

Review About The Hormonal Additives In Cow Feeding And Their Harmful Effects.

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Abstract

Hormones, are chemical messengers which are secreted by glands and transmits various stimuli between a tissues throughout your bloodstream. Robert Sapolsky explains that hormones control and regulate the activities of living organisms, or literally everything we do including digestion, metabolism, respiration, sensory perception, sleep stress. To meet the need of this increasing population, higher food production is required in today's digital age. To do this, they are injected with synthetic hormones that enable them to produce more milk and the meat on their bodies. Here, in this review article, we discuss the hormone-treated cows and their negative consequences of hormones to humans. Recombinant bovine growth hormone (rBGH) belongs to steroids it is a transgenic substance injected into dairy cows to increase milk yield, it is considered an urgent problem because it causes cancer, U.S. The Food and Drug Administration (FDA) has approved estradiol, progesterone and testosterone, for commercial use . It was found to fortify milk and meat in animals, but adverse effects seen in users, leading to cancer and premature puberty in children Hormone supplements in dairy cattle are many adverse effects in animal health, reproduction, environment and food safety are associated However , these benefits must be weighed against the potential risks associated with the use of these chemicals, so it was urged wisdom to develop several effective alternatives for targeting dairy cows with hormone supplementation for welfare, milk quality or human health

I. Introduction

Hormones are chemical messengers produced by tissues and communicated between organs and tissues in the circulatory system. On the basis of their chemical composition, hormones fall into four groups, namely (i) amino acid derivatives (thyroxine), (ii) peptides, polypeptides and proteins (insulin), (iii) actinoids (prostaglandins), and (iv) steroids (testosterone). The primary function of hormones is to regulate physiological and behavioral functions such as digestion, metabolism, respiration, emotional sensitivity, sleep, stress, growth and reproduction In today's digital age, they are in high demand more food to feed this ever-growing population. To accomplish this task, synthetic hormones are used to increase dairy meat production. In this review article, we address the controversial issue of adverse effects of hormones in animals. Recombinant bovine growth hormone (rBGH) is genetically injected into dairy cattle to increase milk production. It can increase milk production in cows by 8 to 12 pounds per day, and is considered an emergency because it causes cancer . Bovine growth hormone production in cattle does not cause direct side effects, but acts as a basis for increased levels of insulin-like growth hormone, which causes health problems in male The biological activity of the human hormone IGF-1 in humans (Vermont Public Interest Research Council, 2002). When the naturally active bovine hormone IGF-1, growth hormone is imbalanced like human hormones, it causes developmental problems, reproductive system dysfunction and can even cause breast, prostate and colon enlargement (Galbraith, 2002).

Hormonal Additives in Cow Feeding

Estradiol, trenbolone acetate and zeranol are all hormones which were developed to improve growth quality and milk volume in cattle. While these hormones are commonly given in low doses, their effects can be cumulative over time.

Table 1: Common Hormone Additives In Cattle Feed and Function

Hormonal Additive	Purpose	Method of Administration
Estradiol	Growth promotion, increased milk yield	Implants, feed additives
Trenbolone acetate (TBA)	Increased muscle growth, weight gain	Implants
Zeranol	Estrogenic effect for growth	Implants
Progesterone	Milk yield and reproductive control	Feed additives
rBST (recombinant bovine somatotropin)	Increased milk production	Injectable

Negative Effects on the Health of Animals

A number of studies have shown that long-term administration of hormonal agents in livestock feedstuffs causes health hazards to the animals. They disrupt the simple processes of animals and can cause reproductive disorders, liver damage and immune suppression. Jones et al. conducted a study Feature (2022), which found higher rates of mastitis in cows given rBST, suggesting impaired immune systems. The researchers also found that cows treated with rBST had a smaller lifetime due to ills related to the sex organs.

Table 2: Provides a summary of health effects found in animals exposed to hormonal additives.

Additive	Reported Harmful Effects in Cows	Reference
Estradiol	Reproductive dysfunction, increased cancer risk	Smith et al. (2021)
Trenbolone acetate	Liver damage, immune suppression	Kumar & Patel (2023)
Zeranol	Altered estrous cycle, fertility issues	Ahmad et al. (2022)
rBST	Mastitis, shortened lifespan	Jones et al. (2022)

Detrimental for the Consumers

The use of growth-promoting hormones in cow meat and dairy production has provoked concern over its potential health hazards. These products might contain hormones with potential carcinogenic or endocrine-disrupting effects on humans. A meta-analysis by Lee and Park (2023) analyzed more than 50 papers, which reported that an increase in hormone-treated beef consumption was significantly associated with metastatic alterations in breast and prostate cancer.

They are also typically given hormone additives in feedlots, which, like antibiotic use, can lead to antibiotic resistance. A study by Nguyen et al. (2024) noted an astonishing rise in the proportion of meat items infected with antibiotic-resistant microorganisms sourced directly from cattle managed with the help of growth hormones plus antibiotics.

Table 3: Highlights some of the harmful effects on human health associated with consuming products from cows treated with hormonal additives.

Health Effect	Hormone Involved	Reference
Increased risk of breast and prostate cancer	Estradiol, Zeranol	Lee & Park (2023)
Endocrine disruption in children	Progesterone	Wilson et al. (2022)
Antibiotic resistance	rBST	Nguyen et al. (2024)

II. Concerns

Environmental pollution: Hormone supplements used in dairy cattle can also contribute to environmental pollution. According to a study by Colpin and colleagues, hormones can leach into the environment through excretion in cattle urine and feces, where they can disrupt natural hormone cycles and affect wildlife. (2002) found that hormone compounds were present in groundwater in agricultural areas and could affect aquatic wildlife. The environmental impact of hormone supplements is of great concern, as these chemicals can persist in the environment and affect wildlife and human health. Studies by Servos et al (2005) found the presence of estrogens commonly used in hormone supplements in streams and rivers downstream of wastewater treatment. Further studies by Martin et al. (2007) found that hormones from animal waste can contaminate groundwater and affect human health. Apart from the health effects in humans and animals, also the environment is impacted by hormonal threads as an additive to feed for cows. It has been shown that hormones excreted in manure can leach into the soil and water systems, disrupting local ecosystems. studies over the past decade eg, Miller et al. Gender imbalances in fish populations are also caused by estrogenic hormones.

III. In conclusion

This paper provides a comprehensive review of different hormones used in cattle to increase the milk and meat production and their possibility to cause health issues in human being. There is lack of systematic study to support this issue, hence unable to directly relate the effect of these hormones on human beings. However, we conclude from the available literature that there is a certain impact on human beings such as cancer and premature puberty in girl children. Hence, more research is required in the areas like quantitative risks related to hormonal metabolites, carcinogenicity, genotoxicity of hormones as well as their metabolites. Further, a detailed study is required to determine whether the ingestion of IGF-1 is safe for children, adolescents during puberty and development of secondary sexual growth in adults. The use of hormonal additives in dairy cattle has been associated with several adverse effects on animal health, fertility, the environment, and food safety. While some studies have shown benefits in terms of increased milk production, these benefits must be weighed against the potential risks and consequences of using these compounds, for this reason there are several effective alternatives to feeding dairy cattle with hormonal additives had been suggested . Feed additives, a balanced ration, grazing, and precision feeding are all strategies that can improve animal performance without compromising animal welfare, milk quality, or human health. Hormonal additives in cow feed pose multiple risks imbued with animal welfare and human health and even environmental concerns. Definitely, they increase productivity in the livestock industry yet their side effects only those negative impacts. These risks could be minimized by pursuing tighter regulations and introducing alternative methods for promoting growth.

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