Folate Content Of Mung Bean Flour Prepared By Various Heat-Treatments

Miftakhussolikhah[a*], M. Kurniadi[a], C. Dewi Poeloengasih[a], A. Frediansyah[a], A. Susanto[a]

[a] Technical Implementation Unit for Development of Chemical Engineering , Process Indonesian Institute of Sciences, Jl. Jogja-Wonosari Km 31.5 Gading, Playen, Gunungkidul, Yogyakarta, Indonesia.

Abstract

The aim of this study was to determine the pretreatment conditions resulted in the lowest lose of folate content and other macro nutrients of mung bean flour production. The pretreatments applied in this study were: (1) blanching at 100°C for 15 min, (2) steaming at 100°C for 15 min, (3) roasting at 160°C for 15 min. The result of this study indicated that the best pretreatment condition for producing mung bean flour was blanching at 100°C for 15 minutes which resulted in the folate content of 18.66 ppm.

Introduction

Mung bean (*Vigna radiate* L.) is a popular legume in Indonesia. The beans are usually consumed as a traditional food. Mung beans are important source of protein. Mung bean supplies a higher proportion of protein than any other plant food can. When mung beans are combined with cereals, the result is a complete protein. Mung beans are also rich in lysine. Sprouted mung beans contain vitamin C that is not found in the bean [1]. Mung bean extracts showed anti diabetic, anti-inflammatory, anticancer, antibacterial and anti-oxidant activities [2]. Mung bean contain protein, fat, carbohydrates, vitamins B1 and B2, carotene, niacin, folic acid, also contains minerals calcium,

* Corresponding author.
E-mail address: miftalipi@gmail.com

phosphorus, iron, etc [3].

Folate is a water-soluble vitamin B that is naturally present in some foods. Folate deficiency can cause neural tube defects in babies born, brain disorders, megaloblastic anemia, dementia, alzheimer's, colon cancer, and coronary heart disease. Folate deficiency anemia happens when a lack of folate force the body to produce abnormally red blood cells that cannot function properly.

Processing mung bean into flour could increase its shelf life and economic value. Pretreatment of mung bean should be done to eliminate unpleasant odors in mung bean flour. Mostly food processing involved heating process using high temperature such as roasting, steaming, boiling. Folate is a compound that is not stable at high temperature. Folate lost during cooking process is a result of vitamin thermal degradation into the cooking water and heat damage [4]. Folate content lost during processing need to be determined. The aim of this study was to determine the optimum pretreatment condition wich have the lowest contain lose of folate and proximate in mung bean flour production.

Materials and Methods

Materials

Mung bean variety Gronong was obtained from Balai Pengembangan Perbenihan Tanaman Pangan dan Hortikultura (BPPTPH) Yogyakarta. Chemicals such as methanol, petroleum ether, etc were obtained from a local agent.

Methods

Mung bean flour processing

Mung bean flours were prepared by three different pretreatment methods i.e. (1) by blanching the mung bean at 100°C for 15 min followed by drying, grinding and screening; (2) by steaming the mung bean using a steamer at 100°C for 15 min followed by drying, grinding and screening ; (3) by roasting the mung bean using a roaster at 160°C for 15 min followed by drying, grinding and screening.

Flour characterization

The macro nutrients of flours were determined according AOAC [5]. Ash, fat and water content were determined using gravimetry method and the protein content was determined using destruction method.

Folate analysis

Folate analysis conducted by Owen and Robert [6]. Two grams samples added with 0.1 M acetate buffer pH 4.5 with ratio 15:1. Samples were filtered, then centrifuged 8000 rpm for 10 min at 4°C. Samples were filtered again with milipore 0.22 μm. Then, the sample wass ready to be injected into the HPLC Shimadzu LC-6A, TSK-Gel