Nutreco Canada Inc. (2014)

A Dairy Feed Supplement Export Product from Canada to Nepal

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Introduction

Nepal is a country located in South Asia, with a total land area of 140, 800 km^2 (Advameg, 2014). The country is bordered by China on one side to the north and India on the other three sides (Advameg, 2014). Nepal is fairly rectangular in shape allowing it to be divided into three ecological zones: hills, mountains and terai (UN Nepal Information Platform, 2012). In the country of Nepal, an average three out of four households own livestock for agricultural use (Maltsoglou & Taniguchi, n.d.). Of the large ruminants used, two major animals are used in Nepal for milk production; buffalo and dairy cattle. Cattle have become increasingly important to the Nepalese people because of their increased milk yield (Maltsoglou & Taniguchi, n.d.). In order to further increase this change in milk production, a very beneficial feed supplement may be given to the dairy cattle to ensure this progression.

Product Info

Background of Rumination

In order for a dairy cow to produce milk for consumption she must ruminate constantly throughout the day (Schirmann et al., 2009). This process of rumination consists of firstly, regurgitation, remastication, salivation, followed by swallowing of the feed. The ultimate amount of rumination occurs while the cow is laying down, but the process can also occur simultaneously while the cow is standing, nursing and walking. If the cows rumination process levels are lower than normal this can be a signal of stress, anxiety or sickness which ultimately lowers the amount of milk production from that animal (Schirmann et al., 2009). One of the main functions of rumination is to decrease the particle size of the feed while increasing the surface area (Onzarda, 2000). This benefits the process of milk production by increasing the

digestion rate of the feed and decreasing the down time prior to the fermentation process. The rumen is the site of the fermentation process in the cow. A dairy cow's rumen capacity is approximately 184 liters and is one of the world's most dense microbial habitats. These microbes found in the rumen allow the cow to digest cellulose and hemicellulose, which humans cannot digest, which in turn supplies humans with these nutrients in other forms (Onzarda, 2000).

Following the process of rumen digestion there are metabolic pathways that occur in the liver that are responsible to turn these products of rumination into nutrients required for the production of milk (Picard et al., 2012). In order for these metabolic reactions to occur catalysts are needed which consist of different enzymes and enzyme cofactors. To further increase productivity of milk production the cow's cells will self-regulate itself by the use of enzyme cofactors. These enzyme cofactors, which are vitamins or minerals, will bind to the enzyme it is designed for and in turn modify its activity. If there is a shortage of the cofactor then the cell will be less efficient and therefore less productive. This decrease in productivity then leads to a decrease in milk production (Picard et al., 2012).

What is VIVALTO©?

VIVALTO© is a feed additive specially designed for lactating cows (Picard et al., 2012). In order to avoid a decrease in milk production due to a shortage of enzyme cofactors, VIVALTO© provides the cow with a number of these cofactors to help regulate enzymes during lactation. These supplementary enzyme cofactors perform in the liver and bind to enzymes to effectively convert digested feed into specific nutrients needed by the cow for milk production. With the addition of VIVALTO© in the cows feeding system more nutrients are being provided

from the same amount of feed to the mammary gland to produce a higher level of milk production. The objective of VIVALTO© is to help increase the cells efficiency and overall, increase each cows lactation levels (Picard et al., 2013).

Exceptional Increases in Milk Yield

Through various field trials VIVALTO© has demonstrated to increase milk production by 2.7kg (5.95lb.) from calving to 200 days in milk (DIM) (Picard et al., 2012). These results are demonstrated in Fig.1. Throughout this trial the amount of dry matter intake (DMI) stayed constant with only the addition of VIVALTO© in the feed. The quality of the milk remained the same throughout this trial which means that VIVALTO© does not lessen milk quality, but instead only increases the overall yield, keeping DMI constant. Fig. 2 shows the long-term gains that come with feeding VIVALTO©. Through a constant DMI the benefits of feeding VIVALTO©

Fig. 1 Milk yield responses comparing cows on VIVALTO© additive vs. the control (Picard et al., 2012)

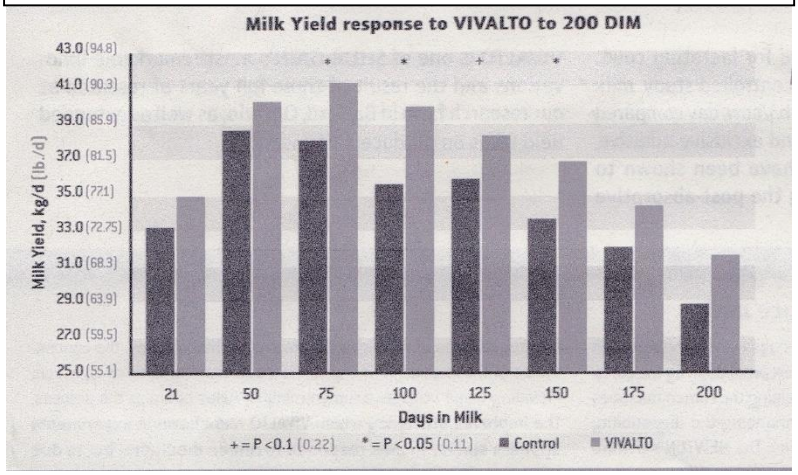
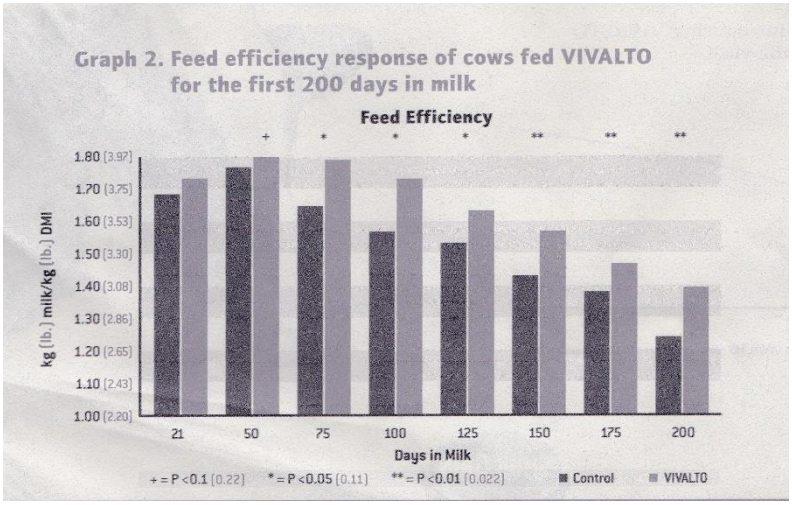


Fig. 2 Long-term responses on feed efficiency comparing cows on VIVALTO© additive vs. the control (Picard et al., 2012)



increase over longer periods of time by increasing milk production (Picard et al., 2012).

Research and Production

SHUR-GAIN© has been a cornerstone company of Nutreco© since 2007 (Nutreco, 2012). Both of these Canadian companies are well known and supported all over North America as they are recognized for their tremendous research and innovations (Nutreco, 2012). VIVALTO© from SHUR-GAIN© is a product designed from 3 extensive years of research at a farm in Burford, Ontario (Picard et al., 2012). In addition to this research, various field trials were carried out at producer's farms to further improve the feed additive and make it as beneficial to farmers as possible (Picard et al., 2012). SHUR-GAIN© has locations in eastern and central Canada as well as in New York State, USA (Nutreco, 2012). With most of these locations being in Canada, the production and distribution of VIVALTO© is from facilities in Canada (Nutreco, 2012).

Costs and Returns of Feeding VIVALTO©

VIVALTO© has been shown to increase a lactating cow's milk production by 2.7 kg per day and 540 kg more in total lactation during 200 DIM (Picard et al., 2012). The important question is though, do the returns received in this increase in yield while feeding VIVALTO© exceed the excess cost it requires to feed the product? That answer is yes. It costs approximately 8 cents (Canadian) per day to feed VIVALTO© to a lactating cow. Furthermore, it costs $16 (Canadian) per cow in total to feed VIVALTO© from calving to 200 DIM. Since the amount of DMI of each cow is not changing the only additional costs would be that of VIVALTO©. With this increase in milk production being assumed to 2.7 kg per day the

increase in income would be approximately $1.82 (Canadian) per day. The overall return on investment would be 23:1. This

can be shown in Fig.3. In addition, to assume feeding VIVALTO© over the total 305 days of lactation, not as much research has been recorded. It can be assumed that costs of feeding VIVALTO© for an additional 105 days would cost $8.40 (Canadian) more. Therefore, it would cost $24.40 (Canadian) to feed VIVALTO© for the total 305 day lactation. The return on investment would be 15:1 because of the 540 kg increase in milk production and $364 (Canadian) increase in income (Picard et al., 2012).

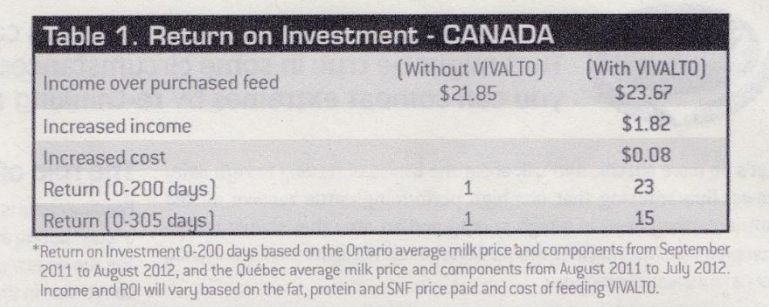


Table 1. Return on Investment - CANADA

	(Without VIVALTO)	(With VIVALTO)
Income over purchased feed	$21.85	$23.67
Increased income		$1.82
Increased cost		$0.08
Return (0-200 days)	1	23
Return (0-305 days)	1	15

*Return on Investment 0-200 days based on the Ontario average milk price and components from September 2011 to August 2012, and the Québec average milk price and components from August 2011 to July 2012. Income and ROI will vary based on the fat, protein and SNF price paid and cost of feeding VIVALTO.

The return on investment when using VIVALTO© 200 DIM and 500 DIM (Picard et al., 2012)

Benefits to Canada of Exporting VIVALTO

There are numerous benefits to the Canadian agricultural sector that may be accounted for if VIVALTO© was chosen to be exported from Canada. Considering that VIVALTO© is a Canadian- made and distributed product from SHUR-GAIN© and Nutreco© the export of this product would promote an increase in job opportunities in Canada. Since more product may need to be made for export, the industry may need to expand in order to accompany this increase, which may in turn require an increase in labor. In addition, the many benefits that come with feeding VIVALTO© to dairy cattle may be acknowledged and appreciated in exporting countries, and because it is a relatively inexpensive product and also easily adaptable in feeding programs, it may be continuously used over the years by farmers. This benefits Nutreco© and

SHUR-GAIN© by allowing for more research opportunities, which may in turn benefit farmers in other countries.

Further Contact Information for VIVALTO©

Nutreco Canada Inc. Head Office
150 Research Lane, Suite 200
Guelph, Ontario
N1G 4T2
Canada
Tel: 519-823-7000
Web: www.nutrecocanada.com

Nutreco Canada Inc. Agresearch Farm
Burford, Ontario
Tel: 519-424-2550

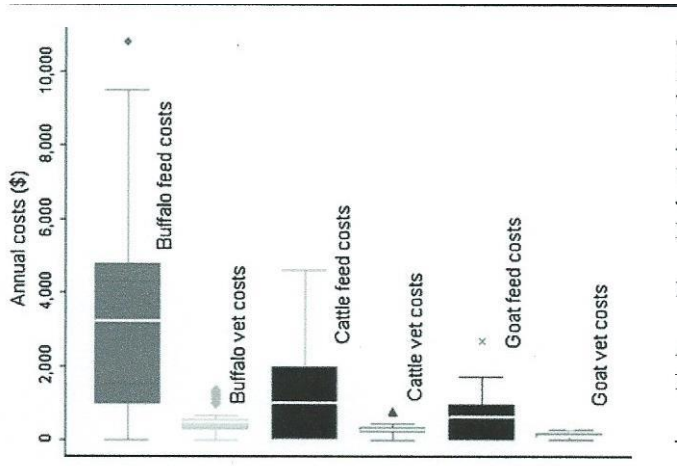
Export Potential to Nepal

Current Dairy Farming in Nepal

Currently in Nepal, cattle are either fed a combination of forages and concentrates or they are grazed on pasture (Redding et al., 2012). Of the total ruminants in Nepal being fed forages and concentrates, 67% of them are cattle; and of the total ruminants being grazed on pasture 92% of them are cattle. With that being said, the land area for grazing animals is deteriorating fast in Nepal so farmers are relying more on forages and concentrates on a daily basis. The downfall of feeding forages and concentrates is that, these sources of feed supply the cattle with an insufficient amount of energy and protein to sustain an increased level of milk production. Presently, on average, farmers are feeding their cattle approximately 1 kg of concentrates and forages each day. With this supply of concentrates along with legume hay and grass pasture fed the cattle are only producing an average amount of 4 to 6 kg per day. In order to increase milk production to 13 kg per day the cattle would require at least 4.9 kg of concentrates added to their feed. This increase in feed is not realistic to Nepalese farmers as their largest expenditures in regards to animals is their feed costs. This trend can be seen in Fig 4. In order to increase milk

production with the decreasing pasturing acreage and the limited nutrients supplied in concentrates, a feed additive may benefit the Nepalese farmers and their dairy production systems greatly (Redding et al., 2012).

Fig 4. Feed vs. veterinary cattle input costs for livestock in the Kaski District (Redding et al., 2012)



Benefits of Introducing VIVALTO© in Nepal

Not only is VIVALTO© an advantageous product to Canadian farmers, but it is also used widely in the United States (Picard et al., 2012). Since VIVALTO© is so easily adaptable on any herd this product may also strongly benefit cattle production systems in Nepal. As the exponential decrease in pasture land in Nepal continues to fall, farmers will need to look into feed additives to feed their herd in order to supplement their forage and concentrate diet (Redding et al., 2012). Considering that VIVALTO© is relatively cheap to feed (8 cents (Canadian) per day or 7.168 rupees per day) it is a very realistic product for farmers to add to their cattle's diet in order to increase milk production with the lacking diet that they are being fed (Picard et al., 2012). As the cattle are fed only 1 kg a day, they are not receiving enough energy and protein to produce a respectable milk yield (Redding et al., 2012). By adding VIVALTO© to the cattle's diet the additional enzyme cofactors will help to convert all the limited available nutrients into a form needed by the mammary gland to produce milk (Picard et al., 2012). With the addition of VIVALTO©, Nepalese farmers may experience a dramatic increase in yield in their herd's production. With this excess milk they may have more product available to use in their households, have more

milk to feed additional calves as well as possibly sell some milk to market to make a profit on. With this increase in profit farmers may have the option to use this money elsewhere in their productions systems.

Increased Profit= Prospering Future

As previously stated, VIVALTO© is a product that is exceptionally easy to introduce into a herd's feeding program that is very low cost, but in return, results in extremely high profits (Picard et al., 2012). With that being said if this product was introduced into the country of Nepal farmers would greatly benefit from the increase in their herd's milk production that they would have various options of what they could do with the excess milk. One option that Nepalese farmers would be open to may be the possibility of selling milk to market. By selling their milk to other people in their village may in turn give them a profit from their increased milk production. This benefits the consumers, but also the producers because they receive some money in their pocket which they can put towards expanding their production systems. Farmers in Nepal now have the prospect of increasing their herd size, which in turn may also increase job opportunities in Nepal because with more animals, more labor is needed. Along with this idea of increasing production systems farmers may also have the option of moving towards applying newer technology into their farming. With the profits they earn they may buy newer technology such as automatic milkers to help make their milk production more efficient which also leads to even greater profits in the future. Alternatively, as VIVALTO© becomes more widely used and the results are approved by various farmers, the

> *"Efficiency leads to increased yields. Increased yields lead to greater profits" (Picard et al., 2012)*

potential for more specific research to herds in Nepal may become more appreciated. This would allow for Nutreco© to perform research in Nepal and benefit not only Nepalese farmers, but also this Canadian company.

Small vs. Large Scale Farmers

VIVALTO© is a fairly diverse product which would benefit both famers with small herds as well as farmers who operate larger scale dairy operations in Nepal (Picard et al., 2014). Since VIVALTO© is a product designed to supplement dairy nutrition by adding excess enzyme cofactors to the diets of cattle, it simply benefits the specific cow that is fed the supplement and that cow's milk production. This method of supplement may increase milk production of a herd with one cow or a herd with 200 cows; it is very versatile. Since each cow is different, just like each human is different, VIVALTO© will affect the increase in milk yield differently in each cow, but generally it will increase by almost the same amount. Therefore a farmer who has a herd of 3 cows will see approximately the same amount of yield increase in each cow as a farmer who has a herd of 200 (Picard et al., 2012). VIVALTO© is very beneficial in both situations, which is one of the main reasons why this exported product would be extremely beneficial in Nepal.

Transportation Logistics

In order to transport VIVALTO© from Canada to Nepal there are many aspects that need to be taken into consideration such as: regulations, transportation mechanisms, costs, and storage. Currently, there are no regulations preventing VIVALTO© from being imported into Nepal (Cargo Experts, Inc. 2014). The only regulations set in place right now pertain to: drugs and beef and beef products (Cargo Experts, Inc. 2014). When bringing to attention that Nepal is

not on the coast of the continent, this alters the direct transportation of products overseas. VIVALTO© would need to be transported by ship to India and then transported by train or truck to Nepal for distribution. Since VIVALTO© has no specific refrigeration requirements, this does not need to be taken into consideration which lowers the cost of transportation (Cargo Experts, Inc. 2014). In addition, VIVALTO© is a relatively small product which allows it to be very easy to transport (Picard et al., 2012). This aspect also lowers the cost to transport VIVALTO© overseas (Cargo Experts, Inc. 2014). There are various sizes of cargo box's that transport general goods overseas on a boat to India: 20 foot dry box, 40 foot standard dry box and 4o foot high cube box. Depending on the amount of product to be shipped to Nepal would determine the size of cargo box that is needed. In regards to paperwork and documents that need to be completed to transport products; they need to be completed and delivered to Nepal and India at least 3 weeks before the shipment is to arrive. Some documents that need to be completed are: customs transit declaration (CTD), as well as cost, insurance and freight (CIF) value of the shipment (Cargo Experts, Inc. 2014). In order to further develop transportation plans of VIVALTO© to Nepal a contact for cargo shipment overseas can be found through:

Cargo Exports Corp.
10091 NW 1st Court
Plantation, FL 33322
Tel: 954-423-1920
www.cargo-experts.net

Looking Into Future Studies

With any potential export idea comes various questions and ideas for future studies. In regards to the export of VIVALTO© from Canada to Nepal there are numerous areas of future studies that need to be looked into. For instance, there is not enough knowledge about the export

and transportation process. More research needs to be done about the documentation and paperwork that would be required to export and import VIVALTO©. As of right now only basic information is known about this area. In addition, the process of transporting is not in depth enough about exactly how the product would make it from the factory to a retailer in Nepal. If VIVALTO© was to be taken into serious consideration for export this step by step process would need to be determined. Another area that is also unknown about the export process are the regulations and restrictions in place of exporting a feed product into another country. Through various research, no specific restrictions were found, however this would need to be further looked into for certain.

Competing Products

Currently there are no products as specific as VIVALTO© for lactating cows. There are however various products such as extra vitamins and minerals from different companies that can be fed to cattle, but none that supply what VIVALTO© does to the lactation process. VIVALTO© is a very unique product in that, extensive research has been done to make it specific to the lactating cow (Picard et al., 2012). It is the only product that provides supplementary enzyme cofactors that work in the liver to supply the cow with the maximum amount of nutrients from its feed intake for the mammary gland to produce the most amount of milk possible. This is why VIVALTO© is such an incomparable item to other supplements because it can do what no other product can (Picard et al., 2012).

Critical Summary of the Export Potential of VIVALTO©

Overall VIVALTO© is a very realistic Canadian export product that provides many benefits to Nepalese farmers. The product is easy to transport, affordable, and provides farmers with an increase in yield that they would not be able to attain any other way (Picard et al., 2012). Looking into the future one way that Nutreco© and SHUR-GAIN© may be able to expand and benefit if VIVALTO© proved to be profitable in Nepal would be by developing a company, factory in Nepal. This way it would cut transportation costs and also be more easily available to Nepalese farmers as well as expand research and be more specific to dairy farming in Nepal. All in all there are not many changes that would need to be done to make VIVALTO© a better export product as it is very realistic already.

Conclusion

In an exponentially changing world of today, such as in Nepal, as the demand of cattle use as the primary source of milk production continues to increase and grazing pasture land as a source of feed continues to decrease, VIVALTO© is a very profitable product that would greatly benefit the farmers in Nepal. VIVALTO© is not only easy to introduce into any feeding system, but it is very affordable and extremely profitable (Picard et al., 2012). The increase in milk yields as proved in farms in Canada through various trials would allow farmers in Nepal to continue to feed their cattle with the forages and concentrates they have and increase their herd's milk yields to a more beneficial value (Picard et al., 2012). This would benefit them in various ways with the ability to: sell milk to market, increasing profits, and allowing the Nepalese farmers to expand their production systems or put money towards newer technology. The key here is "efficiency"; "Efficiency leads to increased yields. Increased yields lead to greater profits" (Picard et al., 2012).

References

Product Info References

Advameg. (2014). *Nepal*. Retrieved from http://www.nationsencyclopedia.com/economies/Asia-and-the-Pacific/Nepal.html

Maltsoglou, I., Taniguchi, K. (n.d.). *Poverty, Livestock & Household Typologies in Nepal.* Retrieved from http://r4d.dfid.gov.uk/PDF/Outputs/Livestock/PPLPIwp13.pd

Nutreco. (2012). *Animal Nutrition Canada.* Retrieved from http://corporatereporting.nutreco.com/2012/ business-performance/animal-nutrition-canada

Nutreco Canada Inc. (2014). *Better Research to Help You Reach Your Goals*. Retrieved from http://www.nutrecocanada.com/shur-gain/animal-nutrition/dairy-cattle/dairy-research/-innovations

Onzarda, M.B. (2000). *The stomach of the dairy cow.* Retrieved from http://www.milkproduction.com /Library/Scientific-articles/Animal-health/The-stomach-of-the-dairy-cow/

Picard, J.P., Metcalf, J.A., Soberon, F., Waterman, D.F., Woodley, B., Steele, M. (2012). *At a glance an outlook on dairy production.* Retrieved from http://www.wmajor.com/download/SG_col_ANG_Low_fall2012.pdf

Schirmann, K., Von Keyserlingk, M.A.G., Weary, D.M., Veira, D.M., Heuwieser, W. (2009). Technical note: validation of a system for monitoring rumination in dairy cows. *Journal of Dairy Science, 92*(12), 6052-6055

UN Nepal Information Platform. (2012). *Ecological Zone Map of Nepal.* Retrieved from http://www.un.org.np/node/10274

Export Potential to Nepal References

Cargo Experts, Inc. (2014). *Important Information About Cargo Shipping to Nepal.* http://www.cargo-experts.net/Shipping-To-Nepal.aspx

Picard, J.P., Metcalf, J.A., Soberon, F., Waterman, D.F., Woodley, B., Steele, M. (2012). *At a glance an outlook on dairy production.* Retrieved from http://www.wmajor.com/download/SG_col_ANG_Low_fall2012.pdf

Redding, L., Chetri, D.K., Lamichhane, D.K., Chay, Y., Aldinger, L. & Ferguson, J. (2012). Animal production systems of small farms in the Kaski district of Nepal. Trop Anim Health Prod, 44, 1605-1613