

This research is about the current situation of Korean feed industry focusing on livestock industries. Currently, raw materials for assorted feed are mostly genetically modified organisms (GMO). By investigating United States of America and Japanese consumer co-operatives and Korean Hansalim and iCOOP KOREA's feed production, distribution, and consumption practices, this research shows that consumer co-operatives' non-GMO feed practices contribute not only to understand GMO-related discussions but also to establish a safer food production-distribution-consumption system.

With growing livestock products consumption, so increased consumer concerns about the safety of livestock and processed products. Livestock infectious diseases such as mad cow disease, foot-and-mouth disease, bird flu actually have threatened the livestock products safety. Thus, it is high time for livestock industries to establish guidelines for ensuring food safety in the whole process of production-distribution-consumption and considering animal physiology at the same time.

Since major raw materials for livestock feed is GMO corns and beans, this research first examined Koreans' awareness of GMO. It turns out that there are considerable worries about GMO's harmful effects to human bodies and environments. Especially, concerns of consumers outweigh that of suppliers and experts. Moreover, consumers found it hard to be informed of GMO in products due to the shortcomings of the indication system. Thus, GMO indication system has to be strengthened to address consumer worries as well as to protect consumer right to know.

Consumer co-operatives worldwide have practices various GMO-related activities. In America, the largest GMO producing and exporting country, consumer co-operatives collaborated with livestock producers to enact GMO indication system. Green Co-op, one of Japanese consumer co-ops, started the distribution of non-GMO milk from 1998 and recently increased supply of rice feed to address GMO feed problems and increase self-sufficiency rate of grain. Hansalim tried to expand barley feed and non-GMO feed along with alternative feed. Consumer co-ops active practices in non-GOM feeds were possible because of the co-ops' unique characteristics. ; businesses and activities based on members' needs and wants; solidarity and cooperation of various stakeholders including producers, consumer co-ops, and agriculture co-ops; the expansion of consumer co-ops activities to change food-related institutions and conditions; responses to cope with human safety concern, environmental hazards, and multinational corporations' food monopoly.

In 2017 April 12, iCOOP KOREA declared that it will feed non-GMO to all livestock animals. iCOOP's comprehensive livestock production-disbtibution-consumption system enables this non-GMO feed conversion. Members; employees, and producers' cooperation also contributed to the conversion. Members promoted signature-gathering campaigns to improve GMO indication

system to inform the harmfulness of GMO products and livestock products consumption to encourage producers' conversion. Livestock producers converted to non-GMO feed even with the concerns for causing poor growth. Employees endeavored to ensure products safety and to reduce cost in the whole process. Combined efforts led to sound livestock supply system so that members could purchase safer products and producers could conduct stable livestock growth and contribute to resource circulation using by-products from workshops and environmental pollution decrease as well.

Based on above investigation, this research draws below suggestions. First of all, there is urgent need to establish sound guidelines both ensuring food safety and reflecting animal physiology. Furthermore, livestock certification system has to be improved compressively by combining livestock farmers' producing environment and safety management and import inspection, examination and disease management in the whole stage of production-distribution-consumption. Based on the system, following practices are in need; improvement of breed environment considering breed density; management and control of drugs for animal use and further animal drug-related enactment; standardization for common certification to avoid repetition of certification of eco-friendly, non-antibiotic, organic, HACCP, animal welfare and to promote animal welfare breed environment; representation of producers' input in policy making and livestock certification system upgrading.

Lastly, Korean GMO indication system has to be improved to be a complete indication system to indicate all GMO raw materials regardless of gene detection. To lower the adventitious presence rate to be lower than 0.9% is also advised. Moreover, guidelines to inform feed to animals for final consumption livestock are needed.

The introduction of non-GMO feed means three things for Korean livestock industry. First, consumers can access wider choice for safer livestock products; producers also can widen choices on animal feed based on accurate information. Second, non-GMO feed could be alternatives to organic feed. Although 100% organic livestock production use only organic feed and prohibit non-GMO feed, it is very difficult and costly to raise organic feed without using chemical fertilizers and pesticides. Further, organic feed might hinder livestock productivity. Even in the case of non-antibiotic livestock, most of non-antibiotic feed are imported and assumed to be GMO corns and beans. Considering current situation, non-GMO feed could be feasible alternative for organic feed. Third, it could address the problem of increasing feed plot and further deteriorating environmental impact of livestock industry.

To promote non-GMO livestock production, stable consumer market and producers are critical. Various stakeholders, especially producers, should cooperate and engage to accomplish non-GMO

livestock production. Thus, producers' consensus and approval for using non-GMO feed is important. Furthermore, final products price should be affordable for consumers and ensure stable income for producers. To accomplish this, consumer choice availability and active producers' participation is in need to lower feed price by scaling production and reducing unnecessary cost, and minimizing distribution stages.