

Chapter 3

Integrated Control Strategies for Helminth Parasites in Livestock

Iram Abdullah

Department of Zoology, University of Kashmir, India

Hidayatullah Tak

Department of Zoology, University of Kashmir, India

ABSTRACT

Parasitic infections are highly prevalent among livestock occurring in one-fourth of farm animals annually. In animal husbandry, chemotherapy is the more successful technique used in mitigating parasitism; although, safe, effective, and economical, its deleterious and debilitating side effects make it necessary to explore alternative disease control strategies. Presently, researchers are examining integrated initiatives that may involve a trifecta of grazing management, biological control, and parasite vaccination programs. Experimental studies and veterinary practice suggest vaccination may be the most effective procedure employed in controlling parasites. Proteomic research has provided viable pathways for the integrated control of parasites resulting in the identification of proteins with promising immunostimulatory properties. In vivo vaccination programs involving several candidate antigens show promising efficacy results. This chapter attempts to review and hopefully consolidate available strategies for parasite control within the context of vaccine development.

DOI: 10.4018/978-1-7998-4120-3.ch003

INTRODUCTION

With a global asset value easily exceeding \$1.4 trillion, the livestock industry is incontrovertibly a significant contributor to the economy of many developed and developing countries; it contributes ~40% of total agricultural product in developed nations and ~20% of farm output in developing countries). Animal husbandry, a subset of the agricultural industry, supports the livelihood and meets the food and nutritional requirements of over 1.3 billion people worldwide (FAO, n.d.). Unfortunately, despite efforts to the contrary, optimal livestock productivity is hugely compromised by disease, particularly helminth infections, leading to tremendous economic loss. There are indications that helminth infections account for increased mortality, reduced feed intake and decreased feed utilization in farm animals (Holes, 1993). Presently, commercial synthetic anthelmintics are believed to be affordable and effective in controlling a broad spectrum of parasites. Limitations such as drug resistance and chemical residues in food intake make it critical to explore alternative control measures. Consequently, the need arises for a multidisciplinary approach that utilizes one or more of these measures. Vaccines, termed “Green Solutions” because of their perceived innocuous utility in the fight to control parasitic diseases, are reputed to be an effective, efficient, and reliable apparatus that reduces the industry’s reliance on pharmacological drugs (Sumbria et al., 2009). Historically, initial experimentation on vaccination involved the use of non-living organisms as inhibitors of *Trichinella spiralis*. These excretory-secretory products invoked a significant immune response in model animals (Campbell, 1955). Although many early studies do not provide significant information regarding immunogenic proteins, over the past fifteen years or more, scientists have made a concerted effort to broaden man’s knowledgebase on parasite proteomics. The effort to identify antigens that produce protective immunity for helminth parasites has led to the identification of several promising vaccine candidates (Knox & Smith, 2001; Lightowlers et al., 2003).

Strategies to Control Parasitic Infections in Animals

Grazing/Pasture Management

Grazing and/or pasture management is the agricultural practice whereby livestock production strategies are performed with the singular objective of achieving profitability. This includes optimizing mechanisms that mitigate the incidence of parasites. Parasitic infections occur through one of two pathways: direct or indirect lifecycle. Pastures contaminated with parasite eggs serve as a reservoir as well as provide a veritable environment for eggs to hatch into larvae that ultimately become infective. Under favorable conditions, infective larvae travel to the tip of forages and

7 more pages are available in the full version of this document, which may be purchased using the "Add to Cart" button on the publisher's webpage: www.igi-global.com/chapter/integrated-control-strategies-for-helminth-parasites-in-livestock/329630

Related Content

Trends and New Advances on Wearable and Mobile Technologies for Parkinson's Disease Monitoring and Assessment of Motor Symptoms: How New Technologies Can Support Parkinson's Disease

Jorge Cancela, Matteo Pastorino and Maria Teresa Arredondo Waldmeyer (2016). *Handbook of Research on Trends in the Diagnosis and Treatment of Chronic Conditions* (pp. 494-517).

www.irma-international.org/chapter/trends-and-new-advances-on-wearable-and-mobile-technologies-for-parkinsons-disease-monitoring-and-assessment-of-motor-symptoms/136534

Pro-/Anti-Inflammatory Bioactive Proteins and Peptides

Fatma Esra Güne (2020). *Role of Nutrition in Providing Pro-/Anti-Inflammatory Balance: Emerging Research and Opportunities* (pp. 106-141).

www.irma-international.org/chapter/pro-anti-inflammatory-bioactive-proteins-and-peptides/252770

Flavonoids: Their Anticarcinogenic Effects and Molecular Modeling Studies

Sefa Celik, Elif Cakir, Sevim Akyuz and Aysen E. Ozel (2022). *Handbook of Research on Natural Products and Their Bioactive Compounds as Cancer Therapeutics* (pp. 265-296).

www.irma-international.org/chapter/flavonoids/299807

Barriers to and Facilitators of Older Adult's Adherence to Health

Recommendations: Towards an Engaging Two-way Health Communication

Rui Gaspar, Samuel Domingos, António M. Diniz and Roberto Falanga (2016). *Promoting Patient Engagement and Participation for Effective Healthcare Reform* (pp. 58-82).

www.irma-international.org/chapter/barriers-to-and-facilitators-of-older-adults-adherence-to-health-recommendations/150346

COVID-19 Infection in Pediatric Population: An Overview of the Epidemiology, Clinical Features, Diagnosis, and Nursing Management in Children

Eftychia Ferentinou, Despoina Pappa and Chrysoula Dafogianni (2022). *Research Anthology on Pediatric and Adolescent Medicine* (pp. 1-18).

www.irma-international.org/chapter/covid-19-infection-in-pediatric-population/298198