

Short Communication

Part of plant concentrates and cow pee distillate as Immunomodulators: A Review

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Immunomodulator is a substance which stimulates or suppresses the components of immune system including both innate and adaptive immune responses (Agarwal and Singh, 1969). The modulation of immune system by various medicinal plant products has become a subject for scientific investigations currently worldwide. Keeping this in view, the present article has been constructed to highlight the importance of herbal extracts and cow urine distillate as potent immunomodulators for livestock.

Key words: Immunomodulator, immune system, medicinal plant products, herbal extracts, cow urine distillate.

INTRODUCTION

In Indian scenario, poultry industry has become a means for earning livelihood for the economically distressed farmers in India due to its promising results in productivity and national economy. Poultry rearing is currently the fastest growing industry in our national livestock sector which is benefiting us from production and advantages in prices along with provision of proteinaceous food. In India, poultry industry is recognized as an important cottage as well as fast growing large commercial agriculture industry. Sustained economically viable poultry production demands the stringent control of various infectious diseases affecting the birds which incur huge economic losses to the poultry farm owners. To overcome this and for the maintenance of healthy flocks for commercial purposes, it is needed to augment the immune system in the susceptible birds. Livestock and poultry population are affected by many infectious diseases which cause immunosuppression leading to failure of vaccination against these diseases. In spite of timely vaccination by established methods, failure and breakdown of immunity has become common. Poultry farming is always prone to a heavy risk of increased disease incidences leading to high mortality even after

scheduled mass vaccination programmes are implemented. Some pesticides and chemicals may lead to immunosuppression in the birds. Large number of reports are available on outbreak of Newcastle disease (ND) resulting in alarming economic losses mainly due to 'vaccine failure state' even after programmed vaccination schedules have been used (Chakraborty and Chatterjee, 1998). To overcome these immunosuppressive conditions, modulation of micro-environment of the immune system seems to be essential. This can be achieved by immunomodulators or immunostimulating compounds.

POTENTIAL EFFECT OF HERBAL PLANT PREPARATIONS ON HOST IMMUNITY

Many herbal plant preparations are prescribed to strengthen host resistance (Thatte and Dahanukar, 1986) due to their immunomodulatory activities. One such plant, *Tinospora cordifolia*, commonly called 'Guduchi' has been examined for its immunomodulatory properties. Guduchi means to rejuvenate dead cells. It is widely used in veterinary folk medicine and has also been claimed to be beneficial according to 'Ayurveda' for the cure of jaundice, skin diseases, diabetes, anemia, emaciations and various infections for its anti-spasmodic,

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anti-inflammatory, anti-arthritic and anti-allergic properties (Chopra et al., 1982). It has also been reported that it improves the phagocytic and bactericidal activities in patients suffering from polymorphism in surgical jaundice (Thatte et al., 1989). Kolte et al. (2007) studied the effect of feeding *T. cordifolia* in broiler birds which were immunosuppressed with cyclophosphamide and found a significant rise in antibody titer against ND virus with augmentation of inflammatory reaction to skin contact sensitivity test. Rege et al. (1989) and Bishavi et al. (2002) have proved the hepato-protective effect of *T. cordifolia*. Manjrekar et al. (1999) also found that aqueous extract of *T. cordifolia* is capable of increasing leukocyte count in mice.

Also, *Ocimum sanctum*, commonly known as '*tuls*' is also used in Ayurveda for various ailments including treatment of allergies. The plant has been reported to evince significant anti-stress properties. The beneficial effects of *O. sanctum* could therefore be due to its direct or indirect effects on the immune system. *O. sanctum* has been reported to modulate humoral immune response by releasing mediators for hypersensitivity reactions (Kujur, 2001; Krishnamohan et al., 1997; Kumar, 2003).

Withania somnifera also fall in this category with many other useful plants. They exhibit immunomodulatory activities. *W. somnifera* (commonly called 'Ashwagandha') root extracts possess anti-estrogenic, adaptogenic, anti-cancer and anabolic activities having beneficial effects in the treatment of arthritis, geriatric problems and stress. The root of *Asparagus racemosus* (commonly called 'Satavar') possess anti-diarrheal, anti-ulcerative, anti-spasmodic, aphrodisiac, galactagogue and other properties and has therefore gained its importance in Ayurveda, Siddha and Unani systems of medicine (Nadkarni, 1954). It has been observed that feeding *W. somnifera* and *A. racemosus* dried root powder significantly stimulates both humoral and cell mediated immune responses in swiss albino mice by Kuttan and Kuttan (1992). *W. somnifera* and *A. racemosus* extracts increase phagocytic activities of macrophages *in vitro* (Rege and Dahanukar, 1993). There have been studies on the immunomodulatory activities of *W. somnifera* and *A. racemosus* in mice with myelo-suppression induced by cyclophosphamide, azathioprim or prednisolone. Extracts of *W. somnifera* and *A. racemosus* have also shown immunopotentiating effects in cyclophosphamide treated mouse with ascitic sarcoma (Diwanay et al., 2004). Kalita and Dutta (1999) reported that maternal antibody was persistently found in sera samples tested against ND virus during the first week of age in broilers. This was attributed to transfer of natural passive immunity in young chicks as demonstrated by Hellar (1975). Muruganandan et al. (2001) reported the effects of ethanolic extracts of *W. somnifera* and *A. racemosus* on humoral immune system which was assessed by humoral immune response and cell mediated immune response in mice.

EFFECT OF COW URINE DISTILLATE IN AUGMENTING HOST IMMUNE RESPONSE

Cow urine therapy and all traditional practices from Indian systems of medicine have a strong scientific base. Traditional systems in medicines, whether from Ayurveda or Siddha or the use of cow urine distillate as immunomodulator are based on classical texts and systems, practices and products handed down over generations going back to Charak, Sushruta, Vagabhatta, the Ashtangahridaya and the Samhitas. Cow urine has been described in 'Sushrita Samhita' and 'Ashtanga Sangraha' to be the most effective substance/secretion of animal origin with innumerable therapeutic values. In Ayurveda cow urine is suggested for improving general health (Khanuja 2007).

Combining cow urine distillate (the term 'distillate' itself is a misnomer, since the material used is the residue, not the distillate) with antibiotics is not recommended at all and its combination in liquid or lyophilized powder form with modern drugs is irrational, since the relative bioavailability and pharmacokinetics of the components remain unknown (Khanuja, 2007). *In vitro* experiments with cow urine distillate have little relevance, since activity *in vivo* largely depends on plasma levels, which in turn are related to serum binding properties and absorption. Mammalian urine contains useful constituents like adrenocorticotrophic hormone (ACTH) isolated from pregnant female urine. Other constituents include various enzymes, amino acids and erythropoietin. The reported results of experiments which have been carried out on cow urine distillate in India and the grant of the U.S. patent vindicates the use of cow urine as a bio-enhancer (Khanuja, 2007). According to a recent online report of 'Love4Cow Trust' by researchers at Central Institute of Medicinal and Aromatic Plants (CIMAP), Lucknow have identified a fraction of cow urine distillate as a bio-enhancer of commonly used antibiotics and anti-cancer drugs. Bio-enhancers do not possess drug activity of their own but promote and augment the bioactivity or bioavailability or the uptake of drugs in combination therapy. Such bio-enhancers have been earlier isolated only from plant sources. In the study at CIMAP Lucknow, researchers found that 'cow urine distillate fraction' enhances the activity of antibiotics such as rifampicin by about 5-7 folds against *Escherichia coli* and 3-11 folds against Gram-positive bacteria. Rifampicin is a front-line anti-tubercular drug used against tuberculosis. Interestingly, it was also found that 'cow urine distillate fraction' enhanced the potency of 'Taxol' (paclitaxel) against MCF-7 a human breast cancer cell line in *in vitro* assays (US Patent No. 6,410,059).

At the same time, care should be taken to monitor that the results published or the patent(s) granted regarding the therapy by using cow urine distillate should not lead to proliferation of quack medicine using cow urine, claiming legitimacy from the traditional or modern

systems of medicine (Nair, 2004). it is a known immunostimulant. How is relevant to the plant products?

CONCLUSION

The use of various plant extracts and herbal fed additives in a specific dose during the scheduled vaccination

regimen may be helpful in obtaining higher protective antibody titre and more effective cell mediate immune response for protection against various bacterial, viral and other diseases. Herbal formulation may be therefore recommended for use as immunostimulant in normal and immunocompromized susceptible animals and birds. The present review also indicates the determinative role of cow urine distillate in helping the immunodeficient and / or susceptible subjects in obtaining higher level of humoral and cell mediated immune protection for overcoming different infections.

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