

**Exploring Export Potential from Canada to Nepal:
Critical Evaluation of the Effectiveness of Oxyvet 200 La Antibiotic**

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Product Information- Part One

Product in Relation to Antibiotics in Animals

The product that will be critically analyzed in this paper is an antibiotic solution called Oxyvet 200 LA Antibiotic. The purpose for antibiotics is the same for both humans and for livestock as the medicine is used to treat or prevent an animal from obtaining a certain illness (South Dakota State University, 2016). Typically antibiotics that are used to treat certain illnesses in livestock are handled much differently than antibiotics in feed. In addition to treating ill animals, antibiotics are also used, but banned in some countries, as a livestock feed additive (Antibiotic Use and Resistance in Nepal, 2015). Antibiotics have been studied and been known to improve the feed conversion ratio in cattle making them grow faster, as well as other livestock animals, but are often criticized and even banned in parts of the world due to antibiotic resistance (MacEwan et al, 2002). Injectable antibiotics focus on helping the animal feel better and promote recovery from an illness (Compendium of Veterinary Products, 2016). The antibiotic, with the active ingredient being oxytetracycline, has been known to treat a wide range of diseases in cattle, pigs and sheep (Compendium of Veterinary Products, 2016). The product has been used to treat a variety of diseases in both dairy and beef cattle and can be administered to animals proven to be sick, rather than the whole herd, to prevent antibiotic resistance among strains (Compendium of Veterinary Products, 2016). The medicine can be administered to pigs being grown for meat and sheep for milk and various other uses (Compendium of Veterinary Products, 2016)

Administration

The product needs to be injected into the animal by intramuscular injection or by subcutaneous injection (Norbrook Incorporated, 2016). The difference between the two is the depth of the injection, as the intramuscular injection penetrates deeper into the muscle rather than

a skin layer (Norbrook Incorporated, 2016). The antibiotic should be administered without the use of other antibiotics, as some may interfere with the prevention of the growth of the bacteria the drug is combatting, such as penicillin (Norbrook Incorporated, 2016). The label contains specific instructions on the exact amount of antibiotic that should be administered at a time. Depending on the disease, more or less of the drug can be administered. For example, if the cattle is suffering from bacterial pneumonia than nine milliliters of the solution can be injected into the animal versus 3-5 millimeters in other diseases such as foot rot (Norbrook Incorporated, 2016). A clean and sterile needle should be used for every injection. A farmer can re use needles, but they need to be properly sanitized in order to kill any bacteria, by bringing water to a boiling temperature for fifteen minutes (Norbrook Incorporated, 2016). The animal should be restrained and this can be done humanely through a low stress restraint (Norbrook Incorporated, 2016). No more than ten milliliters should be injected in one site in cattle and no more than 5 millimeters in swine (Norbrook Incorporated, 2016). The standard conversion for this medication is 1 milliliter per 10 kilograms of body weight (Compendium of Veterinary Products, 2016).

Treatment

As previously stated, Oxyvet La 200 antibiotic has been known to treat a wide range of illnesses in cattle, swine and sheep. Common diseases in cattle include; bovine respiratory disease, blackleg, leptospirosis, and mastitis (Vetoquinol, 2016). Bovine respiratory disease is a bacterial infection that causes pneumonia in mostly calves and is commonly called ‘shipping fever’, as the disease is most notably obtained within four weeks of weaning for a calf, the time when the calves are often sorted and shipped to farms (Centre for Disease Control and Prevention, 2014). This disease is very costly costing the cattle industry 250 to 750 million dollars annually (Centre for Disease Control and Prevention, 2014) Blackleg is an endemic disease caused by a spore forming bacteria characterized by swelling in the animal (Useh et al, 2006). Leptospirosis is a bacterial disease that can lead to respiratory diseases, liver failure, and death (Centre for Disease Control and Prevention, 2014). Mastitis is commonly caused by *Escherichia coli* and *Streptococcus uberis* and is a major challenge for dairy farmers (Bradley, 2002). The antibiotic solution can treat these diseases along with many other less common ones, including; naval infections, metritis, footrot, arthritis, and calf diphtheria (Vetoquinol, 2016). In

pigs, the antibiotic can treat erysipelas, enteritis, leptospirosis, mastitis, metritis and bacterial pneumonia (Norbrook Incorporated, 2016). Erysipelas in pigs is very common in subsistence animal agriculture as it is common on small animal farms (National Animal Disease Information Service, 2016). In sheep, the antibiotic can treat pneumonia footrot, streptothricosis, mastitis, and metritis. Streptothricosis is caused by spores that infect susceptible areas of the skin's surface causing Many of these diseases in cattle, pigs and sheep are fatal and will eventually cause death of the animal. It is important for antibiotics, such as Oxyvet La 200 antibiotic, to be used to treat sick animals, especially in nations were vaccinations are not able to be administered due to a lack of money to vaccinate animals in developing nations.

Canadian Suppliers

Canada is among one of the various countries where the antibiotic has been approved for veterinary use and can be directly sold to the farmer and even used by the farmer. The manufacturer that will supply the solution is *Vetoquinol*. Vetoquinol is a professional pharmaceutical company, the 9th largest in the world (Vetoquinol, 2016). The company originated in France and has a direct presence in twenty five other countries and has 140 distributors (Vetoquinol, 2016). There are two distribution centers in Canada, one in Lavaltrie Quebec and another in Edmonton Alberta, as well as industrial sites in Princeville, Quebec and Belleville Ontario (Vetoquinol, 2016). Vetoquinol supplies Oxyvet La 200 antibiotic at a competitive price as it can be bought here, or from other Canadian veterinary suppliers at a moderate Canadian price (Vetoquinol, 2016). The product, despite where it is purchased, usually has a minimum amount of bottles that need to be bought for the sale. From research and comparative prices the product can be bought for around 20-38 dollars. This equates to 1639 Nepalese Rupees to 3115 Nepalese Rupees. The Vetoquinol site is easily accessible to the general public and can be easily understood. Contacts for each department and different locations can be seen in the table provided. I was able to email the the customer service department for the company and they replied with an email and even encouraged me to call for further information.

Contact Information

Head Office (Lavaltrie, Quebec) -2000, Chemin Gorges -J5T 3S5	Tel: 1-800-363-1700 Fax: 1-888-329-8386
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Plant (Princeville, Ontario) -700 Rue St Henri -G6L 4X1	Tel: (819) 364-3073 Fax: (819) 364-7895
Plant (Belleville, Ontario) -231 Dundas East -K8N 1E2	Tel: (343) 362-0551 Fax: 1-613-966-4177

(Vetoquinol, 2016)

Policies and Regulations for Export

Antibiotics, as well as a wide range of goods, can be exported from Canada to other nations, but there are certain regulations that businesses and manufacturers need to address to ship any product and specifically an animal antibiotic. According to the Government of Canada, Canadian Business Network, the company must have a Business Number, must find out if an export permit is needed on the product, and must report the product to the Canadian Border Service Agency (Canadian Border Service Agency, 2016). A business, such as Vetoquinol, should be aware of the exact steps to exporting their products out of the country according to the Step-by-Step Guide to Exporting Commercial Goods on the Canadian Border Service Agency Website (Canadian Border Service Agency, 2016). Animal antibiotics are not a controlled export item, which means they are not subjected to specific and export controls (Canadian Border Service Agency, 2016). According to the Canadian Food Inspection Agency, animal antibiotics are apart of veterinary biologics (Canadian Food Inspection Agency, 2013). All veterinary biologics are regulated under this agency and in accordance with the *Health of Animals Act* and *Health of Animals Regulations*. Vetoquinol, as well as any other producer and seller of animal veterinary products must have a Canadian *Veterinary Biologics Establishment Licence* (Canadian Food Inspection Agency, 2013).

Other Competitive Products

Oxyvet La 200 antibiotic is not the only antibiotic that should be considered for export. Canada has a wide range of antibiotics to treat the same diseases and may be available at a cheaper price. For example, Oxyvet 100 LP is a similar product, also an oxytetracycline, that treats infections sensitive to oxytetracycline in cattle, sheep and in pigs (Vetoquinol, 2016). The

key is not to promote a particular product, but to allow Canada to provide some sort of antibiotic solution for subsistence farmers in other nations (particularly Nepal) in order to benefit them in a low-cost, user friendly, and effective way.

Unintentional Consequences and Misuse

It is important that any animal farmer, rather it be at an intensive scale or at a smaller approach, be aware of why antibiotic use in animals should be used carefully and not overused. According to the Food and Agriculture Organization, intensive farming is the top cause of food-animal related resistance in antibiotics (Antibiotics in Farm Animal Production, 2011). Therefore, antibiotic resistance is not as prevalent or a large problem for the subsistence farmer, but it is in good practice to still be aware of the problems with antibiotic use. Farmers should know that the antibiotic should not be used to prevent diseases, but rather in the treatment of diseases that can not be unavioded (Antibiotics in Farm Animal Production, 2011). The FAO believes that antibiotics should not be used for non-therapeutic purposes, meaning that they should be used only when animals are ill and are in need of an antibiotic, just as in the case of human life (Antibiotics in Farm Animal Production, 2011). Antibiotics can be used in farming for three purposes; therapeutic purposes such as treatment of a disease, prophylaxis such as preventing a disease, and for promoting an animal to grow faster (Antibiotics in Farm Animal Production, 2011). When antibiotics are used to prevent a disease or as a growth promoter, in much smaller doses, all the bacteria is not killed off and therefore is able to build up a resistance to the drug (Antibiotics in Farm Animal Production, 2011). A farmer should be aware of when and why they are using this antibiotic as well as any other antibiotics for their livestock.

Other Benefits to Canada

One potential benefit that this product will have is it will a positive effect on the economy, by hopefully stimulating jobs for the Canadian plants. More jobs for Canadians means that the economy will benefit by increasing the number of taxpayers and allow these people to be more active in Canada's local economy by purchasing goods and services. In addition, Canada will benefit by allowing by generating profit of of subsistence farmers who buy the product (such as through retailers who buy the veterinary products such as veterinary product sellers) or directly by the farmers. In addition to financial gain, Canada will benefit by creating a closer relationship between manufacturers and sellers in Canada to Nepal veterinary retailers and subsistence farmers. If Canada develops more connects agriculturally with Nepal, other countries

in the Eastern Hemisphere may also be interested in Canadian products and innovation projects such as this one. Examples of other countries that could benefit could be Bhutan, Burma, and or Laos.

Potential Benefits to Nepal- Part Two

A Look at Nepal

Nepal is a small country in South Asia landlocked between China to the North and India to surrounding the country to the South, East, and West (Chapagain, 2016). Nepals population is 28 million, and compared to its land mass, has a high population density (Champaign, 2016). The country can be divided into three geographic regions; the Mountains, the Hills, and the Terai region (Chapagain, 2016). Depending on what section one lives in, the family may be subsistence crop farmers rather than livestock producers, or both (Chapagain, 2016). The Terai region topography is flatter than the other regions and contains the most fertile ground and is therefore dominated by a wide variety of crops such as maize, rice, lentils, wheat, oilseed, potato, tobacco, sugarcane, and other crops (Chapagain, 2016). Crops are also grown in the hills, such as various peas and millet, and a small amount done in the mountain region such as buckwheat (Chapagain, 2016). Livestock farming is common in Nepal in all regions, but depending on the species the animal could be raised in a specific region (Chapagain, 2016). For example, cattle farming is popular in the hill and mountain region (Chapagain, 2016). This is significant to improvements in agriculture as it will be more difficult to get products to these areas as they may not contain many roads and connections to suppliers (Chapagain, 2016). There are over seven million cattle in Nepal and due to religious and cultural reasons, farming animals for milk is much more common (Chapagain, 2016). Nepal is a perfect country for new innovation projects as much of the farming is based on traditional practices that take longer, are more labour intensive, and are not always effective (Chapagain, 2016).

Current Product Amount

Milk	1622 (Metric Tons)
Meat	287 (Metric Tons)
Wool	587 (kg)

(Chapagain, 2016)

How Nepal would Benefit

Just as species have symbiotic relationships between one another to benefit both ends, Nepal would also benefit from this proposed project with Canada. According to the Directorate of Animal Health, in Kathmandu Nepal, it is reported that, in 2014, ten and a half percent of cattle and goats were affected by leptospirosis (Vijay, 2015). The antibiotic could be used to treat the rising cases of this disease as it is clearly a problem for livestock farmers in Nepal. In addition to this, outputs could be increased. If outputs such as milk and meat are increased, Nepalese farmers may be able to have enough to feed their own family as well as create a surplus in order to sell their animal products. Another benefit to this would be that Nepal would be moving a step forward in more newer technological innovations in the animal livestock subsectors. According to the GARP- Nepal National Working group, many people in Nepal, especially rural areas, have little to no access to antibiotics, let alone livestock (Antibiotic Use and Resistance in Nepal, 2015). This Nepalese organization has conducted research on livestock animals and has concluded that bacterial infections such as mastitis are major bacterial diseases in Nepalese cows (Basnyat et al, 2015).

Leptospirosis in Cattle



(National Disease Information Service, 2016).

Current Use in Nepal

Antibiotics in animals have been introduced in Nepal and have been used as a growth promoter and for disease prevention (Antibiotic Use and Resistance in Nepal, 2015). Antibiotics in Nepal are on the rise as the amount of veterinary antibiotic sales have rose fifty percent (Antibiotic Use and Resistance in Nepal, 2015). In complements to this statistic, seventy one percent of these drugs were bought from retailers rather than from veterinary clinics (Antibiotic Use and Resistance in Nepal, 2015). Nepal does not have strong regulations and guidelines when

it comes to veterinary product sales, which is why many retailers sell these products inadequately such as in improper storage conditions (Antibiotic Use and Resistance in Nepal, 2015).

Target Audience

The audience that the product would be most beneficial too would of course be any sheep, pig, and or cow farmers in various regions of Nepal. Since the previously stated diseases, are more prevalent the larger the herd, larger farmers would benefit the most. Confinement is also a big issue in the spread of diseases, and even though many animals range freely, animal housing still needs improvement and could also promote the spread therefore any subsistence farmer in Nepal could benefit from using this product on their farm. One option that could be beneficial to Nepalese farmers is if the product could be used between subsistence farmers (including syringes) to save on cost. Sanitation would be the only problem with this option.

Getting the Product to Nepal

This has been briefly discussed earlier in the report, but will be analyzed slightly further for actuality and the realisticity of the project. There are many shipping companies that Canada can use to export the product, but the problem is where the overseas shipment can land. There is a major port in Kathmandu, Nepal, which would be the ideal place for the products to be shipped to, although the products could also be shipped to India and then transported by truck from India to Nepal. Shipments into Nepal overseas are commonly brought into a port in Calcutta India (Cargo Experts, 2016). The product can be stored at room temperature, but it is not advisable to have the product be exposed to freezing temperatures and humidity. This is important to know in for storage conditions during transit.

Problems and Challenges

There are problems with the exportation of this product into Nepal. The first problem is that since so many of Nepalese that are using antibiotics currently are buying them from retail sources and commonly from sources that may be cheaper than from veterinary sources, it will take a shift in Nepal's economy to start buying an antibiotic from Canada being sold in reputable veterinary clinics. If Nepalese farmers are already getting these antibiotics from a cheaper source, buying the Canadian product may not even be an option for the farmer financially, even if they wanted to use the properly stored and properly sold product. Another challenge is to actually get the product to rural farmers. Many cattle farmers are in the mountain region with

little to no access to roads (Chapagain, 2016). It is a challenge to get these products directly to the buyer without going through a retail seller or a veterinary seller as they still would have to travel to get the antibiotic. With further research into the diseases that Oxyvet 200 La Antibiotic treats, it has been discovered that many of these diseases act fast as can kill the animals within days without treatment. This is not good for the farmer for two reasons. Firstly, even if the disease is detected early in order to go and buy the product however the farmer may make it to the seller to physically obtain the antibiotic. By the time one travels from their rural farm into the retail market (possibly Kathmandu) the animal may already have passed from the infection. Another thing to think about is that this product will need to be administered with a needle, and syringes will also need to be purchased to administer the product. It is possible that farmers already have syringes if they have purchased other products, but this can not be assumed without further research in this product's availability. Finally, Canada is very far from Nepal, and if Nepal could receive the same product, but from a closer source this may overall be more effective. A drawback to this proposed plan is that there are companies that sell this product, as well as other animal antibiotics that fight the same diseases in India. Vetoquinol even has a location in India, it would possibly be redundant to buy this product from Canada if the Nepalese can get it from their geographic neighbours. It is important to evaluate the drawbacks to this product in order to realistically examine if this product would be of benefit to Nepalese farmers.

Summary

The examination of this product will give SAKNepal and officials in Nepal the opportunity to decide if this product would have be beneficial to Nepalese farmers in order to increase agricultural outputs to empower subsistence farmers to earn money from their agricultural pursuits. Agriculture in Nepal is not just a financial opportunity, but it is a lifestyle for many Nepalese and many depend on their livestock to feed their families. Oxyvet La 200 Antibiotic could increase output in treating diseases prevalent in Nepal and encourage Nepal to take a technological step further.

Mentions

As a University student in the agriculture field, I would like to personally thank the University of Guelph for allowing me to experience an entrepreneurial opportunity project through creativity and critical thinking in my field. I would also like to thank Professor Raizada

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