

Applied chemistry: rbst and chlorpyrifos in food

[Science](#), [Chemistry](#)



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Introduction

Most of the food that are being sold in the supermarket are being processed by large-scale food companies (Kenner, 2009). For this reason, majority of the foods that are readily available in the market contain some kind of additives and food chemicals (Butler, 1999).

The recombinant bovine somatotropin (rBST) and Chlorpyrifos are commonly found in the foods we eat. In relation to the commonly used food chemicals, this study aims to closely examine the nature of rBST and the chemical composition of Chlorpyrifos. Eventually, the health and environmental issues related to these two chemicals will be tackled in details.

About rBST

As a type of artificial growth hormone, the rBST is actually a kind of peptide hormone that is normally produced the the pituitary gland of a cow. rBST can be created through the use of recombinant DNA technology.

One of the main reason why rBST is commonly injected on cows or cattle is to increase these animals' milk production (Chaiyabutr et al., 2007).

According to Schoenberg (2012), " the bovine form of ST is not recognized by receptors in the human body". However, rBST can trigger a significant increase in the cows' IGF-I levels (Dohoo et al., 2003). Based on the study that was conducted by Dohoo et al. (2003), animals that are injected with rBST increases the risks of fertility-related problems (40%), increased risks for mastitis (25%), and showing signs of lameness caused by leg and foot problems (55%) among others.

About Chlorpyrifos

The empirical formula of chlorpyrifos is $C_9H_{11}Cl_3NO_3PS$ (Venugopal et al., 2012). Basically, the chlorpyrifos is a crystalline organophosphorus pesticide that is commonly used in killing insects and arthropod pests (Venugopal et al., 2012; Rauh et al., 2011). This chemical can kill insects and arthropod pests by inhibiting acetylcholinesterase (AChE) (Amitai, Moorad, & Adani, 1998).

Even though chlorpyrifos is considered as moderately toxic, exposing a pregnant woman to this particular chemical can lead to developmental and autoimmune disorders and the development of neurological defects on the part of the fetus (Rauh et al., 2011). Exposing young children to this particular chemical can trigger delay in their motor and mental development and increase their risk of developing disorders like ADHD (Rauh et al., 2006), low birth weight (preterm), and below the normal head circumference at birth (Harley et al., 2011; Whyatt et al., 2004).

In the case of the adults, farmers who are often exposed to this chemical can increase their risk of developing lung cancer (Lee et al., 2004). With regards to our environment, excessive use of chlorpyrifos is harmful to the amphibians and marine life (Ashauer, Boxall, & Brown, 2006).

Conclusion

Based on the information gathered in this study, I do not totally agree with what the film entitled “ Food, Inc.” is claiming. Although the foods that are readily available in the market contain some kind of additives and food chemicals, not all substances that are present in our food (i. e. rBST) can cause serious harm to human beings.

Considering the fact that there are substances or chemicals that can be harmful to human beings (i. e. chlorpyrifos), it would be a smart idea to become more careful with my food choices. Ingestion of harmful substances can sometimes be noted from the food labels.

References

- Amitai, G., Moorad, D., & Adani, R. (1998). Inhibition of Acetylcholinesterase and Butyrylcholinesterase by Chlorpyrifos-oxon. *Molecular and Cellular Pharmacology*, 56(3): 293-299.
- Ashauer, R., Boxall, A., & Brown, C. (2006). Uptake and elimination of chlorpyrifos and pentachlorophenol into the freshwater amphipod *Gammarus pulex*. *Archives of Environmental Contamination and Toxicology*, 51(4): 542-548.
- Butler, L. (1999). The Profitability Of rBST On US Dairy Farms. *The Journal of Agrobiotechnology Management & Economics*, 2(2): 111-117.
- Chaiyabutr, N., Thammacharoen, S., Komolvanich, S., & Chanpongsang, S. (2007). Effects of long-term administration of recombinant. *Animal Science Journal*, 78(5): 251-258.
- Dohoo, I., DesCoteaux, L., Leslie, K., Fredeen, A., Shewfelt, W., Preston, A., et al. (2003). A meta-analysis review of the effects of recombinant bovine somatotropin. *Canadian Journal of Veterinary Research*, 67(4): 252-264.
- Harley, K., Huen, K., Aguilar Schall, R., Holland, N., Bradman, A., et al. (2011). Association of Organophosphate Pesticide Exposure and Paraoxonase with Birth Outcome in Mexican-American Women. *PLoS ONE*, 6(8): e23923. doi: 10.1371/journal.pone.0023923.
- Kenner, R. (2009, February 11). You Tube. Retrieved October 22, 2012, from <https://assignbuster.com/applied-chemistry-rbst-and-chlorpyrifos-in-food/>

Food, Inc. : <http://www.youtube.com/watch?v=QqQVII-MP3I>

Lee, W., Blair, A., Hoppin, J., Lubin, J., et al. (2004). Cancer Incidence Among Pesticide Applicators Exposed to Chlorpyrifos in the Agricultural Health Study. *Journal of the National Cancer Institute*, 96(23): 1781-1789.

Rauh, V., Garfinkel, R., Perera, F. P., Andrews, H. F., et al. (2006). Impact of Prenatal Chlorpyrifos Exposure on Neurodevelopment in the First 3 Years of Life Among Inner-City Children. *Pediatrics*, 118(6): e1845-e1859.

Rauh, V., Arunajadai, S., Horton, M., Perera, F., Hoepner, L., Barr, D. B., et al. (2011). Seven-Year Neurodevelopmental Scores and Prenatal Exposure to Chlorpyrifos, a Common Agricultural Pesticide. *Environmental Health Perspectives*, 119(8): 1196-1201.

Schoenberg, K. (2012, March 19). Science of Mom. Retrieved October 22, 2012, from Truth from the Dairy Aisle: Is Milk from Cows Receiving rbST Safe for my Family?: <http://scienceofmom.com/2012/03/19/truth-from-the-dairy-aisle-is-milk-from-cows-receiving-rbst-safe-for-my-family/>

Venugopal, N., Sumalatha, B., Bonthula, S., & Veeribabu, G. (2012). Spectrophotometric determination of organophosphate insecticide (Chlorpyrifos) based on diazotisation with anthranilic acid. *The Malaysian Journal of Analytical Sciences*, 16(2): 180-186.

Whyatt, R., Rauh, V., Barr, D., Camann, D., Andrews, H., et al. (2004). Prenatal Insecticide Exposures and Birth Weight and Length among an Urban Minority Cohort. *Environmental Health Perspectives*, 112(10): 1125-1132.