

# Education of the potential of natural ingredients as an immunomodulator in the transition process from pandemic to endemic Covid-19 through webinar

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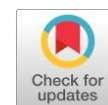
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## ABSTRACT

Covid-19 is a respiratory infection caused by the coronavirus. Early prevention of Covid-19 can be done by increasing the body's resistance. Therefore, using traditional plants, which are included in the immunomodulatory group, is alternative prevention. This PkM webinar aims to introduce and educate the public and pharmacists about the potential of natural ingredients in the transition process from the pandemic. PkM is conducted through webinars. The webinar results were analyzed through a pre-test and post-test, and then the data was processed using the t-test. Evaluation of activities was carried out using a Likert scale. The results obtained from this PkM webinar are an increase in participants' knowledge, indicated by a significant difference between the pre and post-test results after being given PkM material, and the opinion of the webinar participants regarding the PkM webinar that was followed was excellent. This activity is expected to provide understanding and education in the potential of natural ingredients as immunomodulators. It is also essential to implement this as a means of education and provide benefits to the teaching and learning process as an evaluation and improvement of student's ability to think critically.



## KEYWORDS

Covid 19  
Natural\_ingredients  
Immunomodulatory



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## 1. Introduction

Severe acute respiratory syndrome coronavirus-2 (SARS-CoV-2) infection caused by a new type of coronavirus is a global health problem [1], [2]. The World Health Organization (WHO) named the disease caused by SARS-CoV-2 coronavirus disease 2019, also known as Covid-19 [3], [4]. Covid-19 is a respiratory infection caused by a coronavirus first recognized in Wuhan, China, in December 2019. Genetic sequencing shows this virus is closely related to the SARS virus with the betacoronavirus type [5]. Most Covid-19 patients have mild symptoms or without complications [6], [7]. Patients with symptoms of severe disease requiring hospitalization and oxygen support are 14% [8], and patients requiring treatment in an intensive care unit are 5% [3], [9].

Several treatments for patients, including chloroquine/hydroxychloroquine, arbidol, ribavirin, favipiravir, lopinavir/ritonavir, remdesivir, and interferon. Early prevention of Covid-19 can be done by increasing the body's resistance [10]. Therefore, another alternative is needed: utilizing traditional plants included in the immunomodulatory group [11], [12]. Immunomodulators are compounds that can restore the imbalance of the immune system [13], [14]. Immunomodulators work by restoring impaired immune system function, enhancing immune system function (immunostimulation), and suppressing the immune response (immunosuppression) [15], [16]. Drugs derived from plants through the expression of cytokines can affect the defence mechanism or the body's immune system, which includes the specific and non-specific immune systems [17]. Many studies have been conducted on using traditional plants as immunomodulators related to cytokine expression [11].

Research on the use of various types of natural products as immunomodulators has been carried out, including the immunomodulatory effect of the ethanol extract of the sponge *Melophlus sarasinorum* on

phagocytic activity of macrophage cells in male Balb/C mice at doses of 300 mg/kg BW and 400 mg/kg BW [18]; alginic oligosaccharides (osa) produced from alginate from *Sargassum crassifolium* [19]; green coffee extract reduce inflammation and modulation of immunological [20]; dried lemon peel improves antioxidant activity, immune response and modulates immuno-antioxidant genes [12]; and the role of a natural immunomodulator (Aloe vera) in the cellular and humoral immune system [11]. The immune system maintains the balance of immune homeostasis. In general, when a foreign antigen attacks, a specific immune response will work to restore homeostasis. However, when the Covid 19 virus weakens the immune system, an imbalance in the immune response occurs. Nutrients derived from natural ingredients play an important role in regulating immune homeostasis [20]. The general public and health professionals need to be educated about the potential of natural ingredients as immunomodulators.

Based on this background, it is necessary to introduce and educate the public and pharmacists to discover the potential of natural ingredients during the Covid-19 pandemic. The aim of implementing community service (PkM) through this webinar activity is expected to provide understanding, introduction, and education to the public and pharmacists in knowing the potential of natural ingredients as immunomodulators during the Covid-19 pandemic. The method used is education through webinars. The PkM team is collaborating with the Association of Indonesian Pharmacists (PAFI) to increase the role of pharmacists in educating the public to utilize natural ingredients as a source of immunity. Webinar PkM is also important as a means of education and benefits the teaching and learning process as an evaluation and improvement of student's ability to think critically. This activity is like a scientific discussion provided online with the material presented by the resource person per a predetermined theme.

## 2. Method

The PkM webinar was held for 2 (two) days, on 24-25 October 2020. This PkM webinar is conducted through web-based seminar activities using the Zoom meeting application and YouTube Lives. Participants were the general public, health workers, and pharmacists, totalling 963 (nine hundred and sixty-three) people. The speakers consist of 2 (two) people with sub-themes of the material :

- Keynote Speaker

Name : Dr. Ari Widiyantoro, M.Sc

Theme: A chemical approach to natural materials during the Covid-19 Pandemic: Chemical Approaches to Natural Materials during the Covid-19 Pandemic

- Second Speaker

Name: apt. Dina Yuspita Sari, M.Si

Theme: Recognizing the Potential of Herbs in West Kalimantan, which Have the Potential to Increase the Body's Immunity During the Covid-19 Pandemic.

PkM webinar activities occur in 3 (three) stages: preparation, implementation, and evaluation .In the preparation stage, activity topics are designed, and activity proposals are prepared for Participation Credit Units (SKP) submission to the PAFI. Webinar participants can access the webinar link prepared by the PkM team. The socialization will be done through Akademi Farmasi Yarsi Pontianak posters, social media, and a website. The PkM webinar preparation stage includes designing activity topics, preparing resource persons and moderators, publishing webinar activities to participants (minimum H-1 week), participant registration process before the activity is carried out, sending PkM webinar links to participants, preparing pre-test and post-test questionnaires as well as activity evaluation (evaluation link), and preparation of community service certificates for resource persons and moderators.

The implementation phase of the PkM webinar activities includes participant registration, filling out pre-test questionnaires, and delivering material.

The evaluation stage of the PkM webinar includes filling out the pre and post-test questionnaire and evaluating activities. The questionnaire used to assess the knowledge of PkM webinar participants is a closed questionnaire consisting of 18 multiple-choice questions. The evaluation stage of the PkM webinar was carried out by analyzing the pre-test and post-test results using the t-test and evaluating activities using the Linkert scale. Webinar PkM activity flow chart show as [Fig. 1](#).

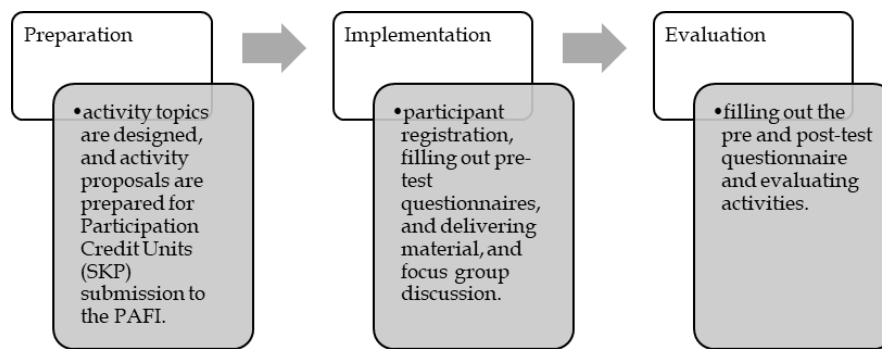


Fig. 1. Webinar PkM activity flow chart

### 3. Results and Discussion

#### 3.1. Implementation of the PkM webinar

The community service activity program "Pharmaceutical Chemistry Studies: Potential Natural Materials in West Kalimantan Which are Useful as Immunomodulators During the Covid-19 Pandemic" through webinar activities was carried out on Saturday and Sunday, 24 and 25 October 2020 using Zoom meetings and YouTube Live. The event began with participant registration and pre-test, followed by remarks from the Director of the Akademi Farmasi Yarsi Pontianak, remarks by the Chairperson of the PAFI of West Kalimantan province, presentation of material by 2 (two) resource persons, attendance of participants, post-test, evaluation of activities, and closed by the Head of Research and Community Service Unit (UPPM) Akademi Farmasi Yarsi Pontianak as well as symbolically giving certificates to resource persons.

Activities can be assessed as running well. Activities are carried out according to a predetermined schedule. The target of this activity is Pharmacy Technical Personnel (ITK), Health Professionals, Academics, and the general public, with a total of 963 (nine hundred sixty-three) participants. The number of participants who participated in the pre-test, post-test, and activity evaluation was 930 (nine hundred and thirty). The distribution of participants came from the islands of Kalimantan, Java, Sulawesi, and Sumatra.

The material presented at this PkM webinar relates to the chemical approach to natural ingredients during the Covid-19 pandemic and the potential for herbs in West Kalimantan, which can be immunomodulators during the Covid-19 pandemic. The Indonesian government has suggested using medicinal plants as immunomodulators in treating Covid-19 based on available safety and efficacy data [21]. These medicinal plants include noni fruit (*Morinda citrifolia*) by increasing the immune response through changes in the relative number of CD4+ T cells in non-infectious and infectious treatments [22]; *N. sativa* increased the ratio of T-helper to T-suppressor lymphocytes and increased the number and function of T-killer cells. In addition, *N. sativa* oil increased the ratio of CD4 to CD8 T cells and increased NK cell activity [23]; Citrus sp, which contains flavonoids, binds strongly to human angiotensin-converting enzyme-2 (hACE-2) and RNA dependent RNA polymerase (RdRp) as potential targets of SARSCoV-2 infection [24]; Temulawak (*Curcuma xanthorrhiza* Roxb) contains curcumin which enhances the immune system by triggering cell proliferation. Webinar documentation show as Fig. 2 and Fig. 3.



Fig. 2. Webinar Documentation



Fig. 3. Webinar PkM documentation

The output of this PkM webinar activity is the Participation Credit Unit (SKP). Participants who registered, then participated from the beginning to the end of the event, filled out attendance, filled out the pre-test form, filled out the post-test form and were declared to have passed the post-test, and have filled out the activity evaluation form will get a certificate with an SKP from the PAFI with Number 337/PP.PAFI/SK/X/2020 with details on the number of SKP: participants (2 SKP), resource persons (2 SKP), Moderator (1 SKP), and committee (1 SKP). Determining the SKP size for this activity is based on an assessment of the activity, including material, event duration, and PkM activity objectives by PP PAFI with an introduction to PD PAFI KalBar. The purpose of establishing SKP is to facilitate the pharmaceutical technical personnel (ITK) and Pharmacists in increasing competence and the need for recertification.

3.2. Assessment of activities

To assess the knowledge and understanding of webinar participants and the effectiveness of the webinar, an activity evaluation was carried out by giving pre-tests and post-tests to PkM webinar participants. To find out whether there was an increase in participants' knowledge after being given the PkM webinar material, a parametric t-test was carried out on the average differences between the two groups in pairs (dependent). The results of the evaluation of this activity are show as Table 1.

Table 1. Post-test and pre-test t-test results

	83,33333	100
<i>Mean</i>	81,34695	97,31398
<i>Variance</i>	38,93822	39,05739
<i>Observations</i>	930	930
<i>Pearson Correlation</i>	0,604269	
<i>Hypothesized Mean Difference</i>	0	
<i>df</i>	929	
<i>t Stat</i>	-87,6456	
<i>P(T&lt;=t) one-tail</i>	0	
<i>t Critical one-tail</i>	1,646495	
<i>P(T&lt;=t) two-tail</i>	0	
<i>t Critical two-tail</i>	1,962521	

From the number of observed samples of 930, seen from the mean value, there is an average descriptive increase; Pearson's correlation description is 0.604269, so the relationship or correlation is very strong. The hypothesis used is two-way, so it uses two tails. The results obtained, where the t table value is 1.962521 with a p-value of 0. Because the p-value is smaller than alpha 5%, Ho is rejected. There is a

significant difference between the pre-test and post-test results after being given PkM material. The result shows that participants, consisting of pharmacists, health workers, pharmacy practitioners and the general public, can understand the material presented in the webinar.

The results of the assessment of the webinar participants' knowledge and understanding showed an increase in the webinar participants' knowledge and understanding of the material presented. This activity aims to provide understanding, introduction, and education to the public and pharmacists in knowing the potential of natural ingredients as immunomodulators during the Covid-19 pandemic to get good results.

### 3.3. Evaluation

In general, the purpose of evaluating PkM webinar activities is to find out the extent to which the process and results of the PkM webinar are carried out by internal PkM implementers at the Yarsi Pontianak Pharmacy Academy so that the results can be used as input material in the implementation of the PkM webinar that has been carried out. In particular, the purpose of evaluating PkM webinar activities is to evaluate the satisfaction and effectiveness of PkM webinar activities. The PkM webinar evaluation was carried out to assess the performance of PkM implementers in carrying out PkM webinar activities, which included three aspects: the material presented, the moderator, and the discussion/question-answer session.

Data was collected by distributing questionnaires using the Google form to PkM webinar participants at the end of the activity session to assess the PkM webinar activities, which were carried out honestly, objectively, and with full responsibility. The assessment is carried out by selecting one of the five options provided, which shows the participant's assessment of the implementation of the PkM webinar, which is carried out in each aspect assessed. After the questionnaires were collected, the data was recapitulated and processed for further analysis.

PkM webinar evaluation indicators are determined using a Likert scale, using interval analysis, where respondents' answers are given a weighting value: very bad (score 1); not good (score 2); fairly good (Score 3); good (score 4); and very good (score 5), with scoring intervals: index 0% – 19.99% (very bad); index 20% – 39.99% (not good); index 40% – 59.99% (fairly good); index 60% – 79.99% (good); and index 80% – 100% (very good). The index obtained from the calculation results is 86.48%, with the index for each aspect being material: 86.82%, moderator: 86.19%, and discussion/questions and answers: 86.19%. From the results obtained, the opinions of the webinar participants regarding the PkM webinar they participated in were very good. These results indicate that the content presented in the webinar attracted participants' interest.

### 4. Conclusion

Based on the results of the community service activities that have been carried out, it can be concluded that the PKM activities carried out through webinars were able to provide understanding, introduction, and education to the public and pharmacists in knowing the potential of natural ingredients as immunomodulators during the Covid-19 pandemic as shown by an increase in participants' knowledge, indicated by a significant difference between the results of the pre-test and post-test after being given PkM material. The opinion of the webinar participants regarding the PKM webinar they participated in was very good. This activity is expected to contribute to the knowledge of the public and pharmacists in recognizing the potential of natural ingredients as immunomodulators during the Covid-19 pandemic. The limitation of this PkM is the limited literature regarding the use of natural ingredients as immunomodulators during the Covid-19 pandemic because the issue when the webinar was carried out in the research and development stage of screening, vaccination and treatment methods was still limited to the use of antivirals. kM's next direction is to provide workshops on using natural materials in the form of products integrated with research results.

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## Declarations

**Author contribution.** The authors confirm contribution to the paper as follows: study conception and design: DYS; data collection: DYS and RW; analysis and interpretation of results: DYS and RW; draft manuscript preparation: DYS. All authors reviewed the results and approved the final version of the manuscript.

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**Conflict of interest.** The authors declare no conflict of interest.

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