

Protein and Amino Acid Composition of Sea Buckthorn Seeds (*Hippophae rhamnoides mongolica* Rouse)

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Abstract

The wild sea buckthorn (*Hippophae rhamnoides* L) is distributed in Mongolia along the basin of rivers and lakes, which disposed between high mountains in western and northern parts of the country. The wild sea buckthorn is a cold tolerant unique plant with beneficial value of medicinal and cosmetic products. About 7.2% of wild sea buckthorn berries belongs to seeds and the protein in seeds composed 37.79%, while the protein in shells equal to 15.25%. Best extraction of proteins was successful at value of pH=1-3 or pH=10-12. The soluble protein content of the whole proteins in seeds was 37.4% at the value of pH=1 and 63.85% at pH=12, while the shell proteins were 16.2% and 22.8%, respectively. The total content of essential amino acids is composed about 43.32-45.04% of whole protein. Therefore, it can be conclude that the sea buckthorn seeds are valuable resource containing respectable amount of valuable proteins. On the other hand, seeds are undamageable during technological procedure and, therefore further processing as raw material is advisable.

Key words: Sea buckthorn, seed, proteins, amino acids, *Hippophae rhamnoides*

Introduction

The wild sea buckthorn (*Hippophae rhamnoides mongolica* Rouse) is distributed in Mongolia along the basin of rivers and lakes, which disposed between high mountains of western and northern parts of the country (Tsendeekhuu, 1996). Sea buckthorn have beneficial value for medicine and cosmetic products (Li & Wang, 1998; Jamyansan, 1973). This is a cold tolerant, hardy plant species, useful for reclamation and farmstead protection. Therefore, the sea buckthorn has been domesticated in various regions of the world (Li & Schröder, 1996). The main products produced from sea buckthorn are oil, juice and different additives to candies, jellies, cosmetics and shampoos (Beveridge *et al.*, 1999; Oomah *et al.*, 1999).

General technology of processing the sea buckthorn berries are similar in many countries, and in Mongolia, we produce only oil and juice. Our general technology is depicted in Figure 1. However, we have not yet produced seed oil and paints for the food from shell.

There are a number of publications on biochemical characteristics of the sea buckthorn,

especially its oil yield, fatty acid composition and biological activities (Jamyansan, 1973; Zhang *et al.*, 1989; Tong *et al.*, 1989; Ma *et al.*, 1989; Badgaa, 1966). The soft part of sea buckthorn berries contained approximately 0.26% of nitrogen, and 38-60% of this nitrogen belong to the proteins. This fact confirms that the sea buckthorn is a plant with high amount of proteins in its fruits and berries than other plant species. Seeds of the sea buckthorn composed 5-7% of berries, and contain about 30% of proteins. Therefore, the sea buckthorn seeds can be considered as the unique protein source (Zhang *et al.*, 1989; Badgaa, 1966; Solonenko, 1983).

In the present work we summarized the general content of proteins, pH-dependence for extraction of proteins, and amino acids composition of seeds and shells of the wild sea buckthorn, collected from the basin of Selenge river in northern Mongolia.

Material and Methods

Berries, which used for this study, were obtained in September, 1998 from shrubs of wild sea buckthorn growing in valley of Selenge river, northern Mongolia. After cleaning from damaged