



University of Kentucky  
UKnowledge

---

International Grassland Congress Proceedings

XXI International Grassland Congress / VIII  
International Rangeland Congress

---

## Comparison on the Newly Developed Silage Inoculant (*Lactobacillus plantarum* NLRI 401) for Whole Crop Rice Silage

Jong-geun Kim

*National Institute of Animal Science, South Korea*

Eui-soo Chung

*National Institute of Animal Science, South Korea*

Jun-sang Ham

*National Institute of Animal Science, South Korea*

Sei-hyung Yoon

*National Institute of Animal Science, South Korea*

Meing-joong Kim

*National Institute of Animal Science, South Korea*

*See next page for additional authors*

Follow this and additional works at: <https://uknowledge.uky.edu/igc>



Part of the [Plant Sciences Commons](#), and the [Soil Science Commons](#)

This document is available at <https://uknowledge.uky.edu/igc/21/15-2/16>

The XXI International Grassland Congress / VIII International Rangeland Congress took place in Hohhot, China from June 29 through July 5, 2008.

Proceedings edited by Organizing Committee of 2008 IGC/IRC Conference

Published by Guangdong People's Publishing House

---

This Event is brought to you for free and open access by the Plant and Soil Sciences at UKnowledge. It has been accepted for inclusion in International Grassland Congress Proceedings by an authorized administrator of UKnowledge. For more information, please contact [UKnowledge@lsv.uky.edu](mailto:UKnowledge@lsv.uky.edu).

---

**Presenter Information**

Jong-geun Kim, Eui-soo Chung, Jun-sang Ham, Sei-hyung Yoon, Meing-joong Kim, and Sung Seo

## Comparison on the newly developed silage inoculant (*Lactobacillus plantarum* NLRI 401) for whole crop rice silage

Jong Geun Kim , Eui Soo Chung , Jun Sang Ham , Sei Hyung Yoon , Meing Joong Kim , Sung Seo  
Rural Development Administration , National Institute of Animal Science , Cheonan 330-801 , Korea ,  
E-mail : jonggk@rda.go.kr

**Key words** : whole crop rice , silage , inoculant , organic acid , quality

**Introduction** In 2007 , approximately five million tons of rice was produced in Korea , but the consumption of rice has decreased . The government has been considering the matter from many angles and farmers have also been considering the problem . A relatively new method of wrapping a large round bale with stretch-wrap plastic films to make silage is an increasingly popular means of preserving forage . However , it is difficult to make good silage from whole crop rice due to low water soluble carbohydrate (WSC) content at harvest (Cai , 2006) . Lactic acid bacteria play a key role in making silage from forage , and lactic acid bacteria selected from good silage could be expected to be suitable inoculant for making good silage .

**Materials and methods** Lactic acid bacteria were isolated from good barley silage by plating on MRS agar containing 0.02% sodium azide , and were screened for growth and acid producing ability . The viable cell counts were measured by the plate count method . Gram stain and morphology were examined after 24 hours of incubation on MRS agar . Catalase activity , growth at different pH values , gas production from glucose , and sugar fermentation were determined by the methods described in Speck (1984) . Whole crop rice was ensiled at ripening stage . The crop was ensiled in an experimental silo (20 liters) with or without microbial additives (NLRI 401 , HM/F and P1132) and stored at room temperature for 60 days . A 10g sample of silage was macerated with 100ml of distilled water , filtered through a filter paper (# No . 6) . The pH was measured with a pH meter (HI 9024 ; Hanna Instrument Inc . UK) . Volatile fatty acids were analyzed by using gas chromatography (Model 3400 ; Varian Co . , USA) . Lactic acid was analyzed by using HPLC (HP-1100 ; Hewlett-Packard Co . , USA) .

**Results** The quality of silages was summarized in Table 1 . After 2 months , NLRI 401 and P 1132 inoculated whole crop silage showed lower pH and butyric acid , and higher lactate content than control and HM/F inoculated silage . The quality grade of NLRI 401 and P 1132 treated silage was excellent , but control was poor . It also showed that all inoculated silages were in low butyric acid content .

**Table 1** Acidity (pH) , organic acid content and Flieg's score of whole crop rice silages in relation to different inoculant treatment .

Item	pH	Organic acid(% in DM)			Flieg's score	Quality grade
		Acetic	Butyric	Lactic		
Control	5.73	0.46	0.16	2.46	61	2
P1132	4.61	0.28	0.06	2.87	83	1
HM/F	4.72	0.31	0.06	2.72	80	2
NLRI 401	<b>4.67</b>	<b>0.23</b>	<b>0.05</b>	<b>2.92</b>	<b>88</b>	<b>1</b>

\* Quality grade : Flieg's score 100-81(1) , 80-61(2) , 60-41(3) , 40-21(4) , below 20(5)