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# Kicking Newcastle Disease in Poultry: The Therapeutic Potential of a Herbal Blend of Christmas Melon, Aloe Vera, Chili, and Ash Extract

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**Abstract:- Newcastle Disease (ND) is a highly contagious viral infection that causes substantial mortality and economic losses in poultry, particularly in resource-limited settings like rural Uganda. This study explores the therapeutic potential of a herbal blend composed of Christmas melon, aloe vera, chili, and ash extract as an alternative or adjunct treatment for ND in poultry. Grounded in** Integrative Medicine Theory **(IMT), which emphasizes the synergy between conventional and traditional medical approaches, the study investigates the effectiveness of this herbal remedy in both treating and preventing ND. The results, based on personal case studies and a larger preventive trial, demonstrate a high recovery rate in affected birds and successful prevention in exposed flocks. Notably, six out of seven birds treated for ND showed full recovery, and no new ND cases emerged in the preventive trial involving 1,654 layers. However, a slight decrease in egg production was observed in treated layers, signaling a potential side effect that warrants further research. This study underscores the viability of herbal remedies in managing ND in areas where conventional treatments may be limited or inaccessible, providing a holistic, farmer-centered, and cost-effective solution to poultry health management in rural African settings. While promising, further research is needed to optimize dosage, assess long-term safety, and minimize adverse effects.**

***Keywords:-*** *Newcastle Disease, Poultry, Herbal Remedy, Christmas Melon, Aloe Vera, Chili, Ash Extract, Treatment, Prevention.*

## I. INTRODUCTION

Newcastle Disease (ND) is a highly contagious viral infection affecting birds globally, particularly poultry (Ahmadi et al., 2024). ND leads to significant mortality and economic losses(Goran, 2023) , prompting the exploration of both conventional and traditional treatment options (Gadhave et al., 2024, Abinaya, 2024). In industrialized nations, where biosecurity and vaccination programs are more widespread, the disease is generally controlled. However, outbreaks still occur, particularly in areas with lapses in vaccination programs or where virulent strains of NDV emerge (Dimitrov, 2017; Kahn et al., 2023).

In Africa, Newcastle Disease is one of the leading causes of poultry mortality, particularly in rural areas where smallholder poultry farming is widespread. According to the Food and Agriculture Organization (FAO), poultry farming in Africa is largely informal, with farmers relying on traditional methods for disease management. Unfortunately, these methods are often inadequate to control the spread of ND, leading to devastating economic losses (Gadhave et al., 2024; Ayele et al., 2022). With limited access to veterinary services and vaccines, African farmers are increasingly turning to locally available plants and herbs to prevent and treat poultry diseases. These traditional remedies are often seen as affordable, accessible, and sustainable, providing a viable alternative to conventional treatments that may not be readily available (Irivboje, 2021; Kabir et al., 2023).

In Uganda, Newcastle Disease is a significant concern for both commercial and smallholder poultry farmers, particularly in rural areas where poultry farming is a vital source of food security and livelihood. In Uganda, poultry farming is predominantly done on a small scale, with many farmers unable to afford the costs associated with ND vaccines (Harrington et al., 2020; Mugisha et al., 2022). As a result, Newcastle Disease remains one of the most commonly reported poultry diseases in the country, leading to high mortality rates and substantial economic losses (Ahmadi et al., 2024; Amanya et al., 2023). Efforts to control ND have been made, but challenges such as inadequate coverage, lack of awareness, and the emergence of new virulent strains continue to hinder these efforts (Kavuma et al., 2024). Consequently, many Ugandan farmers are turning to alternative methods, such as herbal remedies, to manage ND.

The use of herbal remedies has gained traction as farmers seek sustainable solutions for disease management (Collett et al., 2020). Existing research supports the efficacy of various herbal remedies in poultry health, highlighting ingredients such as aloe vera for their bioactive properties (NEMAULUMA et al., 2024). Studies suggest that certain herbs may enhance the immune response in poultry, yet

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comprehensive evaluations of these remedies' safety and efficacy remain limited.

An experimental study by students from African Rural University tested a blend of Christmas melon, aloe vera, and chili in the treatment of Newcastle Disease and reported an 87% success rate. Given the widespread reliance on traditional medicine in Uganda, particularly in rural areas, this herbal approach offers potential benefits not only for disease control but also for reducing the dependency on expensive pharmaceutical solutions. In this context, it is crucial to evaluate the efficacy and safety of such herbal remedies, ensuring that they are both effective and sustainable in the long term (Mukherjee et al., 2024).

Despite anecdotal evidence regarding the effectiveness of herbal blends in managing ND, there is a lack of standardized preparation methods and dosages (Harrington et al., 2020). Additionally, the long-term effects of such treatments, particularly concerning reproductive health in laying hens, require further investigation (Abdisa and Tagesu, 2017, Harrington et al., 2020, Ahmed et al., 2024). This study aims to assess the therapeutic potential of a herbal blend comprising Christmas melon, aloe vera, chili, and ash extract in treating Newcastle Disease in poultry, alongside an evaluation of its safety profile.

## II. THEORETICAL FRAMEWORK

The study can be grounded in the Integrative Medicine Theory, which emphasizes the combination of conventional and alternative medicine (in this case, herbal remedies). Integrative Medicine Theory advocates the use of both conventional and alternative medicine to achieve optimal health outcomes. This theory is particularly relevant in regions with limited access to modern medical interventions, such as vaccines and pharmaceuticals, and where traditional remedies are widely used as alternatives. The study is testing a herbal remedy as an alternative or adjunct treatment for ND in poultry, a scenario where conventional methods (e.g., vaccines and antibiotics) might not be fully accessible, effective, or affordable for smallholder farmers. The IMT framework helps explain the potential for herbal remedies to complement or replace conventional approaches in these settings.

### *A. Key Elements of the Theory Include*

- *Holistic Health*

Herbal remedies aim to enhance overall poultry health by strengthening the immune system (Teschke & Eickhoff, 2015), providing essential nutrients, and naturally managing disease symptoms (Sarris & Kavanagh, 2014).

- *Synergistic Effects*

The combination of multiple herbs—such as Christmas melon, aloe vera, chili, and ash extract—is expected to produce synergistic effects (Weintraub, 2018), where their collective action is more effective in combating ND than individual herbs alone (Doheny, 2018; Mills & Bone, 2005).

- *Patient-Centered Approach*

The study adopts a practical, farmer-oriented perspective (Fadiman & Sumner, 2020), considering factors such as accessibility (Berman, 2016), cost-effectiveness, and sustainability of the herbal remedy for poultry farmers in Uganda and similar regions (Patel & Hatcher, 2019).

This framework underscores the potential for integrating herbal remedies into poultry health management as both a feasible and sustainable solution in resource-limited settings.

## III. METHODS

### *A. Preparation of the Herbal Remedy*

The herbal remedy was prepared using the following ingredients:

**Table 1: Representation of the Ingredients for the Herbal Remedy Preparation**

| Ingredients | Quantity | Active Compounds |
|---|---|---|
| **Christmas melon** | 600gms | Citrulline, Lycopene, Beta-carotene, Vitamin C |
| **Aloe vera gel** | 225ml | Polysaccharides (Acemannan), Anthraquinones, Saponins |
| **Dried Chili pepper** | 15gms | Capsaicin, Carotenoids, Flavonoids |
| **Ash extract (liquid or thin paste)** | **240 ml** | |

The preparation begins by peeling and chopping the Christmas melons, which are then pounded in a mortar. Aloe vera gel and chili pepper are added, and the mixture is further pounded to extract the infusion. Ash extract is incorporated, and the resulting mixture is filtered and left to settle for one hour. Once this process is complete, the mixture is ready for use. The remaining portion should be stored in a cool, dry place at room temperature, where it can be kept for up to three weeks before it spoils.

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**Table 2: Representation of the Bioactive Plants and their Potential Properties in the Herbal Blend**

| Ingredient | Scientific Name | Properties | Benefits for Poultry |
|---|---|---|---|
| Christmas Melon | Citrullus lanatus | Antioxidant, antiviral | have immunomodulatory effects to help poultry recover from ND |
| Aloe Vera | Aloe barbadensis miller | Anti-inflammatory, antiviral, immune-boosting | Supports the immune system in fighting ND |
| Chili | Capsicum spp | Contains capsaicin, antimicrobial | reduces pathogen load in infected poultry, aiding in disease control. \| |
| Ash Extract | | contains minerals and alkaline properties | promotes overall health and healing through mineral content or alkalinity. |

**This table provides a concise overview of the herbal ingredients in the blend, their properties, and how they may benefit poultry in combating Newcastle Disease (ND).**

*B. Dosage and Administration*

For therapeutic purposes, 20 milliliters of the herbal extract was mixed into 1 liter of water and administered to sick birds once daily for a period of three days. For preventive care, 10 milliliters of the herbal extract was mixed into 1 liter of water and administered to the birds once daily for a period of three days.

For broilers and layers aged two weeks, administer 5 milliliters daily. For chicks aged one month and older, the dosage increases to10 milliliters daily. For local birds, administer 10 milliliters daily for those aged two weeks, and 20 milliliters daily for those over one month old.

## IV. TOXICITY

*A. Herbal Extract Concentration*

If the herbal extract is concentrated, exceeding the recommended dosage can lead to toxicity. Typically, 3-4 times the recommended dose is often considered the threshold for potentially harmful effects.

*B. Potential Toxic Effects*

➢ *Overdose Symptoms*

Common signs of overdose may include lethargy, diarrhea, loss of appetite, increased heart rate, or abnormal behaviour. If the extract contains compounds such as alkaloids, saponins, or essential oils, toxicity can occur more rapidly. In this case, a small increase in dosage could be harmful.

*C. Toxicity Thresholds*

➢ *For Broilers and Layers:*

If the birds are receiving 5 millilitres daily (for 2-week-old birds), a toxic level might be around 15–20 millilitres daily. Anything above this might overwhelm their systems, leading to toxicity. For Chicks 1 Month and Older: If the recommended dosage is 10 millilitres daily, 20 millilitres might be a safe upper limit, but anything above 30 millilitres could be potentially harmful, depending on the concentration of active compounds in the extract. For ***Local Birds*:** With 10 millilitres daily for 2-week-old birds and 20 millilitres daily for those over a month, a toxic threshold could be around 3 times the recommended dose, or approximately 30 millilitres daily for local birds under 1 month and 60 millilitres for older birds.

*D. Study Design*

The efficacy of the herbal remedy was evaluated through personal case studies in 2024. Affected birds at Busessa Demonstration Farm in Kibaale district and a separate home flock were treated, followed by preventive administration in a larger flock of 1,654 layers.

## V. RESULTS

*A. Therapeutic Efficacy*

The initial treatment of seven affected birds showed that six out of seven birds fully recovered, indicating significant therapeutic effects of the herbal remedy. The recovery was rapid, with birds showing improved appetite, activity levels, and reduced clinical symptoms such as coughing and nasal discharge.

*B. Preventive Efficacy*

In the subsequent preventive trial conducted in a flock of 1,654 layers no new cases of ND were reported during the three-day administration of the herbal remedy. This suggests that the herbal blend may effectively enhance the immune response, preventing new infections in exposed birds.

*C. Side Effects*

A slight decline in egg production was observed in treated layers during the administration of the herbal remedy. Egg production dropped by approximately 10-15%, but it returned to baseline levels within three weeks of discontinuing treatment. This temporary reduction in egg production indicates a potential side effect that warrants further investigation.

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## VI. DISCUSSION

➢ *Main Results*

The findings of this study underscore the effectiveness of the herbal blend of Christmas melon, aloe vera, chili, and ash extract in treating and preventing Newcastle Disease (ND) in poultry (Harrington et al., 2020). The high therapeutic efficacy, with an 85.7% recovery rate observed in the treated birds, and the preventive success in a large flock of 1,654 layers, suggests that this combination of herbs can significantly enhance the immune response and support recovery. These results align with the Integrative Medicine Theory (IMT), which emphasizes the potential of combining conventional and alternative treatments for improved health outcomes. IMT advocates for the use of herbal remedies to complement or even substitute conventional treatments when resources are limited, as is the case in many rural settings in Uganda.

➢ *Comparison with Existing Literature*

Existing literature supports the use of Aloe vera for its immunomodulatory and anti-inflammatory properties, which may play a role in aiding the recovery of sick birds (NEMAULUMA et al., 2024). Similarly, Christmas melon, known for its antioxidant and antiviral properties, may contribute to fighting the viral infection (Collett et al., 2020). Similarly, chili is believed to have antimicrobial effects, while ash extract may support overall health and healing (Abinaya, 2024). This study extends the existing knowledge by demonstrating the synergistic effects of these herbs in combating ND.

Several studies have already highlighted the efficacy of individual plants for controlling ND. For example, studies in Yewa South Local Government (Irivboje, 2021) and (Ajayi M. A, 2023) demonstrate the positive effects of Christmas melon in treating ND, with benefits including enhanced immune responses and growth performance in broiler chickens. The current study extends this knowledge by demonstrating the synergistic effects of combining multiple herbs, which may provide a more comprehensive approach to managing ND in poultry.

However, while these components show promise, existing research also points to the need for careful consideration of potential side effects. For instance, research by Harrington et al. (2020) on Aloe vera and other herbs in poultry health emphasized the importance of monitoring for reproductive health effects, especially in laying hens. The observed temporary reduction in egg production in this study may align with such concerns and suggests that the long-term safety of these herbal remedies needs further exploration.

In conclusion, this study makes a significant contribution to the growing body of knowledge on herbal remedies for poultry health, providing a foundation for future research aimed at optimizing these natural treatments. The observed effectiveness of the herbal blend in treating and preventing Newcastle Disease offers promising prospects, but further studies are required to address potential risks and refine its use for maximum benefit.

➢ *Strengths and Limitations*

One of the strengths of this study is its real-world application, using personal case studies to evaluate the efficacy of the herbal remedy in both therapeutic and preventive contexts provide valuable insights into the practical use of the herbal remedy in field conditions. The study also benefited from a large sample size in the preventive trial. High recovery rates and effective prevention of new infections support the therapeutic potential of the herbal remedy, suggesting that it could be a viable alternative or adjunct to conventional treatment options. The study explores a combination of four herbs, providing a broader understanding of the synergistic effects of these plants compared to isolated herbal remedies commonly studied. However, limitations include the small sample size for the treatment trial and the lack of a controlled study design. The small sample size (seven affected birds) in the treatment trial limits the generalizability of the findings. Larger sample sizes would help strengthen the validity of the conclusions drawn. While this study focused on Newcastle Disease, it would be useful to assess the potential efficacy of the herbal remedy in managing other viral or bacterial poultry diseases, particularly in regions where such diseases are prevalent but resources for conventional treatments are limited. Further research with randomized controlled trials would help confirm these findings.

➢ *Implications for Future Research*

Further studies should aim to standardize preparation methods and dosages for herbal remedies in poultry, as well as evaluate their long-term safety, especially concerning reproductive health in laying hens. Investigating the potential for these herbs to work in combination with conventional vaccines or treatments could also be beneficial.

## VII. CONCLUSION

This study suggests that a herbal blend consisting of Christmas melon, aloe vera, chili, and ash extract may offer an effective treatment and preventive measure against Newcastle Disease in poultry. The therapeutic efficacy observed in the case studies, with a 85.7% recovery rate in treated birds, supports the remedy's potential in alleviating symptoms of ND. Furthermore, the preventive trial conducted in a large flock of 1,654 layers demonstrated the herbal blend's ability to prevent new infections, suggesting its role in bolstering the immune response of exposed birds. While the remedy demonstrates promising results, the observed side effects—particularly the temporary reduction in egg production—highlight the need for further research to optimize dosages and

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mitigate potential risks. With continued investigation, herbal treatments like this could provide a sustainable, natural alternative or complement to conventional methods for managing poultry diseases.

The findings of this study provide valuable insights into the possible benefits of herbal treatments in poultry disease management, especially in areas where conventional vaccines may be less accessible or where natural solutions are preferred. However, the observed side effects and the lack of a controlled, randomized trial emphasize the need for more rigorous studies to optimize the remedy's application and ensure its safety and efficacy.

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