

## Effect of Water Extract of the Milk Thistle (*Silybum marianum* L.) on Some Liver Enzymes

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### Abstract

We examined the effect of water extract from the aboveground part of milk thistle (*Silybum marianum* L.) and pure silymarin on alaninaminotransferase (ALT) (EC 2.6.1.2), aspartataminotransferase (AST) (EC 2.6.1.1), acidic and alkaline phosphatase (EC 3.1.3.3 and EC 3.1.3.1) of livers, *in vitro* and *in vivo* conditions.

**Key words:** liver, *Silybum marianum* L., ALT, AST, acidic and alkaline phosphatase

### Introduction

The milk thistle (*Silybum marianum* L.) is a native herb of Asia Minor, North Africa and southern Europe. It has been acclimatized to central Europe, North and South America, and South Australia. The herb has dark-green prickly leaves mottled or streaked with white veins. It blooms from June until September and can grow up to six feet tall (<http://www.newhope.com/nutritionsciencenews>). Silymarin extracted from milk thistle has shown a protective effect against many types of chemical toxins, including alcohol. The extract of milk thistle is used to improve liver function, protect against liver damage and enhance regeneration of damaged liver cells (<http://www.bodyandfitness.com/products/Health/herbal>).

Recently, this plant was cultivated in Mongolia. Some researchers have studied only the seed chemical composition of milk thistle, but we studied the effects of water extract from the aboveground part and pure silymarin from this plant's seed on alaninaminotransferase (ALT) (EC 2.6.1.2), aspartataminotransferase (AST) (EC 2.6.1.1), acidic and alkaline phosphatase (Ac.P and Al.P) (EC 3.1.3.3 and EC 3.1.3.1) of sheep and horse livers *in vitro* and at rabbit serum *in vivo*.

### Material and Methods

We determined the ALT and AST activities

by the dinitrophenylhydrazin method (Purev & Bayarmaa, 2003) (one unit was measured as 1 mg of enzymatic protein could change the light absorption by 0.01 in 1 hour;  $\lambda=750\text{nm}$ ,  $d=10\text{mm}$ ), acidic and alkaline phosphatase activities were determined by the Bodansky method (Purev & Bayarmaa, 2003) (one unit was measured as 1  $\mu\text{g}$  phosphorus amount, which was produced by 1 mg enzymatic protein per minute;  $\lambda=750\text{nm}$ ,  $d=10\text{mm}$ ). Protein content was determined by the Lowry method (Tsevegsuren & Purev, 2001), and the infused substance amount by the dehydration method (Purev, 2006).

### Results

First, we examined the protein content of sheep ( $12.2\pm 1.1\%$ ) and horse ( $9.4\pm 2.3\%$ ) livers as well as in fresh weight of milk thistle (Table 1). This result indicates that the protein content of sheep liver is 1.3 times higher than that in the horse liver. We calculated the Standard deviation (1 SD) in each of five trials (Tables 1, 2 and 3).

As shown in Table 1, milk thistle contained approximately  $6.5\pm 1.2\%$  protein in fresh weight, but it was shown by other researchers that milk thistle seeds contained 25-30% protein (<http://www.healingdaily.com/liver-detoxification/liver-detoxification-other-herbs.htm>). By their investigations the amount of seed protein was 3.8-4.6 times higher than the amount in the plant's body.