

Innovation in Poultry Nutrition through Sustainable Alternatives to Antibiotic Growth Promoters

Hemant Kumar Sharma

B.V.Sc and A.H. forth year, MJF College of Veterinary and Animal Sciences,
Chomu, Jaipur,Rajasthan (India)

Abstract:- This article represents that how the importance of antibiotic growth promoters in poultry, due to there is seen of increasing the resistance day by day we must to take some step in this condition for their beneficial health. We have to reduce the resistance of antibiotics in them. So we change in feed and improve the health of poultry and also its production. We must to try reduced the mortality and morbidity also. By doing this, we can do best change or innovation permanently. In this order, overall is seen that if resistance will increase then the treatment of them become impossible and effect of drugs does not occurs.

Keywords:- Probiotics, Prebiotics, Synbiotics, Postbiotics, Phytobiotics, Enzymes, Essential oils and Organic Acid.

I. INTRODUCTION

India having different types of animal farming such as cattle farming, sheep and goat farming, and one of them is poultry farming. According to current census 2023, India ranks in egg and meat productions are 3rd and 8th, respectively in the world. India is also 5th largest producer of broiler chickens.

According to ICMR, now-a-days, it is observed that there is an increase in the demand of poultry products for human consumption. In this order, it must be fulfils the requirement of human population. Because of increasing

human population rapidly and less poultry production, it may raise the demand and supply gap to get the rid off from this problems, people are using antibiotics and other inorganic feed additives to increase the growth rate of birds. But continuous use of antibiotics may leads to antimicrobial resistance which ultimately cause immune-pathologic disorders, carcinogenicity, toxicity, cardiovascular diseases in human and animals. It also affects the environment.

Therefore, to reduce antibiotics as growth promoter, there is a need to search for new alternative feed. In this order, we can include the feed additives that free from antibiotics like: **Probiotics, Prebiotics, Synbiotics, Postbiotics, Phytobiotics, Enzymes, Essential oils, and Organic acids** are replaces the antimicrobial growth promoter and have good effect on growth and production of birds.

➤ Probiotics

These are defined as the live microorganisms which are administered in proper amount for health benefit for poultry. Instead “Probiotics” using of term “Pronutrients”.

The examples of probiotics are: *Lactobacillus acidophilus*, *L.casei*, *L.bifidius*, *Bifidiobacterium bifidium*, *Streptococcus thermophillus* etc (By- Dv Reddy)

➤ Mechanism of Probiotics-

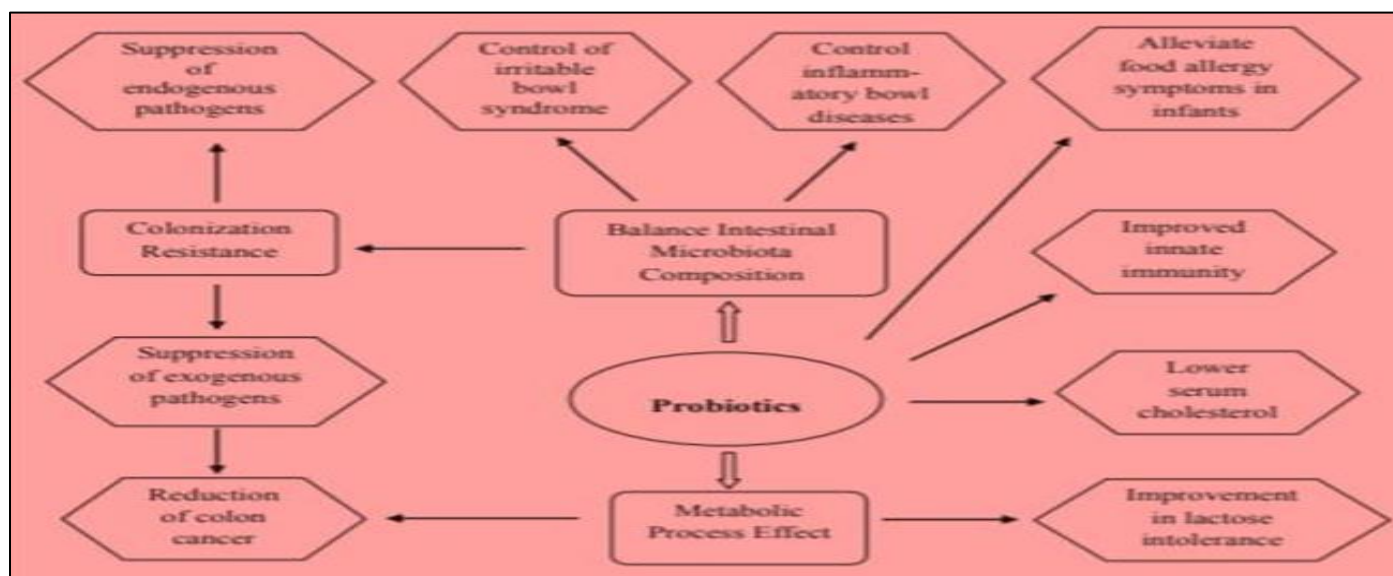


Fig 1 (Parvez, Malik, Ah Kang and Kim, 2006)

➤ Prebiotic

A prebiotic is a non-digestible food ingredient that beneficially affects the host by selectively stimulating the growth and/or activity of one or a limited number of bacteria in the colon and thus improves poultry health. (Gibson *et al.*, 1996).

These are simply sugars, oligosaccharides of between 3 to 6 fructose unit in length may also comprise soluble fibres, with monosaccharide chain lengths. Prebiotics are substrates

for probiotics generally.

- **Examples-** In this we include inulin, MOS (Mannan oligosaccharide), FOS (Fructooligosaccharide) etc.
- **Silver Nanoparticles as a potential Antimicrobial feed additive that alternative to Antibiotics.**
- **Mechanism of prebiotics-** (Ishu and Pratyosh Shukla, 2019)

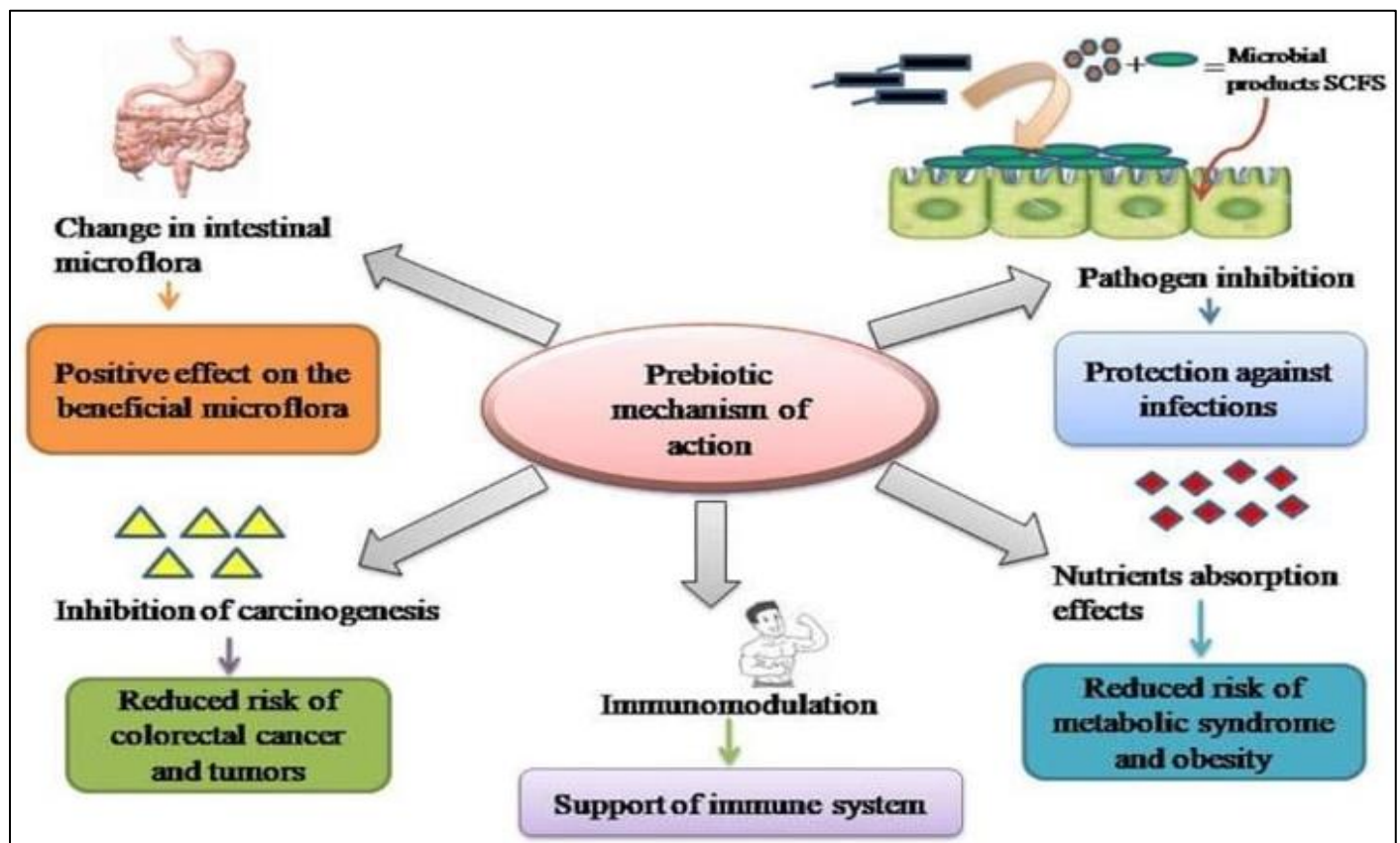


Fig 2 (Ishu and Pratyosh Shukla, 2019)

➤ Enzymes

The enzymes are the protein which plays an important role in digestion, nutrient availability, maintaining the intestinal health in poultry known as **Enzymes**. Every enzyme requires **substrate** to activate the reaction.

- **Examples:** - Phytase, β -glucanase, xylanases and β -galactosidases etc.

➤ Mechanism of Action/their effect: -

- **Phytase** – in this using of **barley or oats as substrate** then **result/effect** may be reduction of intestinal digest viscosity and also reduces dirty egg problem.
- **Xylanases** – in this using of **wheat, rye, triticale, rice bran as substrate** then **result/effect** may be reduction of intestinal digest viscosity.
- **β -galactosidases** – in this using of **grain legumes, Lupins as substrate** then **result/effect** may be removal

of a galactosides.

- **Phytases** – in this using of **plant feed stuffs as substrate** then **result/effect** may be enhanced utilization of plant phosphorus.

➤ Essential Oils

It is defined as a concentrated hydrophobic liquid containing volatile (easily evaporated at normal temperatures) chemical compounds from plants. These are also known as **volatile oils, aetheroleum**, or simply as the plant from which they were extracted.

It helps in immuno-modulatory activity maintain the metabolism of lipids in body maintaining intestinal morphology, having antimicrobial activity, plays role in antioxidant activity & improving growth performance.

- **Example** - Oil of clove.

• *Mechanism of Essential Oils-*

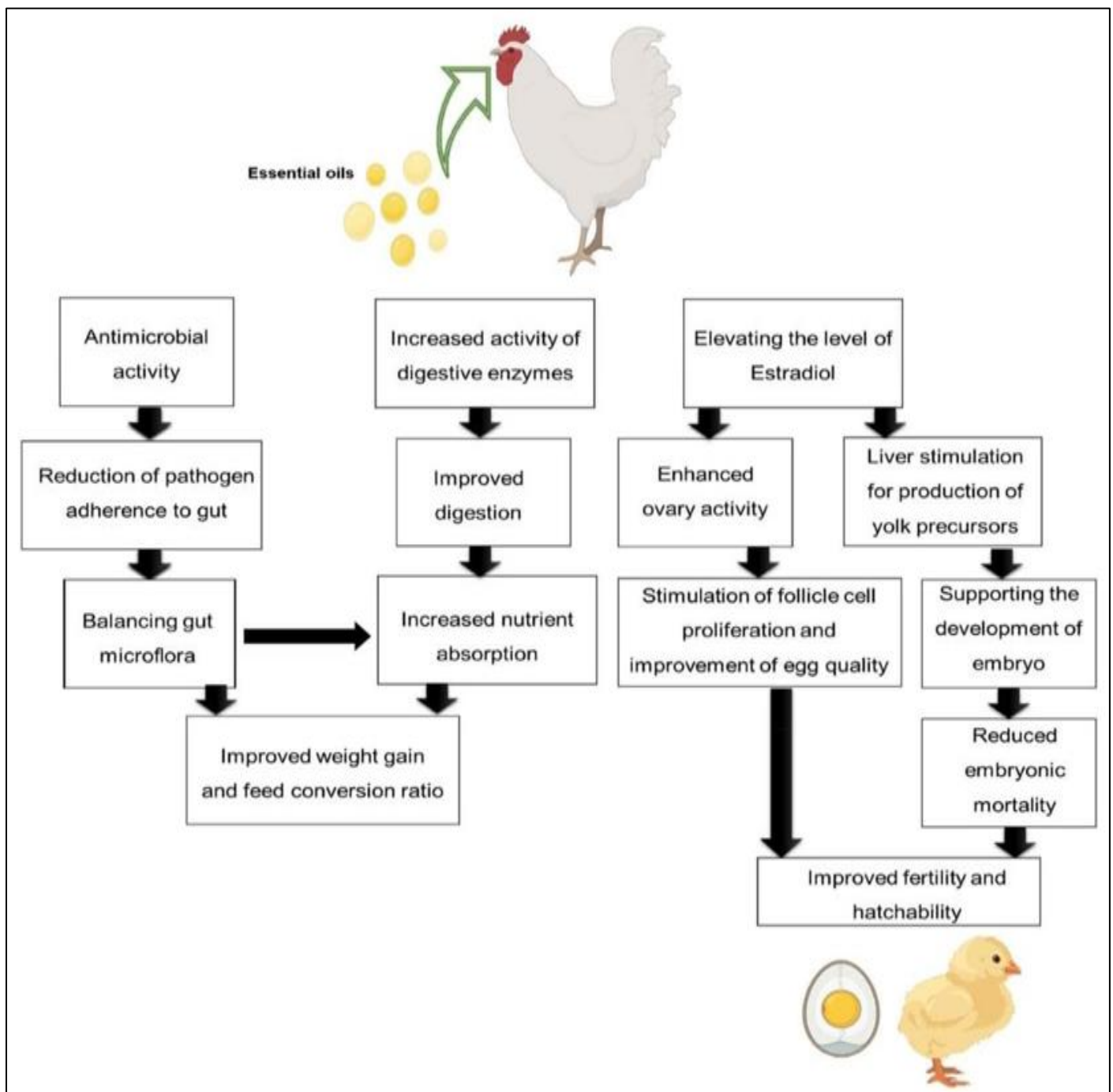


Fig 3 (Fatemeh Movahedi, Nilesh Nirmal et al, 2024)

➤ *Synbiotics*

These are the products which are generally formed from **probiotic** and **prebiotic** combinedly then, it is known as the **Synbiotics**.

According to poultry requirement/condition, It has tendency of synbiotics that acts function of both probiotic and prebiotics are finished at a same time.

So, now a days, there is seen as the using of synbiotics best than both (probiotic and prebiotic) are using at different time.

Generally, the best example of natural synbiotic is using of **Curd** and **Oligosaccharides**.

Now a days, there is seen as that **Synbiotic** products are produced by **Alltech** company feed. The main function of it is that improving the gut health of poultry and also increases growth performance regularly.

- Mechanism of Synbiotics-

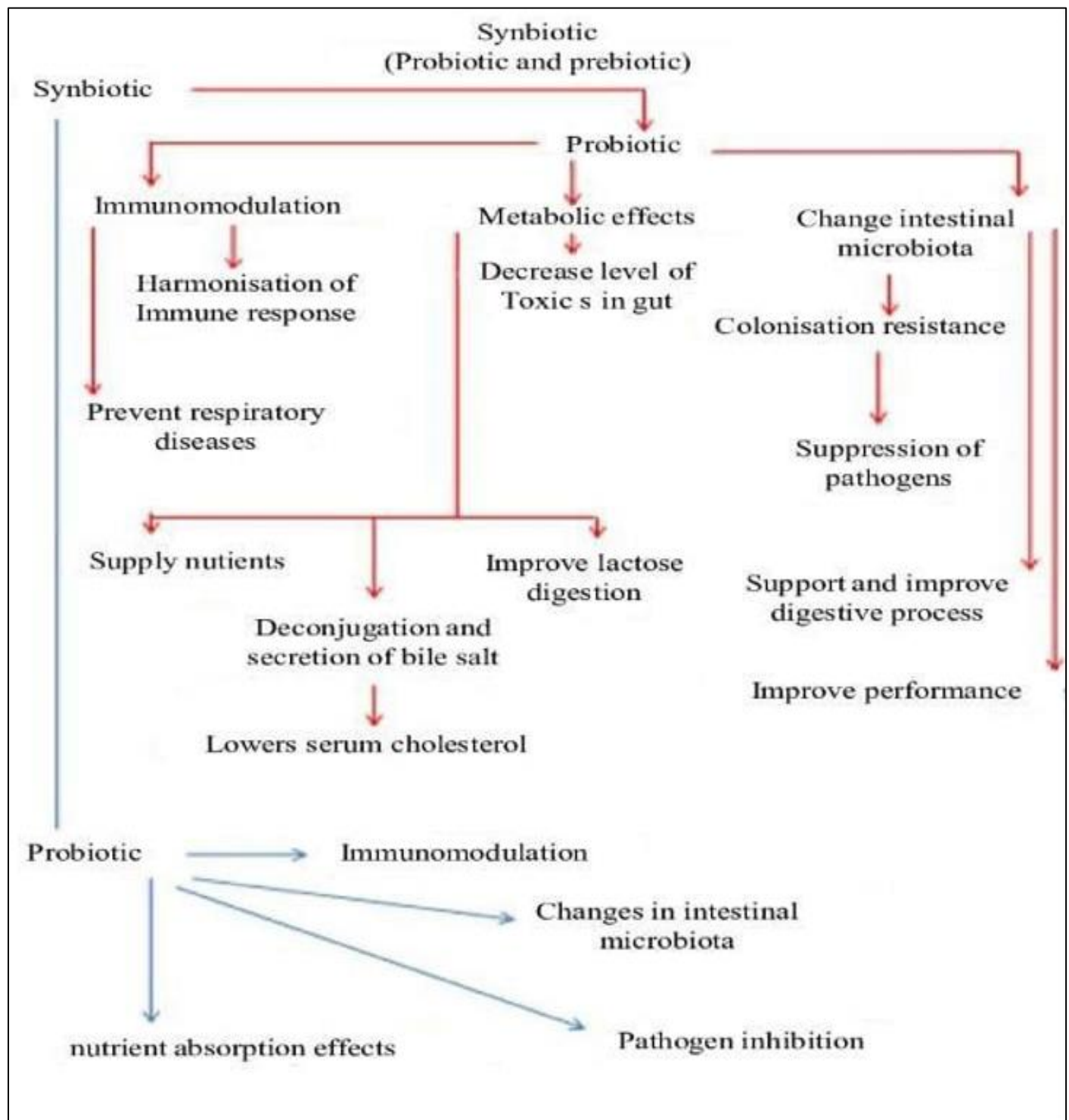


Fig 4 (Hozan Jalil Hamasalim, 2016)

➤ *Phytobiotics*

These are also known as the “Phytogenic feed” and these feed additives are derived from plant compounds known as **Phytobiotics**.

It helps in improving the health of and productivity in poultry. It is one of the best feed additives **alternatives to antibiotic growth promoter**. Because having antibiotic

properties, decrease in production of harmful ammonia in digestive tract and increase tendency to antibody production against bacteria etc

- **Examples-** *Yucca schidigera* extract, basil leaf essential oil and oregano essential oil etc.

- *Mechanism of Action-*

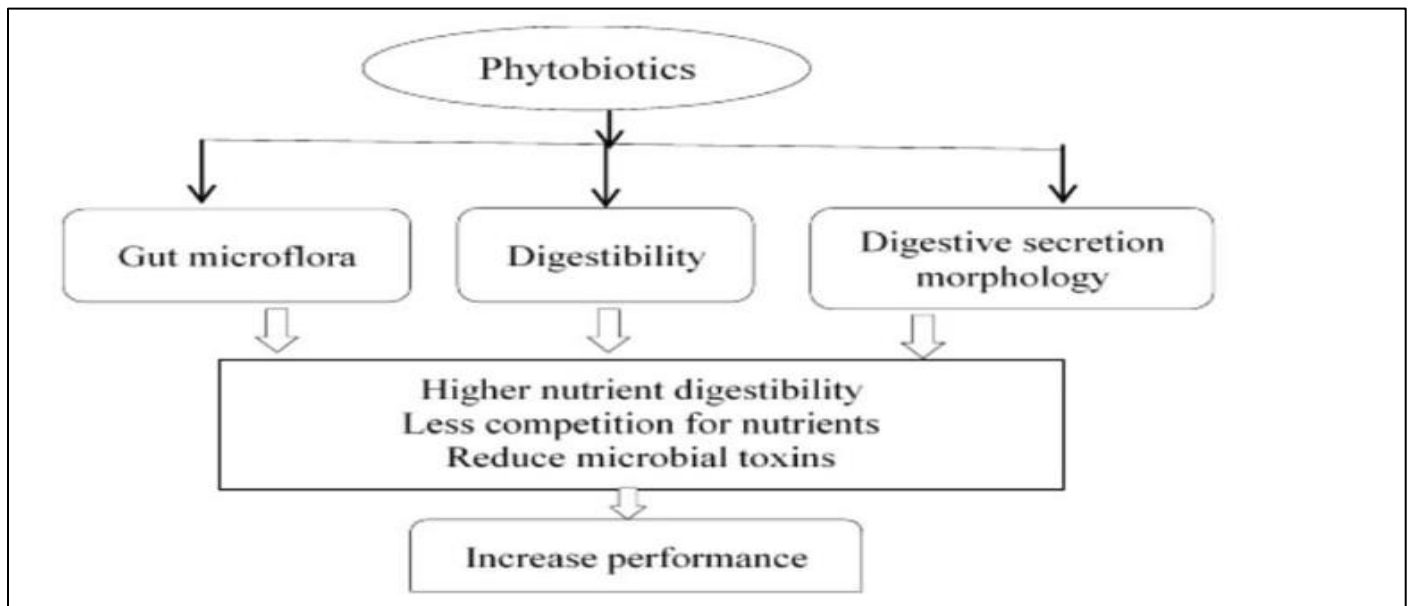


Fig 5 (Md. Shaiful Islam, Mahoumudha Akhtar et al, 2022)

➤ *Postbiotic*

These are defined as the waste components that remains after body digests probiotics and prebiotics but having the important role in maintain homeostasis, gut health, immune system, weight management & in productin purpose, known as **Postbiotics**.

A lactic acid bacterium helps in poultry farming as an alternative to antibiotic growthpromotors.

- **Examples-** Safmannan & SCFP etc

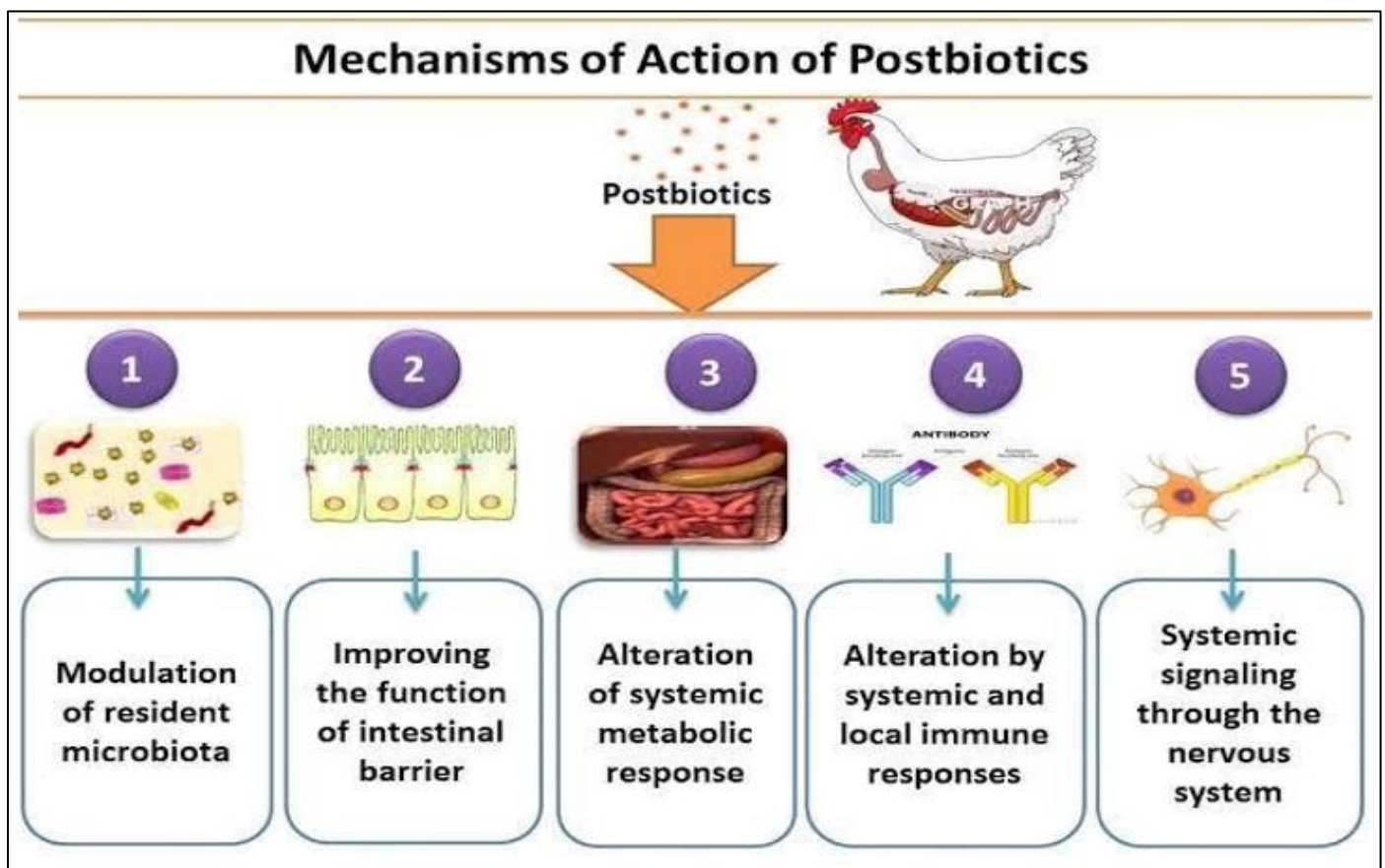


Fig 6 (Muhammad Saeed, Zoya AFzal et al, 2023)

➤ *Organic Acid*

These are organic compounds having acidic properties. They are biologically originated, dissolved poorly in water, also consider into weak acids known as **organic acid**.

- *Examples:-* Propionic acid, Butyric acid, Fumaric acid and Acetic acid.

- *Mechanism of Organic Acid-*

The main mechanism of it there is dissociation of H^+ ions also helps to kills the harmful bacteria (doing bacteriocidal and bacteriostatic process) and eliminates them from body or also regulates the PH of the body generally.

In this order, we can say that the H^+ ions are used in proper using of proton pump into the body. Hence, overall we can say that bacteriocidal and bacteriostatic process having in equilibrium state.

II. CONCLUSION

- We can reduces the resistance to antibiotics in poultry.
- It can be said that we can feed to poultry best and trying to avoid spreading of disease of microbes from it.
- By using of these products we can consume best product of them.
- We can reduce the mortality and morbidity of poultry.

REFERENCES

- [1]. Muhammad Saeed, Zoya AFzal etal, 2023. Use of Postbiotic as Growth Promoter in Poultry Industry: A Review of Current Knowledge and Future Prospectus.
- [2]. Md. Shaiful Islam, Mahoumudha Akhtar etal, 2022. Dietry manipulation to improve the gut health of poultry.
- [3]. Hozan Jalil Hamasalim, 2016. Synbiotic as Feed Additives Relating to Animal Health and Performance.
- [4]. Parvez, Malik, Ah Kang and Kim, 2006. Proiotics and their fermented food products are beneficial for health.
- [5]. Fatemeh Movahedi, Nilesh Nirmal etal, 2024. Recent advances in essential oils and their nanoformulations for poultry feed.