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# Oral administration of hydrolyzed rice bran prevents the common cold syndrome in the elderly based on its immunomodulatory action

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**Abstract.** The preventive effect of Hydrolyzed Rice Bran against the common cold syndrome was examined in elderly people. Arabinoxylan derivatives of Hydrolyzed Rice Bran (HRB) were prepared from water-soluble rice bran through partial processing using a carbohydrate complex. Using the water-soluble Rice Bran (RB) as a control, a cross over double-blind study was conducted on both substances over a 6-week administration period.

Fifty elderly people aged from 70 to 95 years participated in the study and the comparative data from 36 participants were analyzed. There were no withdrawals from in the study due to the side effects of the experimental foods. Symptoms were observed and scored. The total symptom score for the RB treatment group was three times higher than that for the HRB treatment group. The average duration of symptoms was 2.6 days for RB whereas it was only 1.2 days for HRB. Furthermore, some immunomodulatory action was observed in laboratory tests.

HRB was shown to be useful in reducing the physical stress associated with acute respiratory tract infection.

Keywords: Hydrolyzed rice bran, clinical study, common cold syndrome, immunomodulatory action

## 1. Introduction

Arabinoxylan derivatives of Hydrolyzed Rice Bran (HRB) were prepared from the water-soluble dietary fiber fraction extracted from rice bran through partial processing using a carbohydrate complex of *Lentinus Edodes* fungi (shiitake). In former preclinical and clinical studies, Arabinoxylan derivatives showed immunomodulatory activity and the preventive effect of HRB against the common cold syndrome was examined in elderly people.

Using water-soluble Rice Bran (RB) as a control, a cross over double-blind study was conducted on each substance over a 6-week administration period.

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Table 1  
Comparison of common cold syndrome (CCS) symptoms between HRB and RB groups

Group	HRB	RB (control)
Duration of administration <sup>1)</sup> (days)	41.6 ± 1.78	41.1 ± 4.08
Duration of CCS symptoms <sup>1)</sup> (days)	1.2 ± 2.20	2.6 ± 5.94
Numbers of subjects in whom CCS was observed <sup>2)</sup>	15 (39.5%)	15 (39.5%)
Total symptom score for CCS <sup>3)</sup>	74	231

The medical staff evaluated the severity of CCS symptoms once a day. No points were assigned if no CCS symptoms were observed. When any symptom was observed, one point was assigned where the condition was considered to be slightly worse, two points where symptomatic therapy was required, and three points where symptoms were considered to be serious. However, no serious event was observed in this study.

<sup>1)</sup>: Values are mean ± SD.

<sup>2)</sup>: Number of subjects in whom CCS symptoms were observed (observed rate %).

<sup>3)</sup>: Total symptom score combined the CCS scores for all cases for both periods of administration.

Table 2  
Change in NK cell activity based on pre-administration values

Group	HRB				RB (control)			
	n	Before (%)	After (%)	Δ%	n	Before (%)	After (%)	Δ%
> 30 (%)	25	47.3 ± 13.2	43.4 ± 13.0	-5.7	20	47.8 ± 12.4	45.4 ± 14.7	-4.4
≤ 30 (%)	11	18.7 ± 7.6	23.3 ± 12.2	34.1	12	21.7 ± 6.0	25.9 ± 18.9	15.6

Values are mean ± SD and Δ% are mean change rate from pre-administration values. Laboratory tests were carried out before and after the administration of HRB or RB. The above classification > 30(%) and 30(%) was created based on pre-administration values for NK cell activity.

The comparative data from 36 participants were analyzed. The symptoms were observed and scored and the total symptom score for the RB treatment group was three times higher than that for the HRB treatment group. The average duration of symptoms was twice as long for subjects undergoing RB treatment than it was for subjects in the HRB group. Furthermore, some immunomodulatory action was observed in laboratory tests.

## 2. Materials and methods

Fifty elderly people aged from 70 to 95 years who were residents in a care-giving institution and from whom informed consent was obtained took part in the study. Subjects were however free to leave the institution before the end of the study period. In cross over trials, subjects are randomly assigned to two groups, and in this study each group received the trial food for a period of 6 weeks. The volunteers, care-giving personnel and physicians were blinded to the assignment until all data had been analyzed. All sachets (aluminum film) contained the recommended daily dose of 500 mg of granulated HRB or the same amount of RB as a control. Hematological and blood biochemistry tests, leukogram, NK cell activity and so on were examined prior to and after the administration period. The medical staff observed and ranked the severity of Common Cold Syndrome (CCS) symptoms ("cough," "fatigue," "fever," "sore throat," "sputum," "nasal signs," and "sore chest") once a day. No points were assigned where CCS was observed to be absent. When any symptom was observed, it was assigned one point if it was considered to have become slightly worse, it was assigned two points if it required symptomatic therapy, and assigned three points when it was considered to be serious. A mild fever was defined as 1 degree higher than normal, and serious if higher than 39°C.

### 3. Results and discussion

Fifty elderly people participated and the comparative data from 36 participants were analyzed. Almost all the withdrawals from the study were due to healthy subjects leaving the institution and were not due to side effects caused by the experimental foods. The number of subjects observed to have CCS were the same in both groups; however, the total symptom score for the RB group was almost three times that of the HRB and the average duration of symptoms in the RB group was almost double that seen in the HRB group (Table 1). The change in NK cell activity was based on pre-administration values. In lower domain, the change in NK cell activity in the HRB group was larger than in the RB group (Table 2). Some higher scores for CCS symptoms in the RB group show lower pre-administration NK cell activity, but further investigations are required to elucidate possible correlations between these parameters and CCS scores.

### 4. Conclusion

HRB was useful in reducing the physical stress associated with CCS and preventing a shift from the acute phase of respiratory tract infection into a chronic condition.

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