

ANALISIS ADULTERASI JAMU PEGAL LINU YANG DIPEROLEH DARI PASAR DI JAKARTA DAN SEKITARNYA

(Analysis of Adulterated Jamu Pegal Linu Obtained from the Market in Jakarta)

Retno Gitawati¹

Naskah Masuk: 24 Mei 2013, Review 1: 28 Mei 2013, Review 2: 28 Mei 2013, Naskah layak terbit: 10 Agustus 2013

ABSTRACT

Background: "Jamu Pegal Linu" (traditional Indonesian herb for rheumatoid and gouty arthritis) is one of the most popular jamu products manufactured and widely consumed in the community. Despite the claims that they are made of natural herbs, these kinds of jamu are susceptible for being counterfeited and adulterated with drugs that is potentially harmful for health. The aim of this study was to identify medicinal adulteration in jamu pegal linu products obtained from the market in Jakarta and surroundings. **Method:** This study was an experimental laboratory in a cross-sectional design. About 450 samples of jamu pegal linu products were randomly chosen, and the products with different brands were analyzed for medicinal adulteration using a thin layer chromatography (TLC) method. Product labels of the adulterated jamu were also analyzed for the appropriateness of the product information. **Results:** Out of the 114 brands of jamu pegal linu analyzed, 52 samples (45.6%) were positive for medicinal. The medicinal types detected were paracetamol (30.7%), phenylbutazone (20.4%), piroxicam (7.1%) and mefenamic acid (3.5%). Two samples of jamu has been contaminated with molds and found damp. Of the 52 samples positive medicinal, 92.3% include the registration number and only 30.8% include the expiration date in the product labels. About 44.2% include the name of ingredients compositions written incorrectly in the labels. **Conclusion:** A limited numbers of Jamu pegal linu products adulterated with medicinal still existed in the market.

Key words: jamu pegal linu, traditional medicine, adulteration, thin layer chromatography (TLC)

ABSTRAK

Latar belakang: Obat tradisional/jamu kategori pegal-linu, salah satu jenis produk jamu yang penggunaannya paling luas di masyarakat, termasuk jenis sediaan jamu yang rawan untuk "dipalsukan" dengan penambahan senyawa kimia obat (BKO) ke dalam produk. Penelitian ini bertujuan memperoleh data yang dapat menunjang keamanan jamu, khususnya mengidentifikasi senyawa kimia obat dalam produk jamu dengan indikasi pegal linu/asam urat yang beredar di wilayah Jakarta dan sekitarnya. **Metode:** Desain penelitian potong lintang, dengan sampel 450 produk jamu yang dipilih secara acak dari sejumlah pasar/toko jamu di wilayah Jakarta dan sekitarnya. Analisis BKO dalam jamu dilakukan secara kromatografi lapis tipis (KLT), dan deteksi noda pada 254 nm (UV) dan 366 nm (fluoresensi). Selain itu dilakukan juga analisis kelengkapan penandaan produk jamu yang teridentifikasi mengandung BKO. Analisis dilakukan secara deskriptif. **Hasil:** ditemukan 52 sampel (45,6%) dari 114 merek jamu kategori pegal linu/asam urat yang positif mengandung BKO. Jenis BKO yang terdeteksi adalah parasetamol (30,7%), fenilbutazon (20, 4%), piroksikam (7,1%) dan asam mefenamat (3,5%). Ditemukan 2 sampel jamu yang telah tercemar jamur/kapang dan kondisi lembab. Dari 52 sampel jamu yang positif BKO 92,3% mencantumkan nomor registrasi, 30,8% mencantumkan tanggal kadaluarsa dan 44,2% mencantumkan komposisi dengan penulisan nama Latin simplisia yang salah. **Kesimpulan:** Banyak jamu dicampur senyawa obat kimia yang ilegal dan dapat membahayakan kesehatan. **Saran:** Badan POM selalu melakukan surveillance terhadap produk jamu bermasalah dan menarik dari pasaran.

Kata kunci: jamu pegal linu, bahan kimia obat, kromatografi lapis tipis

¹ Pusat Teknologi Terapan Kesehatan dan Epidemiologi Klinik, Badan Litbang Kesehatan, Kemenkes RI, Jl. Percetakan Negara 29 Jakarta Pusat. Alamat E-mail: retnogitawati@gmail.com

INTRODUCTION

Jamu is a traditional Indonesian herb widely used for centuries with various indications, mainly for maintaining physical fitness and health, as well as helping cure the diseases. Among them, “*Jamu Pegal Linu*” (traditional Indonesian herb for rheumatoid and gouty arthritis) is a kind of *jamu* which is the most popular products manufactured and widely used in the community.^{1,2} These kinds of *jamu* are susceptible for being counterfeited and adulterated with drugs,²⁻⁴ despite claims that they are made of natural herbs.

The National Agency for Drug and Food Control (NA DFC) or Badan POM has been repeatedly recalled some *Jamu* products due to adulterations with drugs which are harmful for consumers.⁵⁻¹⁰ However, some medicinal adulterated products probably still available in the market and could be used by consumers. *Jamu Pegal Linu* often adulterates with certain drugs such as phenylbutazone, piroxicam, mefenamic acid, methampyrone, acetaminophene (paracetamol), dexamethasone and allopurinol, and this could be harmful for health if consumed continuously in a long period with uncontrolled dosage.

The aim of this study was to identify any adulteration which was still found in *Jamu Pegal Linu* that was available in the market, in Jakarta and surroundings.

METHODS

This study was an experimental laboratory in a cross-sectional designed. Samples were 450 *Jamu Pegal Linu* products, randomly chosen from the market and *jamu* store/retail in Jakarta, Tangerang, Bekasi and Depok, and obtained in June 2010. Samples should meet the inclusion criteria, i.e. orally used only, includes 10-*jamu pegal linu* products retailer expressed as a product of the “best-selling” (most often purchased by consumers), registered or not. Medicinal adulterations were identified qualitatively using a thin layer chromatographic (TLC) method.^{11, 12} In this method, we used a mixture of Chloroform-Methanol (90:10) and Chloroform-Acetone (80:20) as a solvent (mobile-phase), and a TLC plate Silica Gel 254 and visualized the spot with UV lamp at 254 nm and 366 nm wave length. Product labeling was also analyzed in order to know if the product label provides appropriate information or not.

RESULTS

Out of 450 *jamu* products sampling from Jakarta and surroundings, about 114 which had different brand names, had been analyzed for medicinal adulteration. Most (83.3%) of the various brands of *jamu pegal linu* products had registered (the registration number included in the packaging), and only 32.5% of them that include an expiration date; almost all of them presented in powders and capsules, and a small portion in the form of pills (Table 1). Two products in capsules found damp and contaminated with molds.

Of 114 *jamu* brands being evaluated, 52 (45.6%) products were found adulterated with medicinal. Results from TLC analyzing, it was found that some *jamu* products contained mefenamic acid (4 products, 3.5%), piroxicam (8 products, 7.0%), phenylbutazone (23 products, 20.2%), paracetamol (35 products, 30.7%), and none containing dexamethasone (Table 2) and (Figure 2 and 3).

Product labeling analyzed from 52 adulterated *jamu* brands showed that most of them (92.3%) had a registration number, only 4 had none; expiration date included in the labels of 16 (30.8%) products; five products did not include the herbs composition, and about 44.2% had the herbal names (simplicia) in the composition written incorrectly. Indication and posology of the herbal included in all product labels,

Table 1. Characteristic of *Jamu Pegal Linu* Products Analyzed (N = 114)

Items	N	%
Dosage form:		
Powder	53	46.5
Capsule*	47	41.2
Pill	14	12.3
Registration number included	95	83.3
Expiration date included	37	32.5



Figure 1. Example of *Jamu* product contaminated with molds

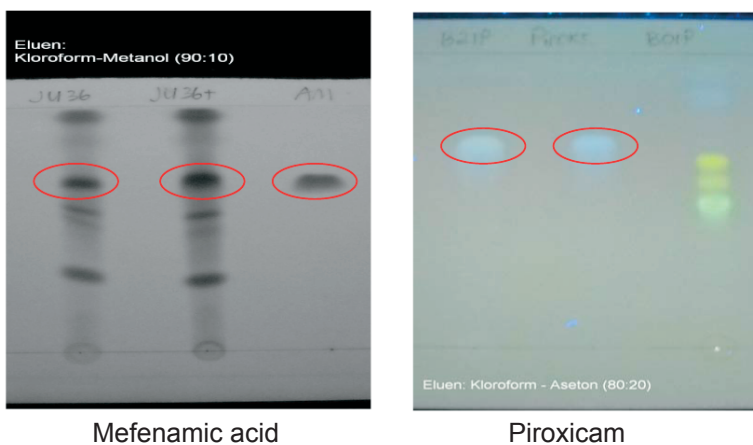


Figure 2. Example of TLC Chromatogram of Mefenamic Acid and Piroxicam

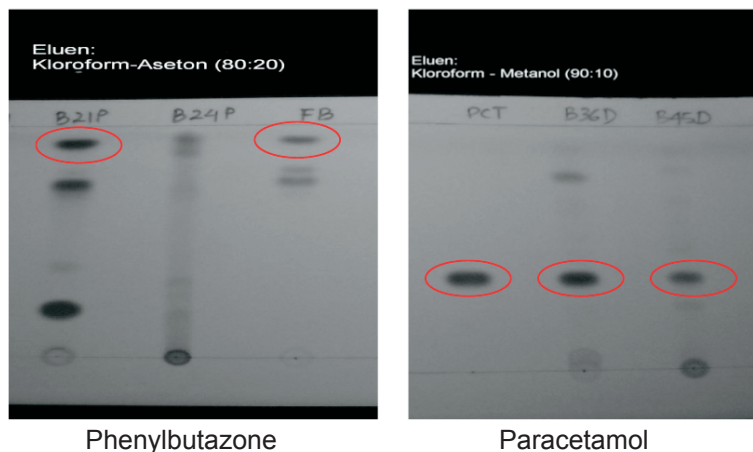


Figure 3. Example of TLC Chromatogram of Phenylbutazone and Paracetamol

Table 2. Medicinal Found in Adulterated Herbal (Jamu Pegal Linu) Products (N = 114)

	N	%
Medicinal not found	62	54.4
Medicinal found	52	45.6
Sort of medicinal:		
Paracetamol	35	30.7
Phenylbutazone	23	20.2
Piroxicam	8	7.0
Mefenamic acid	4	3.5
Dexamethasone	0	0

but contra-indication and warning/precaution only found in 15 products; only one gave the information about the storage method. (Table 3).

Table 3. Product Labeling Items Included in the Adulterated Jamu (N = 52)

Items	Available in the product label	
	N	%
Registration number	48	92.3
Expiration date	16	30.8
Production code	8	15.4
Composition (ingredient) of the herbal product:		
written correctly	24	46.2
written incorrectly	23	44.2
Indication, posology	52	100.0
Contra-indication, precaution	15	28.8
Storage method	1	1.9

DISCUSSION

Jamu Pegal Linu is a kind of *jamu* which is the most extensive herbal product used in the community. This herbal product can be purchased directly by consumer without prescription. Approximately 40% of *jamu* users consume this kind of herbal continuously and regularly for a period of 1 year.² *Jamu Pegal Linu* is susceptible for being counterfeited and adulterated with medicinal that is prohibited to put in the composition of herbal product.²⁻⁴ Herbal products that contain medicinal, notably prescription drugs, can be harmful to health since the appropriate dosage cannot be controlled. However, results from this study revealed that some herbal products (45.6%) sampled in the market still found adulterated with medicinal including prescription drug.

Most types of drugs detected were paracetamol (35 samples, 30.7%) and phenylbutazone (23 samples or 20.4%). Phenylbutazone is a well-known medicinal which is the “favorite” to be added to the herbal product, particularly herbal for arthritis or *jamu pegal linu*. Obviously from the number of herbal products that have been withdrawn from the market by NA FDC, most are herbal products that contain phenylbutazone.^{5,7}

Phenylbutazone is a non steroid anti-inflammatory drug (NSAID), and has a strong anti-inflammatory, antipyretic, and analgesic activities. It is especially effective in the treatment of ankylosing spondylitis. It is also useful in rheumatoid and gouty-arthritis. However, this drug has numerous adverse effects; some could be serious, especially in prolonged use with uncontrolled dosage. Phenylbutazone adverse effects are similar to those of other NSAIDs including nausea, vomiting, skin rash, water retention (edema), GI ulcers, blood dyscrasias, and renal failure.¹³ Besides its strong anti-inflammatory effect or frequently expressed by the consumer as “cespleng” (= potent), it is likely --due to the relatively low price of phenylbutazone-- caused the producers mixing this drug into *jamu*.

Paracetamol is an analgesic-antipyretic drug relatively safe if it is used in therapeutic dose. This is an OTC drug which can be sold directly to consumer without prescription. Although it is relatively safe, the addition to herbal product is illegal, especially because of the dosage used might be uncontrolled

and overdosed. Prolonged use and high dosage of paracetamol may cause liver damage.¹⁴

Two other drugs identified in the herbal product with TLC method were piroxicam (8 samples or 7.1%) and mefenamic acid (4 samples or 3.5%). These drugs are also a strong NSAID and more expensive than phenylbutazone. Piroxicam is often prescribed by doctors for the treatment of rheumatoid arthritis and gouty arthritis. The common adverse effect of piroxicam is gastrointestinal upset and the more serious is the onset of peptic ulcers.^{15,16} Other adverse effects include headache, tinnitus, and erythema. Piroxicam is contraindicated for pregnancy and patients with peptic ulcer. Mefenamic acid has several adverse reactions, the most common is gastrointestinal effects (included abdominal pain, gastric/duodenal ulcers, gross bleeding/perforation, dyspepsia, constipation, diarrhea, flatulence, heartburn, nausea, and vomiting). Hematological adverse reactions have also reported included anemia, increased bleeding time, ecchymosis, eosinophilia, leucopenia, purpura, and thrombocytopenia. Respiratory side effects have included asthma and dyspnea; while renal adverse effects include abnormal renal function and renal failure.^{17,18} Mefenamic acid is contraindicated for patients with GI ulcers, asthma and renal dysfunction.

Results from analyzing of product labels of the 52 *jamu* products which have been counterfeited with medicinal, showed that most products (92.3%) had registration numbers included in the package labels and four products did not have registration number. However, it should be proven whether the registration number is authentic or spurious/pseudo-number. Based on data retrieval of traditional medicine in the NA FDC,¹⁹ in this study it was identified that only 6 samples of products registered. The rest still need to be investigated regarding the validity of the registration number. When withdrawn some traditional medicine products containing drug from the market, apparently NA FDC also found a number of products that use fake registration number.⁹

Expiration date of the product is required to ensure the product is safe to use up to a specified date. Approximately 30.8% of the adulterated products included the expiration date. It was found in this study that two products expired when purchased (expiration by June 2005 and October 2008). Herbal products that

contain *simplicia* prone to be contaminated with mold/fungal and damp, especially *galenic* preparations extract. In this study, it was found that two *jamu* capsules had contaminated with mold and physically damp, although the products were still not beyond the expiration date; which means that those products, based on the expiration date, were still appropriate for consumption. Mold contamination might be dangerous if that is the *Aspergillus flavus*, because it is a fungal that produces *aflatoxin*.²⁰ Mold contamination may be caused by inadequate storage conditions (humid), or contamination has been occurred since the start of the raw materials processing. Contamination in herbal raw materials may occur if post-harvest drying process is not appropriate. Beside the expiration date, method of storage is also important. All of *jamu* products being observed in this study did not include method of storage in their packaging labels.

Composition of the ingredient in an herbal product determines the indication of the product. Most of *jamu* products observed in this study consist of 4–7 *simplicia* in their compositions. There is one product that includes up to 15 different types of *simplicia*. The herbal (*simplicia*) names were written in Latin, but 44.2% were written incorrectly. For example, there were written *copticifructus* instead of *capsicifructus*, *minosa pudica* instead of *Mimosa pudica*, *diper nigrum* instead of *Piper nigrum*, *ngristica program* instead of *Myristica fragrans*, *gladziosa superbal* instead of *Gloriosa superba*, and so on. One of the quality assurance of a product (including products of traditional medicine/herbal medicine), among others is the validity of the content or composition of the active ingredients. Errors in writing the herbal name, in addition to detected moldy product samples, indicating the possibility of the production of herbal medicine has not yet follow the good manufacturing practice for traditional medicine (GMP), so the product quality may still questionable.

Out of 52 samples positive adulterated with medicinal, five products did not include the composition of active ingredients in the packaging labels, and three of them unregistered (did not have a registration number). One of the unregistered products was a Chinese traditional medicine (TCM) with almost all information in the packaging label written in Chinese, except the product name written and translated as “*Asam Urat*”. Indications included in all adulterated

products, but only 15 (28.8%) products have contra-indication and precaution/warning written in the labels, mostly a warning to “avoid consuming foods such as nuts” (“*hindari makanan berupa kacang-kacangan*”). Precaution and contraindication for pregnancy and ulcers stated in 4 adulterated products.

Self-medication for minor ailments and complaints by consuming traditional herbal medicine (*jamu*) should be done rationally and safely. With a number of herbal products containing drugs (adulterated *jamu*) still existed in various markets in Jakarta and surroundings, people still exposed to the possibility of taking *jamu* products which are dangerous and can be harmful to health. Beside manufactured *jamu* (branded *jamu*) found adulterated with medicinal, presumably there are also ‘ready-to-consume’ herbals (such as *jamu gendong*) which taken directly by consumers, that purposely mixed with medicinal by the seller. To proof this assumption, another comprehensive study is required.

CONCLUSION

Although in limited numbers, *jamu pegal linu* products adulterated with medicinal still existed in the market. Medicinal mixed into the herbal products, is illegal and can be harmful to health. The government, i.e. NA FDC (Badan POM), is expected to continuously performed surveillance to the adulterated products and withdrawn them from the market.

ACKNOWLEDGMENT

I am grateful to the head of Center for Biomedical and Basic Health Technology, NIHRD (formerly, the Biomedical and Pharmacy Research and Development Center), the head and all staffs of Chemical Pharmacy Laboratory – especially to Sukmayati Alegantina and Kurniati – for all supports and technical assistance to this study.

REFERENCES

- Anonim, 2008. 54 Jamu dilarang beredar. Gemari. Edisi 90, Tahun IX/Juli.
- Aronson JK, 2010. Meyler’s Side Effects of Analgesics and Anti-inflammatory Drugs. Elsevier B.V.: 334–5.
- Badan POM, 2003. Public Warning tentang Obat Tradisional mengandung Bahan Kimia Obat; No. KB. 01.04. II.22.

- Badan POM, 2005. Public Warning tentang Produk “ARMA SIN GANG SAN LANGSING AYU” yang dicampur Bahan Kimia Obat Keras Sibutramin hidroklorida; No. KH.00.01.1.034.
- Badan POM, 2005. Public Warning tentang Produk illegal yang dicampur Bahan Kimia Obat Keras Sildenafil sitrat; No.KH.00.01.1.042.
- Badan POM, 2006. Public Warning tentang Obat Tradisional mengandung Bahan Kimia Obat; No. KH.00.01.1.5116.
- Badan POM, 2007. Hasil Survei Aktif Terhadap Produk Obat Tradisionil Kategori Pegal-linu di Makassar, Yogyakarta dan Jabotabek, Laporan. Jakarta.
- Badan POM, 2008. Public Warning/Peringatan Nomor: KH.00.01.43.2773.
- BPD-ISFI Jawa Tengah & GP Jamu dan OT, 1999. Daftar Obat Alam Ed. 1. Jawa Tengah.
- Badan POM, 2013. Database Registrasi, Daftar Produk Obat Tradisional. Tersedia pada: <http://www.pom.go.id/webreg/index.php/home/produk/10> [Diakses 31 Januari 2013].
- Departemen Kesehatan RI, 1990. Peraturan Menteri Kesehatan Republik Indonesia No. 246/Menkes/Per/V/1990.
- Departemen Kesehatan RI, 1994. Pedoman Pengujian Mutu Obat Tradisional. Pusat Pemeriksaan Obat dan Makanan, Dirjen POM, Jakarta.
- Departemen Kesehatan RI, 2005. Metoda Analisa. Pusat Pemeriksaan Obat dan Makanan, Dirjen POM, Jakarta.
- Handa SI and Freestone S, 1990. Mefenamic acid-induced neutropenia and renal failure in elderly females with hypothyroidism. *Postgrad Med J.* Vol. 66, pp. 557–9.
- James LP, Mayeux PR and Hinson JA, 2003. Acetaminophen-induced hepatotoxicity. *Drug Metab Dispos*; Vol. 31, No. 12. p. 1499–506.
- Laake K, L Kjeldaas, 1984. CF Borchgrevink. Side-effects of piroxicam (Feldene). A one-year material of 103 report from Norway. *Acta Med Scand.* Vol. 215. No. 1, p. 81–3.
- Lipscomb GR, Wallis N, Armstrong G, and Rees WDW, 1998. Gastrointestinal tolerability of meloxicam and piroxicam: a double-blind placebo-controlled study. *Br J Clin Pharmacol.* Vol. 46, No. 2, p. 133–7.
- Sperling, IL. (S.a) Adverse reactions with long-term use of phenylbutazone and oxyphenbutazone. *The Lancet* Vol. 294, Issue 7619, pp. 535–7.
- Rotblatt M, Ziment, 2002. Evidence-based Herbal Medicines. Hanley & Belfus. Inc. Philadelphia 387–95.
- Williams JH, Phillips TD, Jolly PE, Stiles JK, Jolly CM, Aggarwal D, 2004. Human aflatoxicosis in developing countries: a review of toxicology, exposure, potential health consequences, and interventions. *Am J Clin Nutr.* Vol. 8, No. 5, pp. 1106–22.