

## ANALYSIS PARACETAMOL IN "JAMU PEGAL LINU" POWDER

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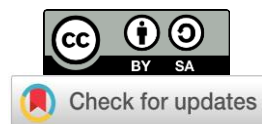
### ABSTRAK

#### Abstract:

The addition of BKO (Chemical Drug Ingredients) to traditional medicines is no longer commonplace. This condition is raises serious health concerns if it is allowed to continue because it can cause damage to body organs, especially liver damage. The purpose of this study was to test whether traditional medicines ("jamu pegal linu") sold at Pasar Tingkat Lamongan contain paracetamol or not. This is because this type of traditional medicine is widely sold in this market and has never been tested for the presence of BKO. The traditional medicine samples studied have criteria that are not listed the composition of the ingredients. The test for the presence of BKO (paracetamol) uses two methods, namely the color test by reacting with iron (III) chloride reagent and the TLC test. The results of the study showed that 1 out of 4 samples studied contained paracetamol. For further research related to the TLC test for the presence of paracetamol in traditional medicines, it is better not to use only one type of eluent comparison.

#### Abstrak:

Penambahan BKO (Bahan Kimia Obat) pada obat tradisional sudah tidak menjadi awam lagi.. Kondisi ini sangatlah memprihatinkan jika terus dibiarkan karena dapat mengakibatkan kerusakan organ tubuh, terutama kerusakan hati. Tujuan penelitian ini adalah untuk menguji apakah obat tradisional ("jamu pegal linu") yang dijual di Pasar Tingkat Lamongan mengandung paracetamol atau tidak. Hal ini karena jenis obat tradisional ini banyak terjual di pasar ini dan juga belum pernah dilakukan pengujian terhadap keberadaan BKO. Sampel obat tradisional yang diteliti memiliki kriteria yaitu yang tidak tertera komposisi bahan. Uji keberadaan BKO (paracetamol) menggunakan dua cara, yaitu uji warna dengan mereaksikan dengan reagen besi(III) klorida dan uji KLT. Hasil penelitian menunjukkan bahwa ada 1 dari 4 sampel yang diteliti yang mengandung paracetamol. Untuk penelitian selanjutnya terkait uji KLT keberadaan paracetamol dalam obat tradisional sebaiknya tidak hanya menggunakan satu jenis perbandingan eluen.



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## INTRODUCTION

Human Immunodeficiency Virus is a virus. Nowadays, many people choose natural products known as back to nature. One of these products is about the use of traditional medicine or "jamu". Jamu is a type of natural medicine, the safety status and efficacy of which are proven empirically. There are 95.6% of the Indonesian population who feel the benefits of "jamu" in all age groups and economic status. The most preferred form of "jamu" is liquid, followed by infusion/powder, decoction/chopped, and capsule/pill/tablet form [1].

Information related to the use of traditional medicine is still relatively uneven in Indonesia. Many people still do not understand the classification of traditional medicine. Most of them say that traditional medicine is "jamu", even though traditional medicine has other types, namely OHT (Obat Herbal Terstandar) and Fitofarmaka. In addition, only 17.6% of respondents knew that "jamu" has the possibility of being added with BKO (Bahan Kimia Obat). BKO is added with the aim of providing a "ces pleng" effect for the community or in other words this herbal medicine can cure with just one drink [2].

The addition of BKO to traditional medicines has been done for a long time. There are 45.6% of traditional medicines that have BKO added. The BKO added include Paracetamol, Phenylbutazone, Piroxicam, and Mefenamic acid. The majority of these traditional medicines have registration numbers, but only 46.2% write the composition of natural ingredients [3]. Identification of BKO was also found in the "jamu pegel linu" brew and packaging sold in one of the markets in Indonesia. In the "jamu pegel linu" brew, dexamethasone and paracetamol were found, while in the "jamu pegel linu" packaging, paracetamol was found [4]. Another type of BKO that

was also identified in "jamu pegel linu" was ibuprofen [5]. Generally, BKO added to traditional medicine is a strong medicine that must have a doctor's prescription. The use of BKO in traditional medicine is unknown in terms of dosage and amount, so it can cause damage to body organs. Possible damages include gastric ulcers, liver and kidney damage, and allergies [6].

Based on a survey at Pasar Tingkat Lamongan, many traditional medicine stalls were found. The level of traditional medicine purchases there is relatively high, especially the purchase of "jamu pegel linu". "Jamu pegel linu" sold in this market have never been studied for the presence of BKO (especially paracetamol). The purpose of this study was to test the presence of BKO (mainly paracetamol) in "jamu pegel linu" sold in this market.

## RESEARCH METHOD

### Materials

Four samples of packaged 'jamu pegel linu' powder were analyzed in this study. The traditional medicines used as research samples were those without any explanation regarding the composition of the ingredients. There were four traditional medicines without any explanation regarding the composition of the ingredients. Henceforth, the 4 samples will be stated as S1, S2, S3, S4. Other materials used in this study include paracetamol (as standard), 96% ethanol (technical), chloroform (pro analyst), ethyl acetate (pro analyst), distilled water, and iron (III) chloride.

### Instrumentation

The tools used in this study include GF254 silica plates, 250 ml beaker glass, 10 ml measuring cylinder, 10 mL and 100 mL measuring flasks, UV lamps, 2.0 capillary pipettes, TLC chambers, test tubes, analytical balances, watch glasses, and dropper pipettes.

## Experimental Procedure

### Preparation of blank solution

Weigh 100 mg of paracetamol powder and dissolve it in 10 ml of 96% ethanol [5]. The next step is to mix manually until homogeneous and coded with the term "PCT". The color of the blank solution is clear and colorless (Figure 1).

### Preparation of sample solution

Weigh each herbal medicine sample as much as 100 mg. Then dissolve it with 10 mL of 96% ethanol [5]. The next step is to shake it until homogeneous. Shaking is done until all the samples are dissolved (Figure 1).

### Preparation of 10% Iron(III) chloride solution

A 10% Iron(III) chloride solution was prepared by dissolving 10 g of  $\text{FeCl}_3$  in distilled water and diluting to 100 mL in a volumetric flask[7].

### Preparation of TLC plates

The stages of preparing the TLC plate media are as follows: the first step is to cut the TLC plate with a width of 5 cm and a height of 6 cm. After that, make the upper and lower boundary lines of the TLC plate with a size of 1 cm. Next, give a marker in the form of a dot with a distance between points of 0.5 cm on the lower boundary line of the TLC plate.

## Qualitative analysis

### Color test with iron(III) chloride reagent

Qualitative tests with Iron(III) chloride reagent were carried out three times for each research sample. Each sample and blank were taken 10 drops and put into a test tube. Then, each test tube was added with 10 drops of Iron(III) chloride reagent and shaken. The formation of a greenish black color indicates the presence of paracetamol in the sample [7].

### TLC test

In this TLC method, the eluent ratio of chloroform: ethyl acetate is 9: 1 [8]. The  $R_f$  value of paracetamol is 0.75 [9]. The stationary phase (TLC plate) used for the TLC test is 6 x 5. The distance between points is given one centimeter. The height of the TLC is given a limit of one centimeter from the bottom and 0.5 centimeters from the top so that the total distance of the eluent is 3.5 centimeters. The next step is to spot all samples on the lower limit of the TLC plate and insert them into the TLC chamber that has been filled with eluent with the ratio above. Wait for the TLC process until the eluent reaches the top line of the TLC plate. The formula for calculating the  $R_f$  value is as follows:

$$\text{Nilai } R_f = \frac{\text{Jarak yang ditempuh oleh komponen}}{\text{Jarak yang ditempuh oleh pelarut}}$$

## RESULT AND DISCUSSION

The results of the sample preparation and blank can be seen that the color of the paracetamol solution is clear and colorless. The color of each sample can be seen in Figure 1.



Figure 1. Color of sample and blank solutions

Based on Figure 1, it can be concluded that the colors of samples 1 and 3 are similar, as are samples 2 and 4. The colors of each sample can be seen in Figure 2.

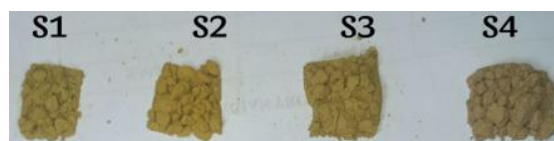


Figure 2. Color of sample

From Figure 2, it can be seen that sample 4 has a darker color compared to the other three samples. The color of natural ingredients will fade if the amount of extract is less than other fillers [10]. However, after being dissolved with the same solvent as the other samples, the color of the solution from sample 4 is lighter. All samples have a bitter taste and a distinctive aroma. The bitter taste in the sample is possibly due to the presence of BKO paracetamol, because in the structure of the paracetamol compound there is an amine group (Figure 3).

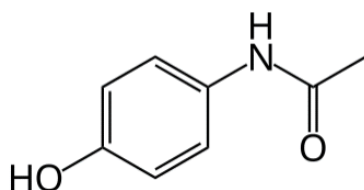


Figure 3. Compound structure of paracetamol

#### Color test with iron(III) chloride reagent

After the sample and blank solutions were added with iron(III) chloride reagent, the color changed as shown in Figure 4. Some specific reagents that can be used to identify the presence of paracetamol include  $\text{FeCl}_3$ , methyl red, and ferric ammonium sulfate [11].

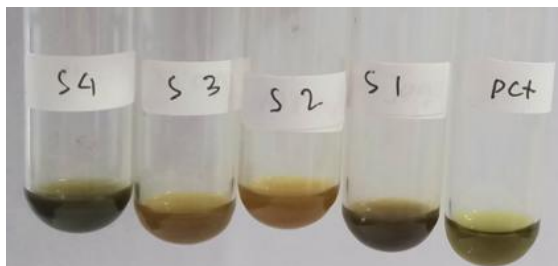


Figure 4. Color test results

Based on Figure 4, it can be concluded that samples 1 and 4 experienced the same color change as the blank. The color change to greenish black means positive for the presence of paracetamol [7]. However, there is also a possibility that it contains tannin compounds [12].

#### TLC test

The results of the TLC test can be seen in Figure 5. TLC is one way of separating compounds. Separation by Thin Layer Chromatography (TLC) is carried out several times using several eluents with different levels of polarity to obtain a solvent that is able to provide good separation and good dye stains. The spots on the TLC plate were monitored under UV 254 nm and UV 365 nm light [13].

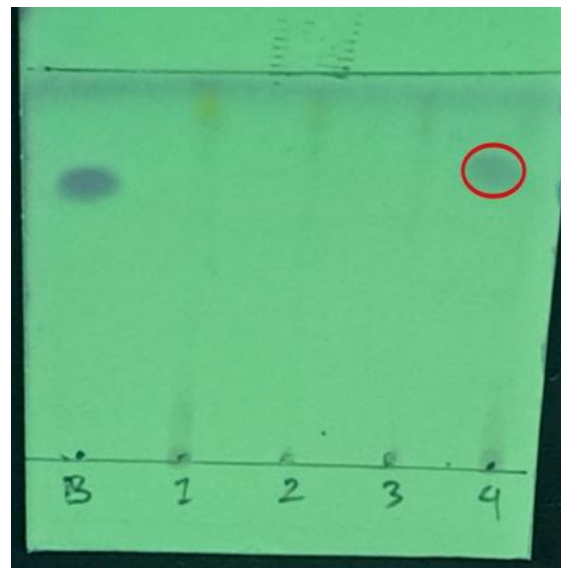


Figure 5. TLC test results

The results of the TLC test can be concluded that there is one sample that can produce a spot with almost the same position as the blank. However, the spot obtained is not as sharply colored as the blank spot. The  $R_f$  values of the blank and samples can be seen in Table 1.

**Table 1.**  
**TLC test results**

Test sample	$R_f$	Results
Blanko	0,72	+
S1	-	-
S2	-	-
S3	-	-
S4	0,75	+

The  $R_f$  value obtained in this TLC test corresponds to the  $R_f$  value of paracetamol, which is 0.75 [9]. In the

paracetamol solution used in this study, there was a difference of 0.03 with the Rf value of paracetamol. The difference between the test solution spot and the comparison solution spot is less than 0.05, then the sample is declared positive for containing BKO and if it is more than 0.05 then the sample is declared negative for containing BKO [14].

The results of this TLC test are supported by a color test with iron (III) chloride reagent, which both state that sample 4 is positive for the presence of paracetamol. Sample 1 can be concluded that it does not contain paracetamol. The color change to greenish black when reacted with Iron(III) chloride can be concluded because it is positive for the presence of tannin compounds [12]. The spot color of the TLC test on sample 4 was less clear, requiring a change in the eluent from the TLC. There are several eluent comparisons for TLC in the test for the presence of paracetamol, including using 4.5 ml of ethyl acetate, 5 ml of ethanol and 25 ml of ammonia [9]. There are also those who use a ratio of chloroform and methanol (9:1) [4]. This study supports the facts that have been spread in the community that in traditional medicines, BKO is added, even though this medicine already has a registration number.

## CONCLUSION

The test for the presence of paracetamol requires more than one test to ensure its presence, at least a color test with iron (III) chloride reagent and a TLC test. From these two tests, it can indicate the presence of paracetamol in "herbal medicine for aches and pains" circulating in Lamongan Level Market. There is one herbal medicine that is identified as having paracetamol, marked by a change in color to greenish black in the color test and there is a spot in the Rf value area of paracetamol. For further research related to the TLC test for the presence of paracetamol in traditional medicines, it is better not to use only one type of eluent

comparison. The eluent comparison that can be tried is the ratio of chloroform and methanol (9:1) or the ratio of ethyl acetate:ethanol:ammonia.

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