Biscuits with Aquatic Bioactive Ingredients

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In modern-day societies, health is one of the central values, which are primarily focused upon. Healthy attributes of foods are prime theme in various organizational or governmental initiatives. The fast moving lifestyle of today's environment has burdened us with huge amount of stress, which is taking a toll on our mind and body. Due to upsurge in various diseases like coronary heart disease, diabetes, ageing etc., there is a continual demand for foods with enhanced functionality, which can be handy against many diseases either through preventive or recuperative effect. Due to consumers' demand for healthier foods, the food industry is directing new product development towards the area of functional foods and ingredients. Functional products are a new variety of foods that promise targeted improvement in physiological functions in the body. In these foods, particular components are directly connected with well-defined physiological effects and the health benefit is linked to a single product. Functionality creates a novelty in the food without necessarily changing the sensory quality of the product. The importance of functional foods, nutraceuticals and other natural health products has been well recognized in connection with health promotion, disease risk reduction and reduction in health care costs.

Bakery products are a suitable carrier for utilization of seaweed functionality because of their wider reach. Biscuits are favourite food widely consumed mostly due to their pleasant taste, ready to eat nature, accessible cost and availability and longer shelf time and they can contribute significantly to daily cereal intake. However, in the era of increasing popularity of functional foods and nutraceuticals, new demands have been set for different categories of snack foods including biscuits maintaining traditional nutritional aspects of foods and exhibiting additional health benefits. The development of new functional ingredients has the advantage that food manufacturers can add extra value to products the consumer is already familiar with. The main factors that have to be considered are the variations affecting the processing conditions, the sensory properties, and the nutritional value of the final product. Biscuits represent a potential choice for the addition of functional ingredients.

Collagen peptide is a major component of skin, scale, bone and visceral mass. Collagen is one of the most abundant animal proteins. It is fibrous in nature and forms the basis of mechanical/ structural support in living tissues. Collagen is having unique amino acid composition and it possess distinct bioactive propertiesCollagen peptide are considered as a functional ingredient for its health beneficial effects. Collagen peptides are hydrolyzed forms of collagen i.e. short chains of amino acids. Hydrolysis of collagen produces small molecular weight peptides having increased biological activities. Collagen peptides also promote the absorption of vitamins and minerals. Small peptides

are desirable for nutraceutical and pharmaceutical applications. The collagen peptides are water soluble and their bioavailability is relatively higher than native collagen. Collagen peptide consumption increases the bone mineral density and supports healthy joints. The peptide also provides better inflammatory response against inflammation arising from training and exercise Elderly/aged people suffer from various age-associated degenerative diseases particularly, bone-linked problems. Ageing is associated with inflammation and higher risk of osteoporosis due to changes in bone density. Age- related bone loss can be effectively prevented by the dietary supplementation of collagen peptide.

Biscuits are important and commonly eaten baked products like cakes, pastries, bread etc. obtained from wheat flour. Biscuits are energy dense foods consumed either as breakfast items or snacks. Biscuits can be classified into three categories: sweet, semi-sweet and salted. Sweet biscuits are produced from soft dough and have higher sugar and fat content than semi-sweet and salted biscuits. Semi-sweet biscuits are produced from hard dough and have lower fat and sugar content. Salted varieties also called crackers have low fat and sugar. They are also produced from fermented doughs. Refined wheat flour is the base material required for biscuit preparation and acts as main structural component. Protein content of wheat flour governs the quality of biscuits produced. Generally, flour having protein content < 9% are preferred for biscuit making. Sugar imparts sweetness to the biscuit. It also improves the colour and flavour of the biscuits. Higher sugar causes hardening of biscuit texture. Fat gives a shortening effect to the dough and makes the dough more extensible. Moreover, fat gives the palatability to the biscuit. Salt also imparts taste to the biscuits. The leavening agents are added to biscuits for porous and crisp texture. Ammonium and sodium bicarbonate are generally used for leavening in biscuits. Water is added to maintain consistency of dough. It also helps in uniformly distributing the salts and leavening agents. Steam generated also gives some leavening effect to biscuits. Skim milk powder or milk are added for flavour and colour development. Emulsifier help in uniform dispersion of fat throughout the dough. Lecithin, glyceryl monostearate and sodium steroyl lactate are added as emulsifier in biscuits.

Preparation of Collagen Peptide Supplemented Biscuits

The formula for biscuit is presented in table 1. The stages for biscuit preparation are presented in Figure 1. Initially, fat and powdered sugar are creamed for 3-4 min in a planetary mixer. The mixing is carried out further after adding lecithin, flavour, skim milk powder and invert syrup. Salts and leavening chemical are dissolved in water and then added to creamed mix. Then, collagen peptide and refined wheat flour mix is added to the mixer and mixing is continued. Water may be added to achieve desired consistency dough. The dough produced is soft in nature and breaks very easily. The dough is allowed to rest for 30 min. The dough is then sheeted into desired thickness (4 mm) and shaped. The shaped biscuits are placed over a baking tray and baked at appropriate time-temperature combination (180°C for 14-15 min) to get optimum quality biscuits. Biscuit are then allowed to cool at room temperature and packed in metallized polyester pouches.

Table 1. Recipe for collagen peptide biscuits

Refined wheat flour	:	90 g
Collagen peptide	:	10 g
Powdered sugar	:	30 g
Biscuit fat	:	40 g
Lecithin	:	0.5 g
Salt	:	0.5 g
Sodium bicarbonate	:	0.5 g
Ammonium bicarbonate	:	1.0 g
Skim milk powder	:	2 g
Invert syrup	:	2 g
Vanilla flavour	:	0.1 g

Fig. 1 Collagen peptide supplemented biscuits

Fig. 2 Different stage in preparation of collagen peptide enriched biscuits

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