SG films were good at food applications. The oxygen and water vapor barrier properties of SG were better than others, and SG film was less mechanically resistant than LBG but more flexible than galactomannan films. The highest transition temperature (Tg) was determined to be −11.46 ± 0.65◦C for SG film. They concluded that SG has good potential for use in producing an edible film for various food applications (Kurt and Kahyaoglu, 2014).

It was concluded that controlled deacetylation of glucomannan from salep exhibited a thermo irreversible character. The gel strength was improved by increasing deacetylation degree and this caused smooth surface. Deacetylated salep glucomannan powder dissolved hardly, and high temperatures promoted the dissolution of samples at lower degrees of deacetylation. The deacetylated salep glucomannan samples showed higher integral procedure decomposition temperatures values. The gel behavior properties and the characteristics with the different acetyl ratio of salep glucomannan were effected the utilization of salep in different fields of polymer application (Kurt and Kahyaoglu, 2017).

4. FUTURE PROSPECTS

In the future the potential properties of salep as cryoprotectant agent, potential fat analogue/fat replacers and on volume increase (overrun) can research. Also, the health prospects of salep like minimization of insulin levels, age-related histological changes, weight loss may study.

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