



Feed additives for Swine

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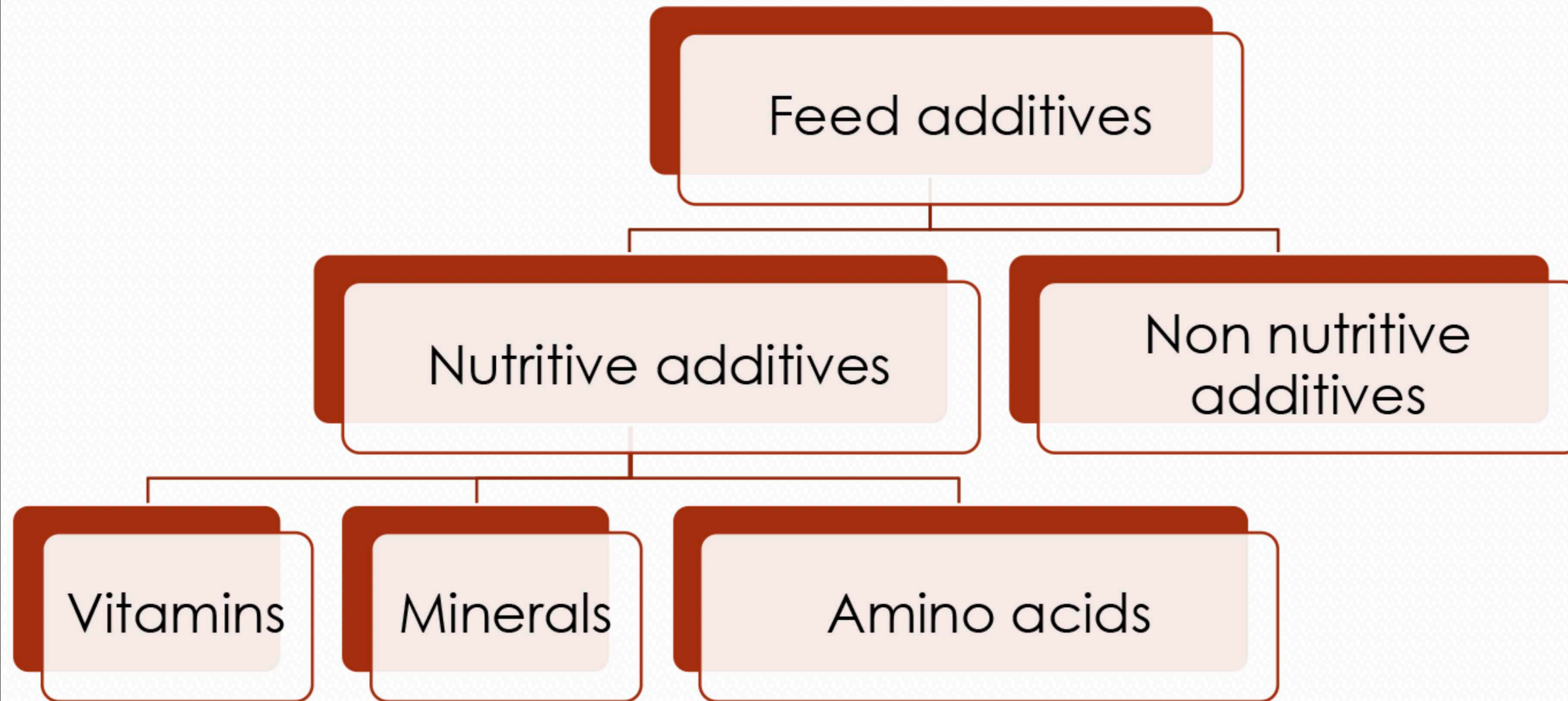
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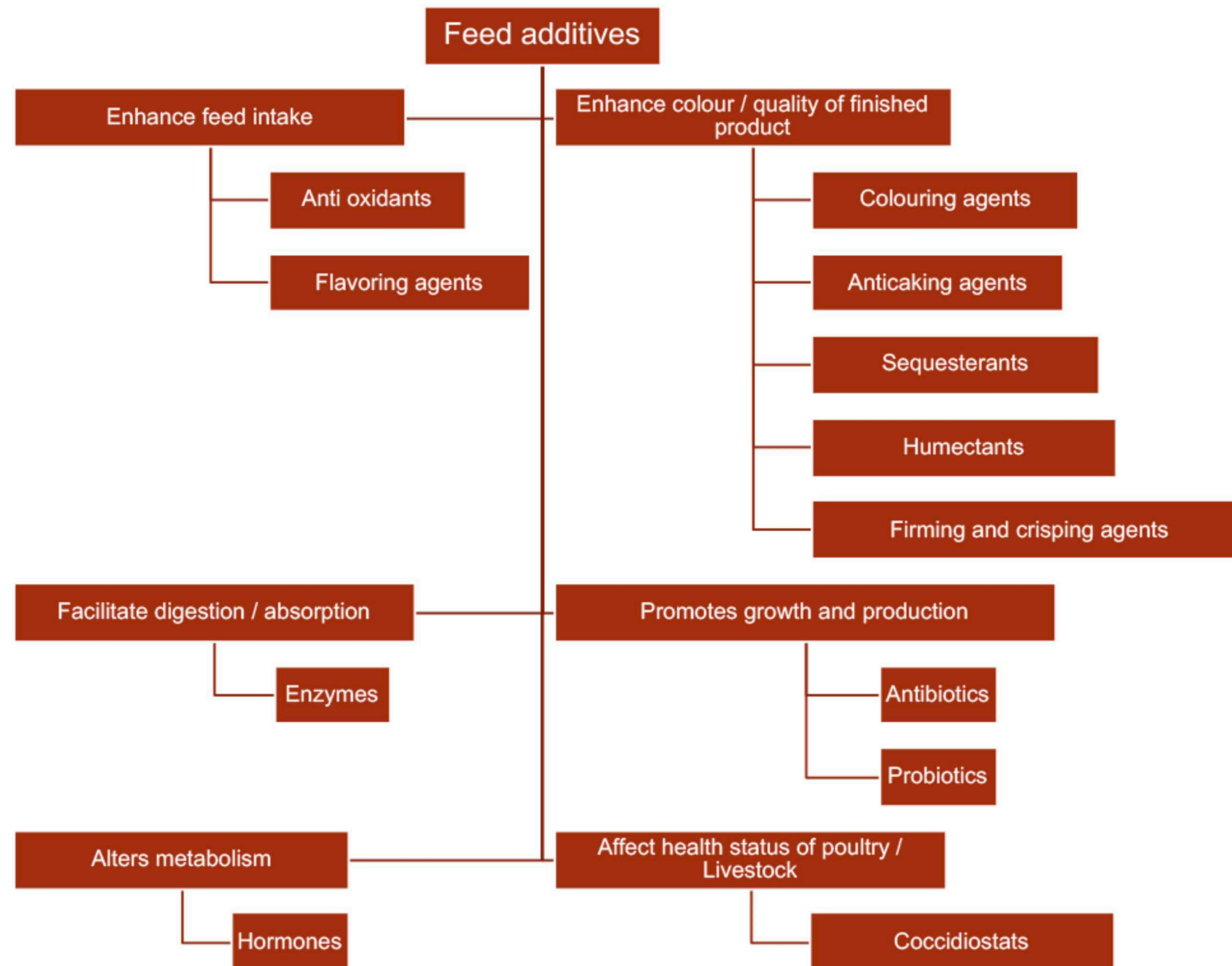
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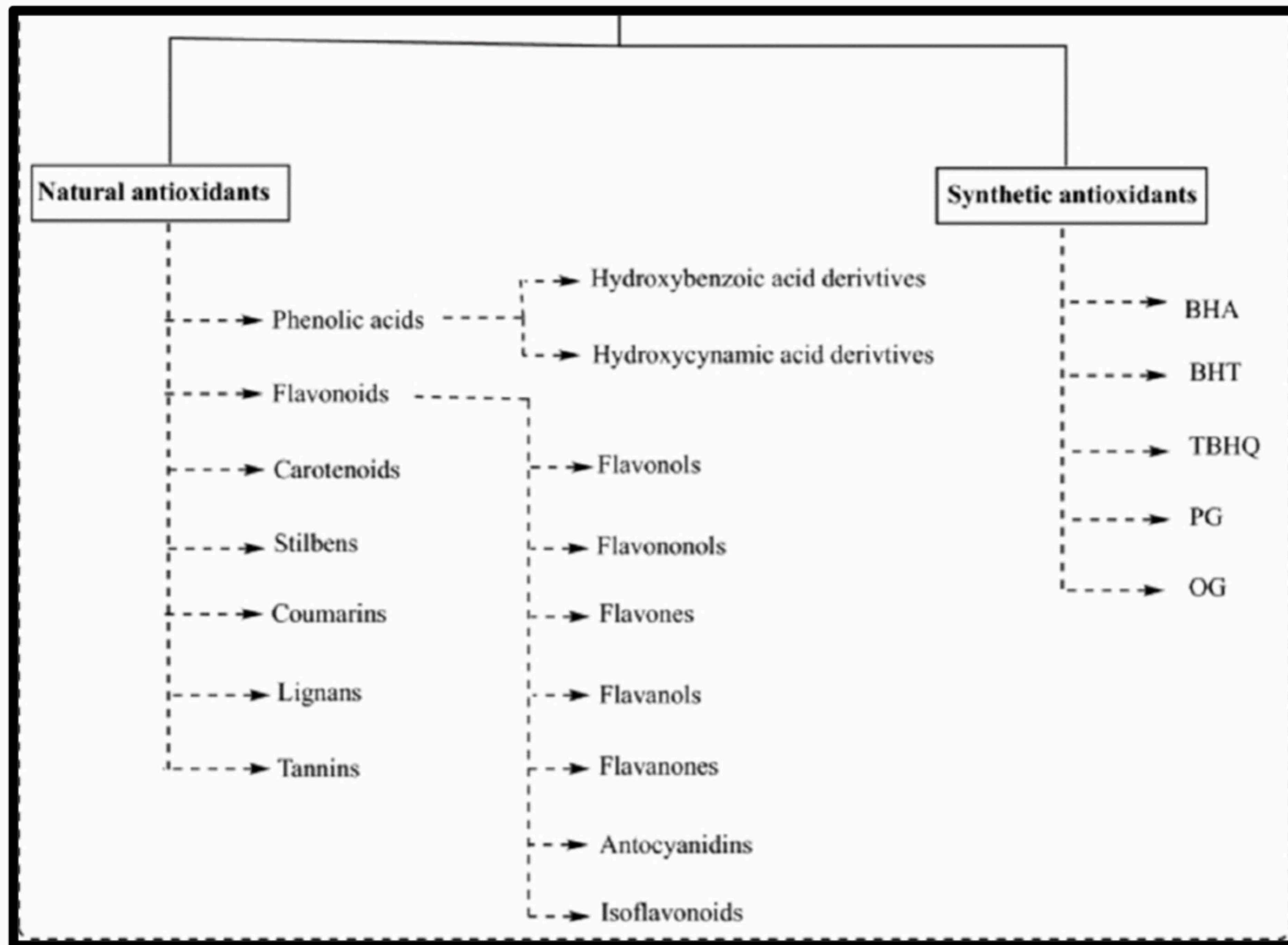
Feed additives - Classification



Feed additives



Antioxidants



Flavouring agents

- ▶ Flavoring agents are feed additives added to the ration to improve palatability and acceptance of a feed and to facilitate feed intake.
- ▶ Sweeteners – Large pigs - 200g/ton of anhydrous sugar, and for medium-sized pigs, 100g/ton of anhydrous sugar.

Good Attractant: Sweet Milk Flavor, Vanilla & Cheese Fragrance, Grilled Fennel Aroma.

Dosage: 300-800 G/T

Shelf Life: 18 Months

Net Weight: 20 Kg/Box

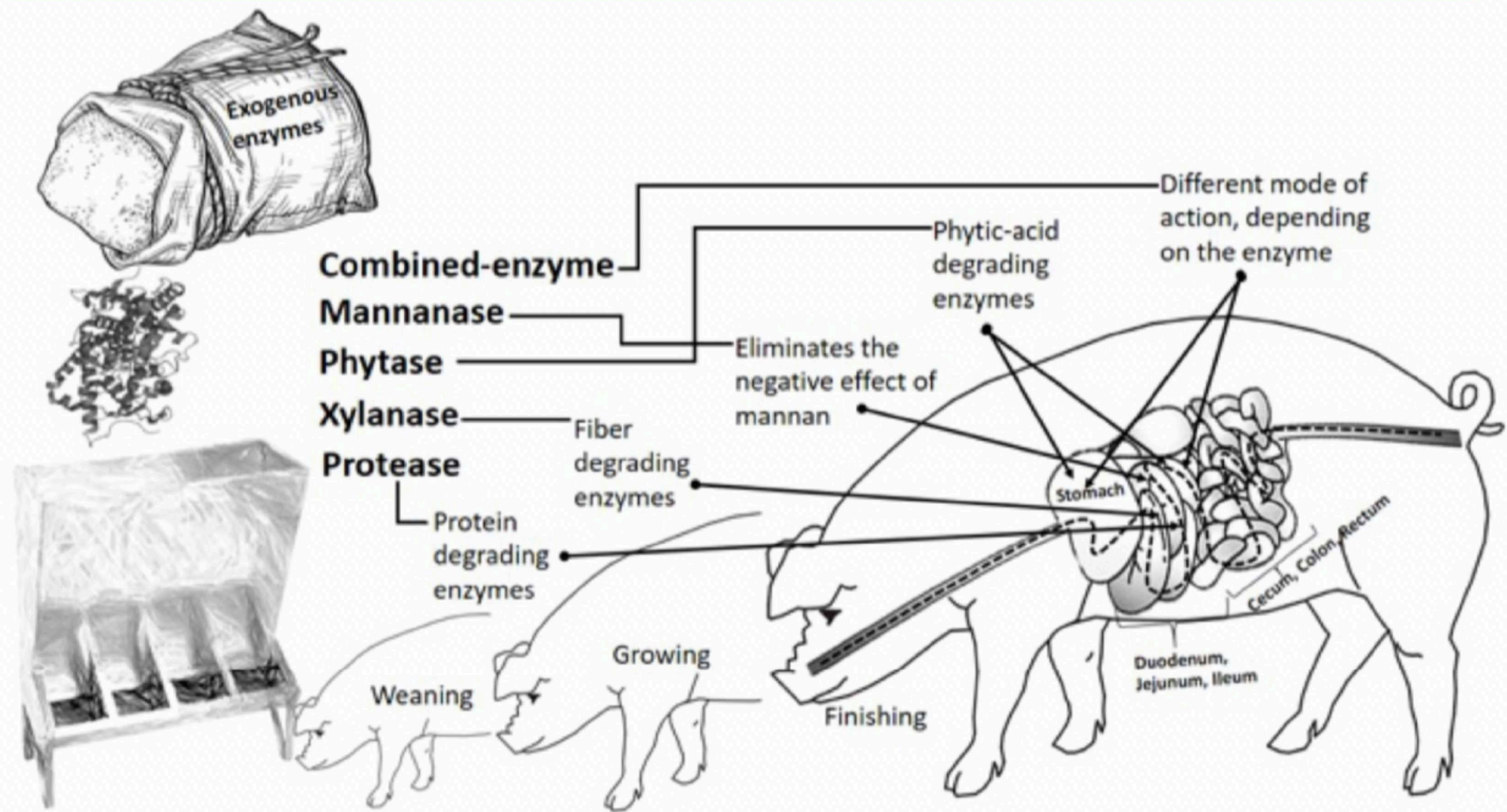


Feed additives that enhance feed quality

- ▶ **Anticaking agents** used by the feed industry to avoid the formation of lumps in feeds
- ▶ It is also used to improve the packaging and transportation of these feeds.
- ▶ Most anticaking agents are made from synthetic substances such as **silicon dioxide, magnesium carbonate and iron ammonium citrate.**
- ▶ Natural anticaking agents include magnesium silicate and corn starch.
- ▶ **Firming agents** include gelling, thickening, emulsifying, bulking, binding, and rising agents, humectants, and modified starches.
- ▶ There are **natural (guar gum, agar, curdlan), chemically and physically modified (modified starches), and synthetic gums.**

Additives that promote digestion

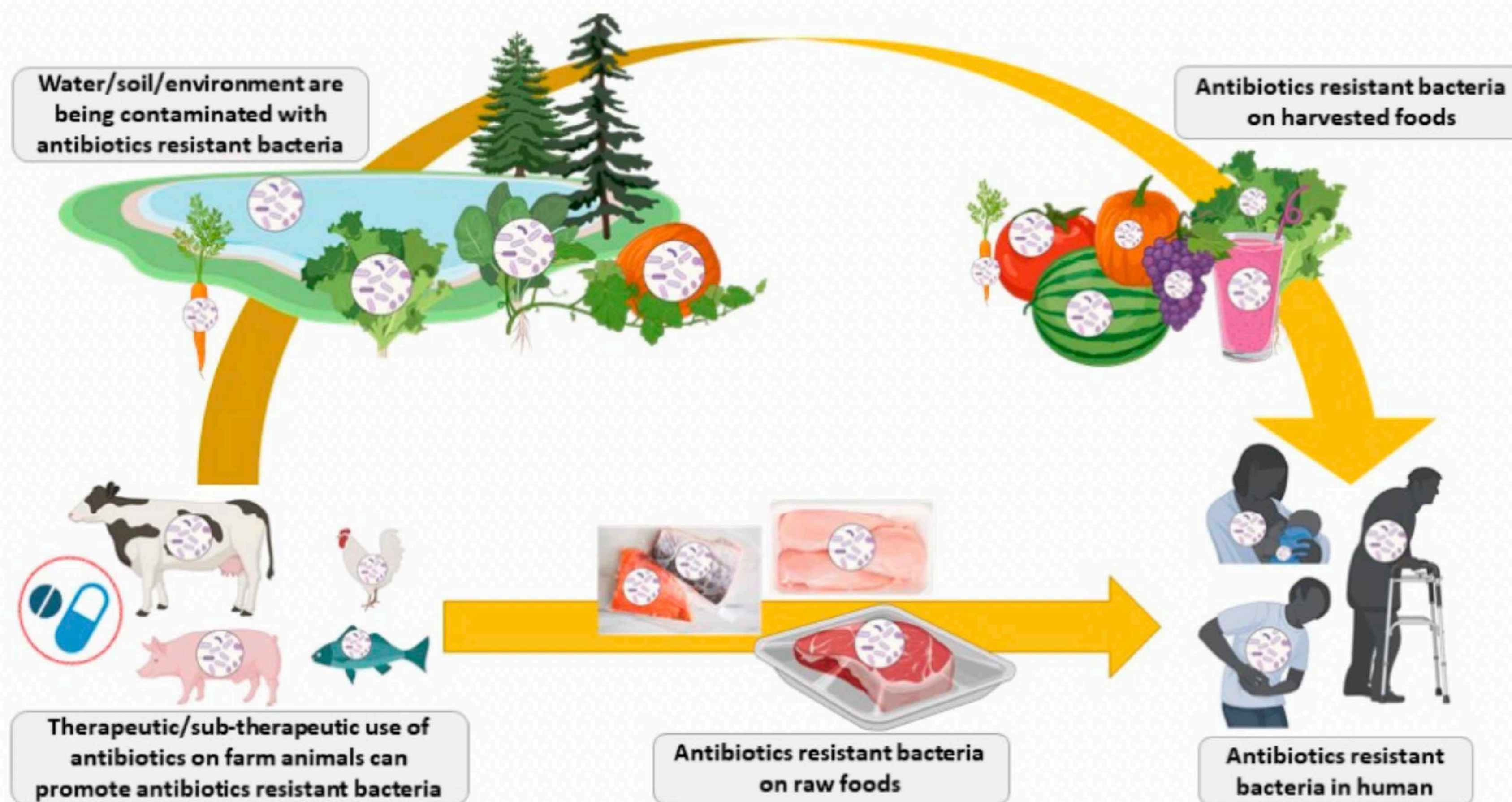
Enzyme	Target substrate	Target feedstuff
Phytases	Phytic acid	All plant-derived ingredients
β -Glucanases	β -Glucan	Barley, oats, and rye
Xylanases	Arabinoxylans	Wheat, rye, triticale, barley, fibrous plant materials
α -Galactosidases	Oligosaccharides	Soybean meal, grain legumes
Proteases	Proteins	All plant protein sources
Amylase	Starch	Cereal grains, grain legumes
Lipases	Lipids	Lipids in feed ingredients
Mannanases, cellulases, hemicellulasespectinases	Cell wall matrix (fiber components)	Plant-derived ingredients, fibrous plant materials



Mode of action of exogenous enzymes in the production stages of the pig - Edgar Aranda-Aguirre et al (2021)

Additives that promotes growth and production

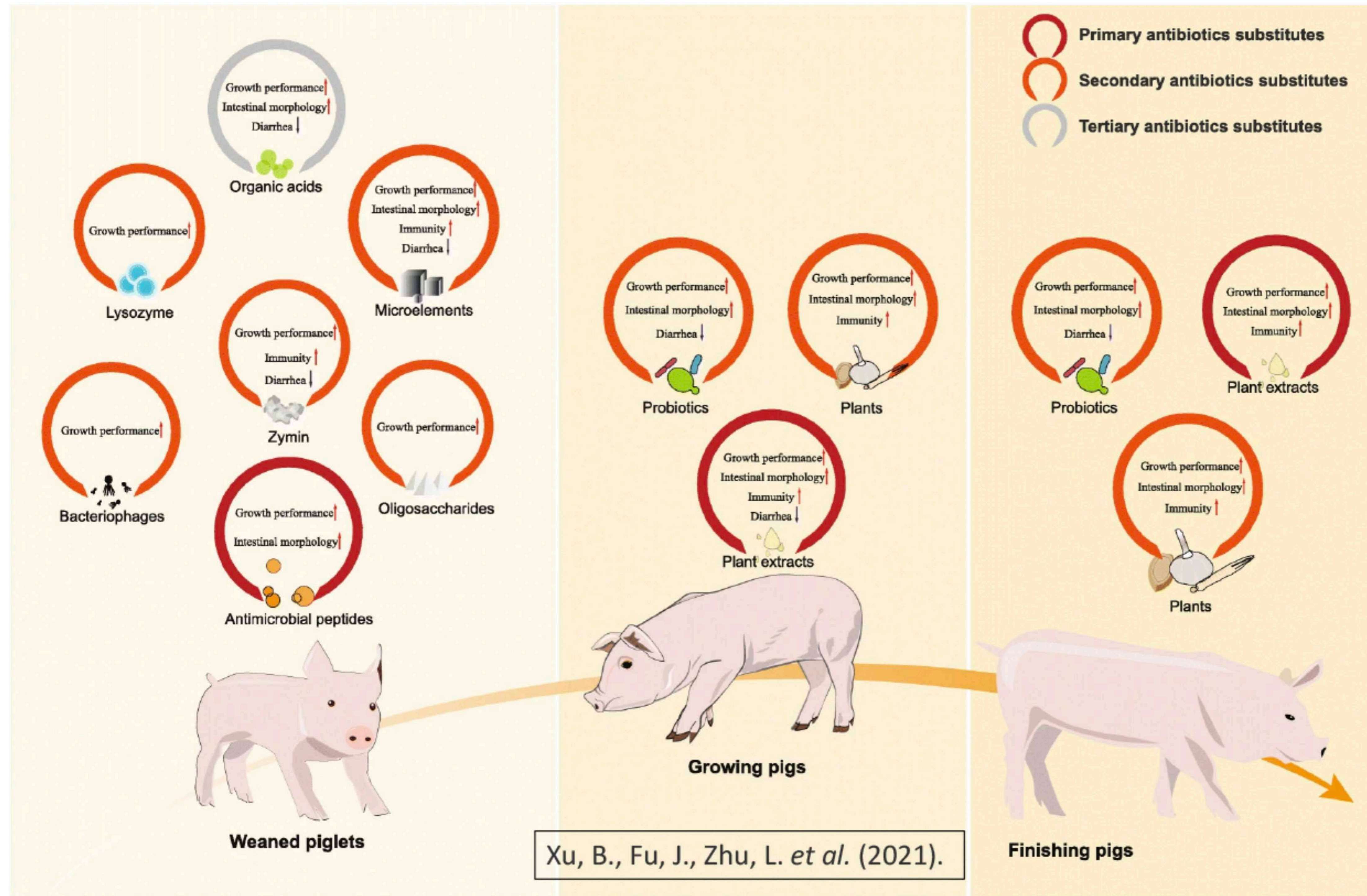
Antibiotics: Reduce or eliminate the activity of pathogens causing “subclinical infection.”
Reduce the growth of micro-organisms that compete with the host for supplies of nutrients.

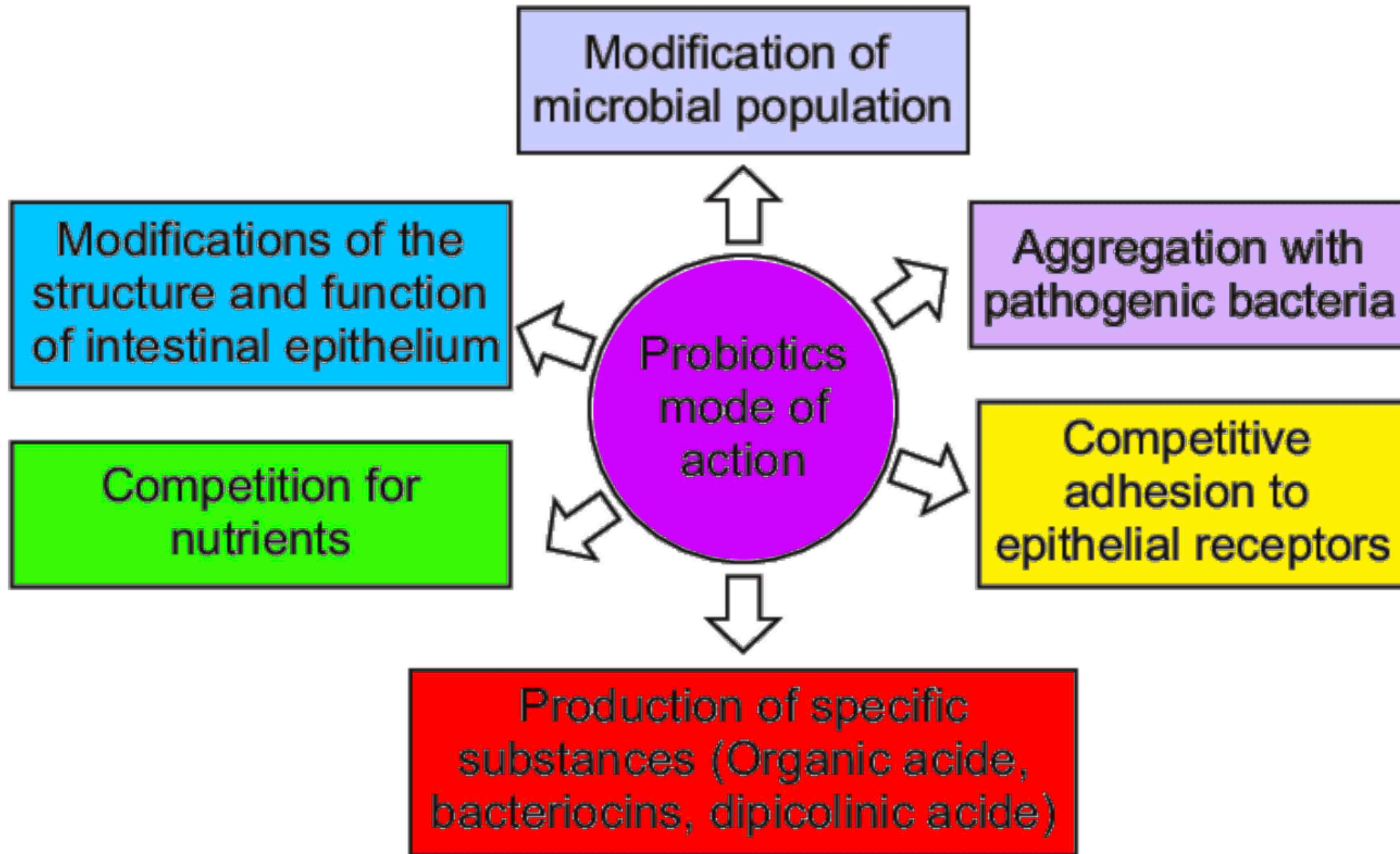


Rahman, Md Ramim Tanver, Ismail Fliss, and Eric Biron, (2022)

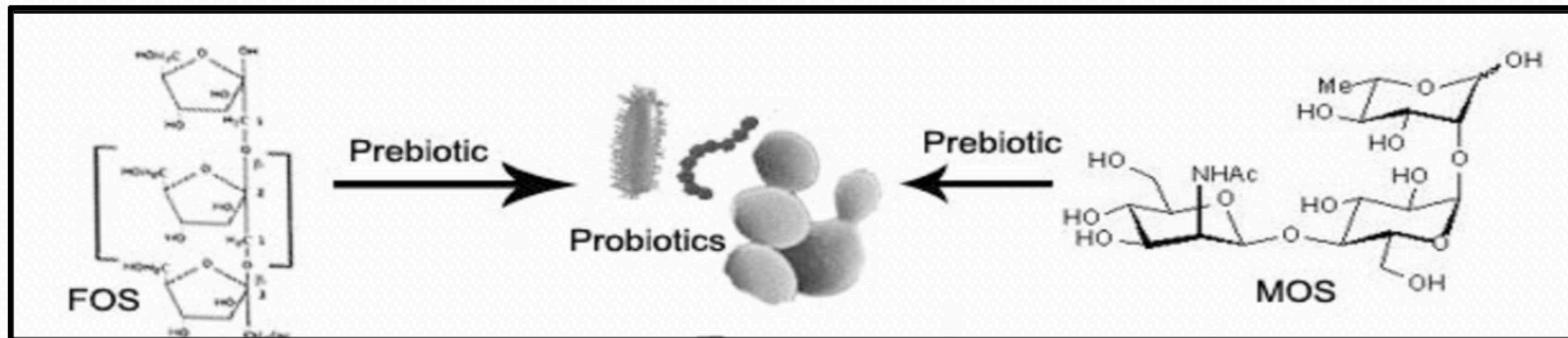


Alternative to AGP	Description	Advantages	Disadvantages
Probiotics	Live bacteria and yeasts that provide health benefits	<ul style="list-style-type: none"> Improves digestion Strengthens immunity 	<ul style="list-style-type: none"> Strain and dose-dependent Possible adverse side effects
Prebiotics	Non-digestible fibers that stimulate growth or activity of certain healthy bacteria	<ul style="list-style-type: none"> Improves mineral absorption Enhances immune function 	<ul style="list-style-type: none"> Dose-dependent Possible adverse side effects
Hyperimmune IgY	An antibody that helps transfer passive immunity	<ul style="list-style-type: none"> Environmentally friendly Reduces the number of animals required for antibody production 	<ul style="list-style-type: none"> Susceptibility to proteolytic degradation in the gut High manufacturing costs
Antimicrobial Peptides	Proteins with broad-spectrum antimicrobial activities against bacteria, viruses, and fungi	<ul style="list-style-type: none"> Broad-spectrum beneficial activity 	<ul style="list-style-type: none"> High manufacturing costs Systemic and local toxicity Susceptibility to proteolysis Natural resistance
Organic Acids	Different acids that have antimicrobial activity	<ul style="list-style-type: none"> Improves growth performance Strengthens immunity 	<ul style="list-style-type: none"> Dose-dependent Possible adverse side effects
Phytogenics (Oleoresin, Essential oils)	Natural growth promoters or non-AGPs used as feed additives derived from herbs, spices, or other plants	<ul style="list-style-type: none"> Improves growth performance 	<ul style="list-style-type: none"> Potential interactions with bacteria
Enzymes	Exogenous feed enzymes that break down fiber and other (anti-nutritional) components of the diet—e.g., phytate	<ul style="list-style-type: none"> Improves growth performance Strengthens immunity 	<ul style="list-style-type: none"> Highly sensitive to the environment
Clay	Supplements used as a binding and lubricating agent in the production of pelleted feeds	<ul style="list-style-type: none"> Enhances growth performance Combats bacterial infections in poultry 	<ul style="list-style-type: none"> Potential interactions with bacteria Possible adverse side effects

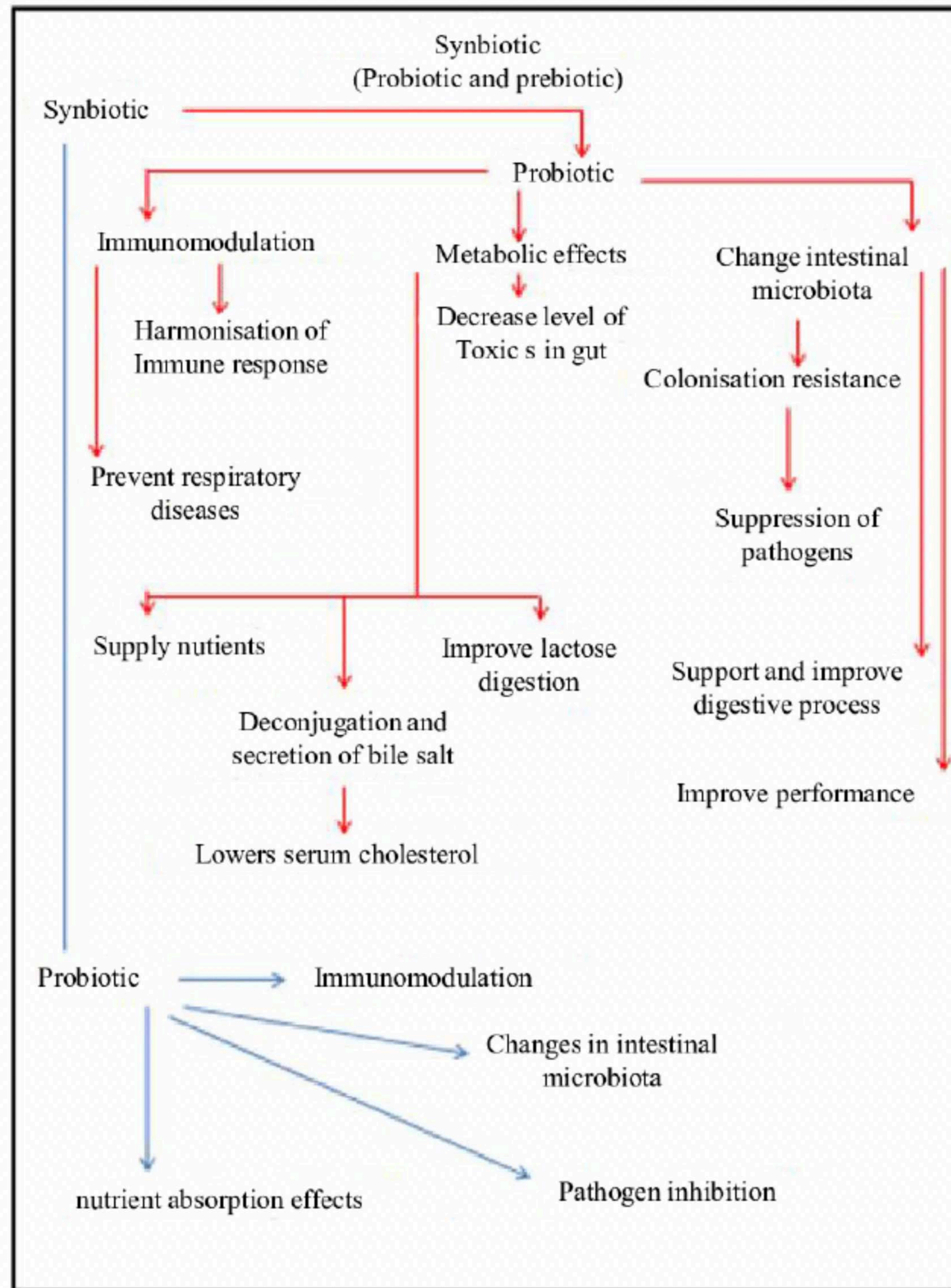




Prebiotics

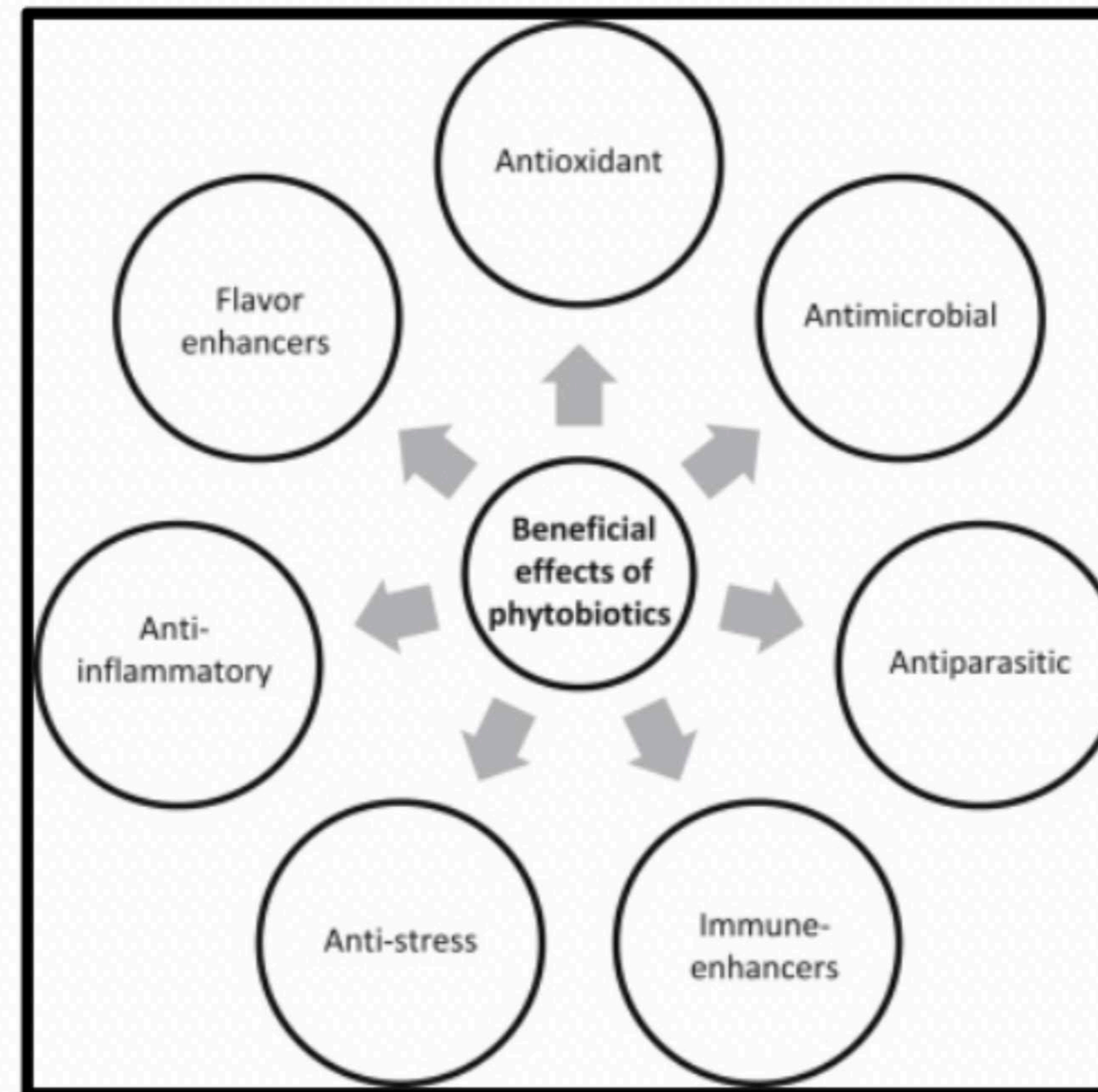


- PREBIOTIC SELECTION CRITERIA**
- Resistance to digestion in the upper sections of the alimentary tract.
 - Fermentation by the intestinal microbiota.
 - Beneficial effect on host/s health.
 - Selective stimulation of growth of probiotics.
 - Stability in various food/feed processing conditions.



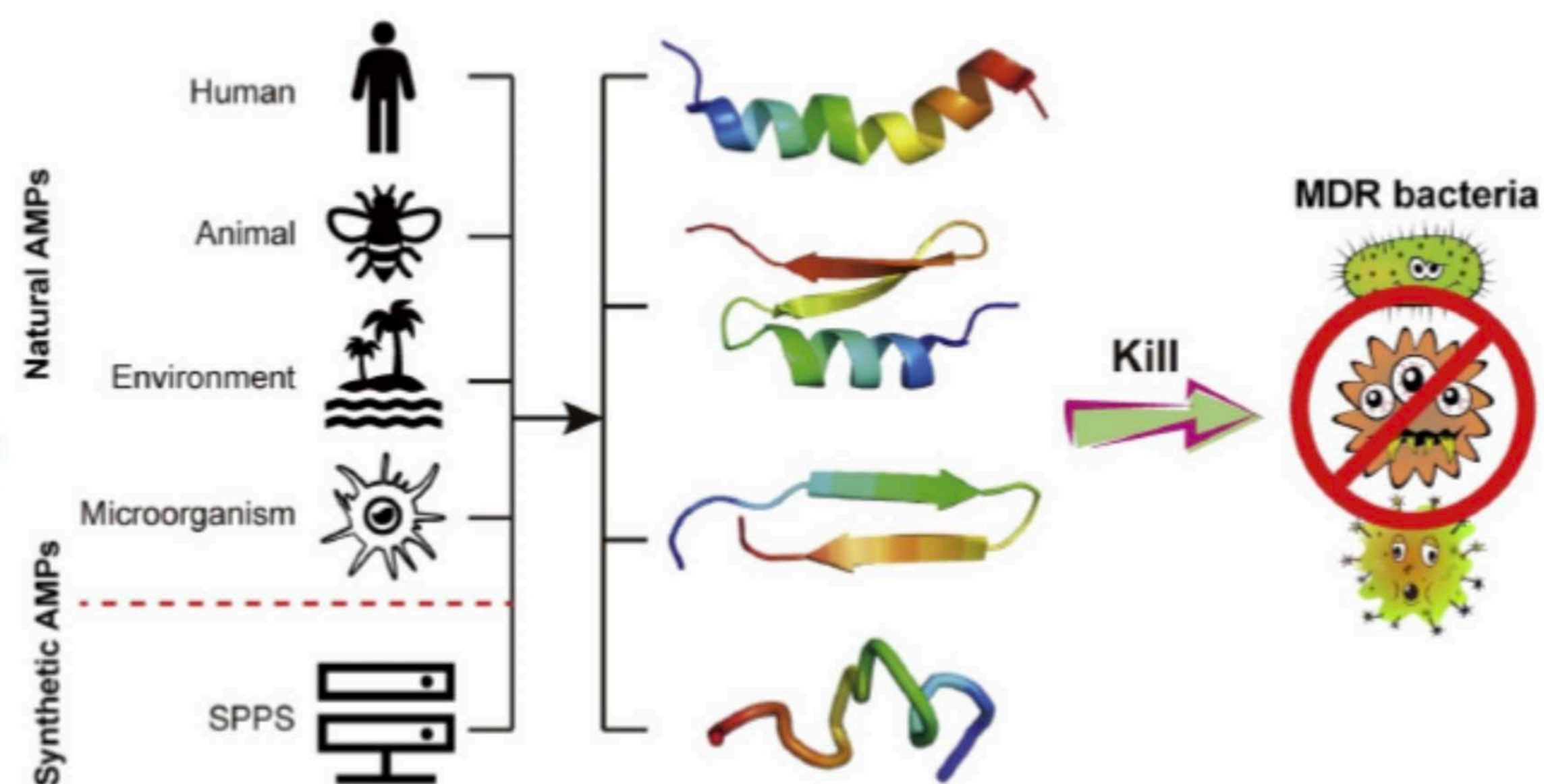
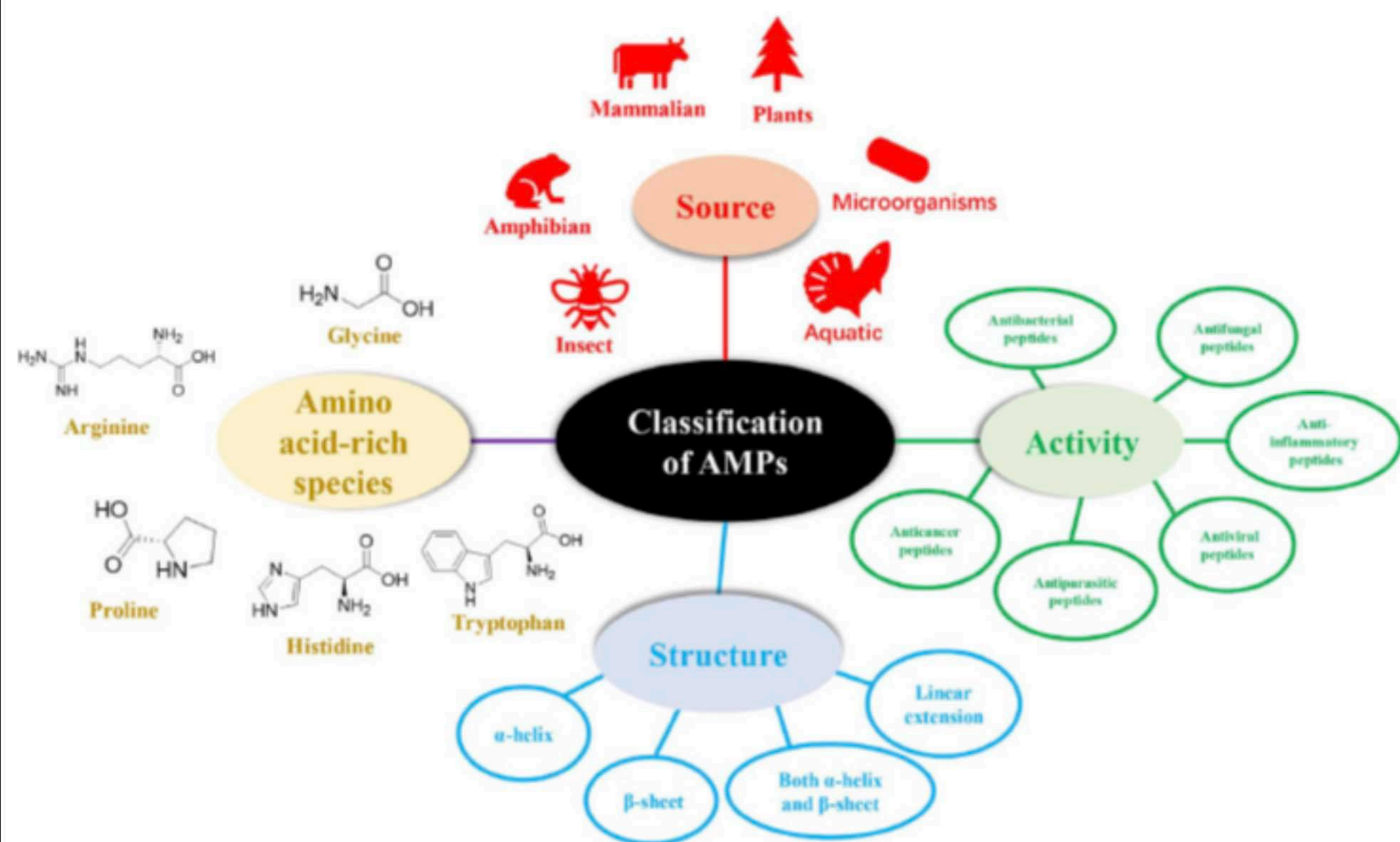
Phytobiotics

Latin name	Common name	Parts/products used
<i>Achillea millefolium</i> s.l.	Yarrow	Infusion
<i>Arnica montana</i>	Arnica	Extract
<i>Boswellia sacra</i>	Frankincense	Resin
<i>Carum carvi</i>	Caraway	Seed, essential oil
<i>Citrus</i> sp.	Citrus oil	Essential oil
<i>Curcuma longa</i>	Curcuma	Rhizome
<i>Foeniculum vulgare</i>	Fennel	Seed
<i>Matricaria recutita</i>	Camomile	Infusion, essential oil
<i>Mentha</i> sp.	Mint	Infusion, essential oil
<i>Pimpinella anisum</i>	Aniseed	Seed, essential oil
<i>Pinus</i> sp.	Turpentine	Essential oil, (oleo) resin
<i>Salvia officinalis</i>	Sage	Infusion, essential oil
<i>Syzygium aromaticum</i>	Cloves	Buds, essential oil
<i>Zingiber officinale</i>	Ginger	Rhizome



Antimicrobial peptide

- ▶ peptides composed of predominantly α -amino acids that display antimicrobial activity, or that facilitate the antimicrobial activity of other compounds e.g. peptide efflux pump inhibitors.



Additives that affect the health status of livestock

- ▶ **Antifungal additives:** Mould inhibitors are added to feed liable to be contaminated with various types of fungi such as *Aspergillus flavus*, *Penicillium cyclopium* etc. Before adding commercial inhibitors all feedstuff should be dried below 12 cent moisture. **Propionic, acetic acid and sodium propionate** are added in high moisture grain to inhibit mould growth. Antifungals such as Nystatin and copper sulphate preparations are also in use to concentrate feeds to prevent moulds.
- ▶ **Anticoccidials:** Various brands of anticoccidials are now available in the country to prevent the growth of coccidia which are protozoa and live inside the cells of the intestinal lining of livestock.
- ▶ **Anthelmintics:** Under some practical feeding conditions anthelmintics have also been used. The compounds act by reducing parasitic infections.

What you have learnt

- ▶ *Nutritive feed additives*
- ▶ *Non nutritive feed additives*
- ▶ *Enzymes*
- ▶ *Growth promoting feed additives*
- ▶ *Additives impacting feed quality*



Swine Nutrition A Practical Approach



Swine Nutrition A Practical Approach

- 1. Nutrient specifications for swine and ration formulation**
- 2. Feeding management of swine in various life stages**
- 3. Feed manipulation to produce designer pork**
- 4. Prevention and treatment of nutritional disorders in swine**
- 5. Feed additives for Swine**



Thank you