Introduction to a systematic review and meta-analyses in Indonesia nutrition poultry: case study in probiotic

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Abstract. The review conducted to Introduction to a systematic review and meta-analysis in Indonesia nutrition poultry: case study in feed additive. A review on the table showed the origin phase research and introduction in Indonesia (representatives for animal sciences) both meta-analyses and probiotic. The result showed first generation origin of probiotic started on Indonesia the oldest one were from \textit{Aspergillus sp} and \textit{Bacillus sp} with meta-analysis started with small ruminant. Meta-analyses origin with author from Indonesia on animal science were started with title Influence of dietary tannin levels on methane production from ruminant livestock: a meta-analysis (Anuraga Jayanegara, 2010). To sum up, the idea help to increase in industry revolution 4.0 were adaptable and applicator.

1. Introduction

The World Health Organization (WHO) announced the coronavirus novel (COVID-19) as a global pandemic outbreak as of March 11, 2020. A total of 4.87 million cases have been confirmed worldwide, with 1.66 million people recovering and 321 thousand people die. The pandemic spread over the world and faced development countries e.g. Indonesia. COVID-19 impact to livestock sector especially poultry production. Intensive poultry production systems demand a supply of high protein-available in development countries. The key current to ad However, during the last decade, since 1997 the banned of antibiotics growth promotes were began at Denmark with \textit{avoparcin} as AGPs. The phase continued, until the last phase when the EU-wide ban on AGPs in animal feed (poultry) took effect since 2006 (EC Regulation No 1831/2003). According to the newest regulation PERMENTAN/14/16/2017 Indonesia has banned the use of antibiotics on poultry both broiler for meat and laying hens for egg product.

The banned were started early periods from 1 January 2018. Probiotics are defined as a living microorganism that is used as feed additives and can benefit their hosts by improving the balance of their digestive microorganism. Probiotics commonly from lactic acid bacteria (LAB), namely; \textit{Lactobacillus} and \textit{Bifidobacterium} that can be found in the intestine. Probiotic feed additives improve
growth, feed efficiency, and intestinal health. Earlier studies reported an active role for probiotics in prohibiting or reducing the shedding of \textit{Campylobacter jejuni} load in vivo trials. In recent research that probiotic mixtures also have beneficial effects against a wide range of disorders, although the evidence that mixtures are more effective than their component strains is more limited. Nevertheless, in future a further potential advantage. The feed additive or probiotics era already through by itself from upstream to downstream. A lot of researchers already conduct research on probiotic with data increasing significantly on Scopus data since 2000-2020 but the determination of conclusion from it research were weak. In addition, to answer that the systematic review and meta-analysis were conducted. A meta-analysis approach, which increases the power of the statistical analysis.

2. Methods

2.1. Meta-analysis

![Figure 1. The steps of meta-analyses [23]](image)

The stage for conducting a meta-analyst starts from 1) choosing the objectivity of the study, where the theme selection plays a key role in a study, the hypothesis will be determined. For example the effect of specific nutrients on feed additives. The next step is to start 2) data entry or start entering data, where the selected literature review must be entered into a database, systematically, and each study is given a specific code. The final step is 3) data filtering or sorting out data, which in this stage is further divided into three sub-sections namely a) correlation between studies, b) finding error data on the results of quantitative meta-analyses, c) ensuring that selected publications are mutually related to each other.
### 2.2. Meta-analyses in animal science from author on Indonesia

Meta-analyses in Indonesia were showed on this table follows sorting from oldest to newest, data adapted from Google scholar, Scopus documents.

#### Table 1. The practices of meta-analysis in animal science

| Animal origin                     | Purposes                                                                 | References                                |
|-----------------------------------|--------------------------------------------------------------------------|-------------------------------------------|
| Goat and sheep                    | Summarize and to quantify the tannin effects on CH4 production from ruminants and its associated variables | [1] Jayanegara, et al., (2010)             |
| Sheep, goat, cattle, and Buffaloes| This meta-analysis was performed to evaluate whether voluntary feed intake and digestibility of forage-based diets differ between four domestic ruminants | [2] Riaz, et al., (2014)                  |
| Dairy cattle, bulls and heifers, sheep, and goats | To evaluate correlations derived previously by deduction. | [3] Schuba, et al., (2017) |
| Sheep in Indonesia                | The objective of this study was to determine energy and protein requirements, for both maintenance and gain | [4] Jayanegara, et al., (2017)            |
| Dairy                             | This study aimed to perform a meta-analysis on the effect of 3-nitrooxypropanol (3-NOP) on enteric methane (CH4) emissions from ruminants. | [5] Jayanegara, et al., (2018)            |
| Silages                           | The present evaluation aimed to analyse the influence of tannins on silage quality | [6] Jayanegara, et al., (2019)            |
| Ruminants                         | To integrate the published data on different concentrations and types of MCFA such as lauric acid and myristic acid, which investigated ruminal methanogenesis and fermentation in in vitro and in vivo experiments | [7] Yanza, et al., (2020)                |
| Broiler                           | To determine the effects of zinc on the immune response and production performance of broilers. | [8] Hidayat, et al., (2020)               |
| Laying Hens                       | To determine the effects of probiotic on the laying hens with it parameters | [26] Sjofjan et al., (2021)               |

### 2.3. Probiotic origin from author on Indonesia

Research on probiotic in Indonesia were showed on this table follows sorting from oldest to newest, data adapted from Google scholar, Scopus documents.

#### Table 2. The probiotics practices started from old to newest in Indonesia

| Kind of Probiotic                       | References | Animal          |
|----------------------------------------|------------|-----------------|
| Aspergillus niger dan bacillus sp.     | [9] Sjofjan O 2003 | Laying hens     |
| Bacillus sp, Lactobacillus salivarius  | [10] Kompiang I P 2009 | Poultry industry |
| Bacillus subtilis                      | [11] Abbas et al 2004 | Broiler         |
| Marine yeast (Saccharomyces sp)        | [12] Sjofjan O 2010 | Broiler         |
3. Results and Discussion

The references style use APA style. The first generation origin of probiotic started on Indonesia the oldest one were from [9] with A and B concept for probiotics, this author were conducted the research on laying hens and it egg quality. The phase continued when WHO started to banned the antibiotic growth promoters for animal product on 2006. Even though, the Europe countries were already began with avoparcin in 1997. The banned spread to development countries e.g. Indonesia. 1999-2000 the researcher association started in on agriculture not animal. However, Sjofjan and Kompiang (2003) started selected for it candidate from crop, intestinal, caecum, and even faeces for it probiotic. Lactobacillus acidophilus, L. casei, L. fermentum, L. plantarum, L. salivarius, L. reuteri, L. delbrueckti, L. lactis, L. cellobiosus, L. brevis, Aspergillus oryzae, Bifidobacterium longum, B. pseudologum, B. bifidum, B. suis, B. thermophilum, Bacillus subtilis, Enterococcus faecum, Saccharomyces cerevisiae, Streptococcus faecium, and S. intermedius. Not only lactic acid bacteria but also yeast were selected. In addition, probiotic were selected also from marine yeast. Fourth generation from (2003-2020) were still conducted the probiotic until it occur second generation extracted from outer cell wall of saccharomyces cerevisiae on arbor acres (Adli and Sjofjan, 2020). In addition, probiotic and selected candidate for probiotics were not only for broiler and laying hens but also on quail, duck, and even native chicken. The regulation PERMENTAN/14/16/2017 Indonesia has banned the use of antibiotics on poultry both broiler for meat and laying hens for egg product [21]. The banned were started early periods from 1 January 2018, the probiotics already implemented in current poultry industries from upstream to downstream [22][24][25]. A huge variation on this research should be in line with the new method to make it strong result with meta-analyses.

Meta-analyses origin with author from Indonesia on animal science were started with title Influence of dietary tannin levels on methane production from ruminant livestock: a meta-analysis (Anuraga Jayanegara, 2010). The author conducted a lot meta-analyses but 80% were for ruminant animal and it first were to determine the effects of zinc on the immune response and production performance of broilers. The author tried wrote the probiotic that already conducted in Indonesia era were already conducted in Indonesia started with this paper for introduction. Hopefully, in industry revolution 4.0 were adaptable and applicated using meta-analyses [26].

4. Conclusion

To sum up, the idea help to increase in industry revolution 4.0 were adaptable and applicated.

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