

## REVIEW OF SOME TRADITIONAL HERBALS INCLUDED IN USADA TENUNG TANYA LARA AS DIARRHEA THERAPY AGENTS

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### ABSTRACT

**Background:** Diarrhea is one of the most extraordinary diseases in the world, with a number of 2.195 children die every day, and 801.000 children die from diarrhea every year. Diarrhea therapy has actually been conducted by society, but the use of synthetic drugs is limited for diarrhea cases since it will trigger undesirable effects, such as abdominal pain and resistance to pathogenic bacteria. Bali, with its unique culture, has Usada Tenung Tanya Lara, which contains procedures for treating diarrhea using plants. **Objective:** This work aimed to review traditional medicine, which is written in Usada Tenung Tanya Lara, that has been intensified nowadays and can be an alternative in the treatment of diarrhea. **Methods:** This article review using a primary data source and secondary data sources. **Results:** Some of the plants that have been collected have anti-diarrheal activity in the usada Tenung Tanya Lara are turmeric (*Curcuma longa*), banana (*Musa paradisiaca*) and ancak (*Ficus religiosa*). These three plants mostly have anti-diarrheal activity by inhibiting and killing pathogenic bacteria that cause diarrhea, such as *Shigella dysenteriae*, *Escherichia coli*, and *Vibrio cholerae*. Aside from being antibacterial, all three plants also have several mechanisms to cure diarrhea. **Conclusion:** It was revealed that turmeric, banana, and ancak leaf could act as agents of diarrhea therapy with their respective mechanisms of actions.

**Keywords:** Diarrhea, Usada Tenung Tanya Lara, *Curcuma longa*, *Musa paradisiaca*, *Ficus religiosa*.

### INTRODUCTION

Diarrhea is bowel movements with a consistency of a liquid or semi-liquid stool, which contains more water than the usual (>200 grams or 200 mL/24 hours) and can be accompanied by or without slime and blood desiccation<sup>[1]</sup>. The latest data compiled by the *Centers for Disease Control*<sup>[2]</sup>, diarrheal diseases including extraordinary events in the world, whereas many as 2.195 children die every day and 801.000 children per year die from diarrhea. Dehydration due to diarrhea is an important cause of death in children<sup>[3]</sup>. The CDC data above illustrates that diarrhea is still one of the most common health problems in the world, especially in developing countries

with low living standards, such as in Indonesia<sup>4</sup>. The Ministry of Health of the Republic of Indonesia<sup>[5]</sup> states that diarrhea is the second highest cause of infant mortality in Indonesia after pneumonia. Diarrhea caused 11% of under-five deaths based on data from the Ministry of Health of the Republic of Indonesia in 2018, which has increased by 8,6% over the past five years (2013 data showed a mortality rate of 2,4%).

Risk factors can cause an increase in diarrhea rates, including environmental sanitation, which includes the provision of clean water, waste management, wastewater disposal facilities, and personal hygiene, such as washing hands<sup>[6]</sup>.

Generally, the most common cause of diarrhea is infectious diarrhea, where infectious diarrhea can be caused by viruses, bacteria, and parasites. Bacteria that can cause diarrhea are *Shigella dysenteriae*, *Shigella sonnei*, *Escherichia coli*, *Vibrio cholerae*, and *Shigella flexner*, where *S. dysenteriae*, *E. coli*, and *V. cholerae* are the main causes of diarrhea which results in a high mortality rate<sup>[7]</sup>. Other factors cause death due to diarrhea, namely dehydration, due to loss of fluid and electrolytes during diarrhea through feces. Generally, infants who experience prolonged diarrhea will cause dehydration. Dehydration due to diarrhea depends on the percentage of body fluids lost. Dehydration of diarrhea that occurs is categorized into diarrhea without dehydration, mild/moderate, and severe dehydration<sup>[8]</sup>.

Diarrhea therapy has been guided by the available literature, such as WHO diarrhea treatment guidelines, important medicines book by Tjay and Rahardja, and MIMS Diarrhea is essentially healed in less than five days, so it is recommended not to be given medication because at that time the damaged mucosal epithelial cells are replaced by new cells, but if severe diarrhea can be used symptomatic drugs such as tannic acid (*tannalbin*), aluminum hydroxide and absorbent carbon<sup>[3]</sup>. However, the use of synthetic drugs is limited for diarrhea sufferers because it will have undesirable effects, such as loperamide should be avoided in bloody diarrhea or suspected inflammation, or when associated with significant abdominal pain<sup>[9]</sup>.

WHO guidelines in 2005 were updated in 2016<sup>[10]</sup>, which discussed that treatment for diarrhea infected by pathogenic bacteria could be treated using antibiotics, with ciprofloxacin as its first line. Pivmecillianam antibiotics (amdinocillin pivoxil) and ceftriaxone can also be used, where these antimicrobials are effective for the treatment of *Shigella* multi-resistance strains in all age groups. However, their use

is limited because of the high cost and difficulty of formulation, and the use of this drug is only intended when the local strain of *Shigella* is resistant to ciprofloxacin. The second line that can be recommended is Azithromycin, but its use is not recommended for children due to a lack of safety data usage.

Based on the presence of several complications during therapy, such as drug resistance, it encourages researchers to find alternatives to tackle the problem of diarrhea. Nowadays, traditional medicine or ethnomedicine has been intensified. Ethnomedicine is a treatment that is based on local wisdom and is carried out empirically or hereditary. The local wisdom in question is the cultural wealth of the local community, especially regarding traditional medical systems. In Indonesia, especially in Bali, there is a well-known traditional medicine system known as indigenous lontar, which is known as Usada Bali. Lontar Usada Bali is a script about the system of medicine, herbs, and traditional Balinese methods of treatment<sup>[11]</sup>. Usada treatment in Bali is based on *Ayurveda* medicine and ancient medical manuscripts in Bali<sup>[12]</sup>.

The treatment of diarrhea itself (or better known as *mencret* in Usada Bali papyrus) using various herbs and mantras has been widely discussed in Usada Bali, especially in Usada Tenung Tanya Lara papyrus. In this papyrus, many types of treatment with herbs and spells are offered for various types of diarrhea<sup>[13]</sup>. However, in Usada Tenung Tanya Lara papyrus did not explain the mechanism of its activity can be used as therapy in diarrheal diseases. The number of herbs will certainly confuse the reader in using which herbs to use in his therapy.

Based on the problems outlined above, the writer is interested in discussing some of the herbs used in Usada Tenung Tanya Lara as diarrhea therapy and aims to facilitate the public in choosing herbs for diarrhea therapy.

## METHODS

The primary data source was obtained from the derivation of Usada Tenung Tanya Lara papyrus by Sudiasta and Suwidja (1991). The process of finding secondary data sources is obtained by searching on google, google scholar, and NCBI with the keywords "diarrhea", "treatment of diarrhea", "anti-diarrheal activity in turmeric (*Curcuma longa*)", "anti-diarrheal activity on bananas (*Musa paradisiaca*)" "anti-diarrheal activity on ancah (*Ficus religiosa*) " and " anti-diarrhea activity in plants ". Secondary data sources used are journals that have been published for the past ten years. The use of data over the last ten years is applied if no last ten years of data is supported.

## RESULTS

The results obtained from primary data sources in the form of derivation Usada Tenung Tanya Lara are several herbs that have activities as diarrhea therapy agents in the form of plant names in Usada Tenung Tanya Lara, the plant parts used, and how to use them, while pharmacological activities were obtained from various data sources in this review. The results obtained from these primary data sources are listed in Table 1.

## DISCUSSION

### 1. Overview of the Antidiarrheal Effects of Turmeric

Turmeric has long been used in traditional medicine. Curcumin is a lipophilic polyphenol compound<sup>[14]</sup>. Curcumin, an active compound in turmeric, has several health benefits, which is useful as an antioxidant and anti-inflammatory<sup>[15]</sup>. In Usada Tenung Tanya Lara, turmeric (*C. longa*) can be used to cure diarrhea. Based on the research, turmeric methanol extract at a dose of 100 mg/kg BW and 200 mg/kg BW have a significant inhibitory effect on intestinal motility, where the parameters being observed were the amount of dry and wet stool in diarrhea cases<sup>[16]</sup>. Observation

of intestinal motility needs to be considered, considering that in classical theory, diarrhea is caused by an increase in intestinal peristaltic so that the passage of the *chymus* is greatly accelerated and in this condition, there is still a lot of water<sup>3</sup>. In vivo studies in mice showed that *C. longa* extract could reduce contractions in the ileal smooth muscle and large intestine<sup>[17]</sup>.

Turmeric has also been reported to have antibacterial activity, especially against pathogenic bacteria that cause diarrhea, namely *E. coli* and *V. cholera*. For screening, it was preliminary found that some turmeric extract was able to inhibit the growth of pathogenic bacteria by observing the inhibitory zone. In *E. coli*, turmeric ethanol extract produces inhibition zones are 8 mm and 25 mm<sup>[18,19]</sup> and ethyl acetate extract produces inhibition zones of 25 mm<sup>[19]</sup>, whereas, in *V. cholerae*, ethanol extract produces 20 mm inhibition zones and ethyl acetate extract produces 25 mm inhibition zones<sup>[19]</sup>. Further research was carried out to obtain the MIC value of pathogenic bacteria, wherein *E. coli* bacteria; ethanol extract produced a value of 0,006 µg/mL - 5 µg/mL<sup>[19,20]</sup>. Treatment of diarrhea caused by gram-negative bacteria can be combined with antibiotic therapy, such as ciprofloxacin which can inhibit and kill the growth of gram-negative bacteria, such as *E. coli* and *V. cholera*<sup>[3]</sup> so that the MIC results can be interpreted with the antibiotic approach used. Ciprofloxacin has a limit on the MIC value of the category *susceptible* in the area under 5 µg / mL, so it can be stated that the turmeric extract susceptible against bacteria *E. coli* and *V. cholera*<sup>[21]</sup>.

### 2. Overview of the Antidiarrheal Effects of Banana Plants (*Musa paradisiaca*)

In Usada Tenung Tanya Lara, the banana part used is the root. However, there is little literature that states that banana roots can potentially be anti-diarrheal. The main compound in bananas that acts as a

**Table 1. Herbals in Usada Tenung Tanya Lara that can be Used as Diarrhea Therapy Agent**

No	Plant's name in Usada	Indonesian Name	Scientific Name	Parts Plant Used	Indications Diarrhea	How to Use
1	<i>Kunir</i>	Kunyit	<i>Curcuma longa</i>	Bulb	Diarrhea as if pouring	Bulbs of turmeric combine with <i>ampo</i> and the juice is drunk
2	<i>Biu sepet</i>	Pisang	<i>Musa paradisiaca</i>	Root	Diarrhea out water	Roots of <i>biu sepet</i> pounded by onion and fennel, squeezed, water is taken
3	<i>Ancak</i>	Bodhi	<i>Ficus religiosa</i>	Leaf	Diarrhea with feces expenditure volume gradually ( <i>ngecer</i> )	7 leaves of <i>ancak</i> combine with <i>ireng</i> salt and then poured boiling hot water, the water is drunk

therapy for diarrhea is Pectin<sup>[22]</sup>. Several studies have described the presence of Pectin in bananas. Hot water extract of the banana root has a MIC value of 100 mg/mL for *E. coli*. Hot water extract of the banana root contains secondary metabolites of alkaloids, flavonoids, saponins, glycosides, and antraquinone<sup>[23]</sup>. Other studies reveal that other parts of banana plants can potentially be anti-diarrheal regardless of the part mentioned in Usada Tenung Tanya Lara.

The leaf of bananas contains secondary metabolites that are similar to the roots, namely alkaloids, saponins, tannins, glycosides, flavonoids, carbohydrates, and terpenoids. The difference lies in the absence of anthraquinone compounds in banana leaf. The curve *time-kill* in ethanol extract of the banana leaf shows the ability of the extract to reduce the micro population exponentially with time, where one of the bacteria tested was the pathogenic bacterium that causes diarrhea, *S. dysenteriae*<sup>[24]</sup>. Sap and banana peels have also been reported to function as anti-diarrheal. Research on these two parts of the banana plant uses an *in vivo* approach to Wistar rats induced by castor oil. The anti-diarrheal activity of banana sap is associated with the presence of secondary metabolites of alkaloids, phenolics, flavonoids, and saponins, which can increase the absorption of fluids and electrolytes through de novo synthesis of

sodium-potassium ATPase and/ or reducing nitriloside levels<sup>[25]</sup>. Meanwhile, banana peel can influence the consistency of water in the stool, where the concentration of water in the stool can be reduced and significantly has the same effect on attapulgit on the ethanol extract concentration of banana peels at 400 mg/kg BW<sup>[26]</sup>. The pectin content in banana peels ranges from 13,5% to 24,08%<sup>[27,28,29,30]</sup>.

Clinical testing of bananas has long been carried out, based on research reports by Rabbani<sup>[22]</sup>, in which studies of babies aged 5-12 months who have diarrhea. Giving food mixed with 250 g/L cooked green banana fruit and 4 g/kg pectin showed significant results in reducing total stool, oral rehydration fluids, intravenous fluids in the body, vomiting, and duration of diarrhea on the third day after giving pectin-rich foods, and experienced an increase in the percentage of diarrheal therapy parameters on the fourth day. In terms of toxicity, bananas tested for sub-acute toxicity do not cause toxic effects if consumed up to 800 mg/kg BW daily<sup>[31]</sup>.

### 3. Overview of the Antidiarrheal Effects of *Ancak (Ficus religiosa)*

*Ancak (F. religiosa)* in the book of *Ayurveda* has been well-known as an ethnomedicinal agent. In northern India itself, the decoction of *ancak* leaf mixed with honey is used to treat diarrhea<sup>[32]</sup>. Part of the leaf in Lontar Usada Tenung Tanya

Lara has also been mentioned to have efficacy as a diarrhea therapy agent. Phytochemicals, *ancak* leaf contains campesterol, stigmasterol, iso-phytosterols,  $\alpha$ -amyrin, lupeol, tannic acid, arginine, serine, aspartic acid, glycine, threonine, alanine, proline, tryptophan, tyrosine, methionine, valine, isoleucine, serine, aspartic acid, glycine, threonine, alanine, proline, tryptophan, tyrosine, methionine, valine, isoleucine, leine, and n-nonacosane<sup>[33,34,35,36]</sup>. Various studies have been carried out on the pharmacological activity of the *ancak* leaf as a therapeutic agent of diarrhea, especially diarrhea caused by a bacterial infection. The methanol and ether extract of *ancak* leaf able to provide antibacterial activity as pathogenic *E. coli*<sup>[37,38,39,40]</sup>. The methanol extract was reported to be better than diethyl ether extract<sup>[37]</sup>. Another study also mentioned that the ethanol extract of *ancak* leaf has antibacterial activity against *S. dysenteriae*<sup>[38]</sup>.

The ethanol extract of *F. religiosa* at doses of 200 and 400 mg/kg BW has given to male Wistar rats induced by castor-oil was shown to significantly reduce the incidence of diarrhea. This can be caused by the content of tannins and flavonoids, where these compounds can denature proteins in the mucous ducts, thereby reducing secretion and having an effect on reducing the incidence of diarrhea<sup>[41]</sup>. *Ancak* leaf also has anti-inflammatory activity, where the inflammatory reaction can be caused by the invasion of bacteria and cytokinins in the colon with the manifestation of dysentery syndrome with diarrhea accompanied by mucus and blood<sup>[42]</sup>.

## CONCLUSION

Treatment of diarrhea can be done with synthetic drugs, but its use needs to be limited so as not to cause unwanted effects. Treatment with herbs today has been intensified, and one of them is by using an herbal approach to Usada. One of the Usada papyrus that explains about the treatment of

diarrhea is Usada Tenung Tanya Lara. In this papyrus, Three main plants can be used as agents of diarrhea therapy, namely turmeric (*Curcuma longa*), banana (*Musa paradisiaca*), and leaves of *ancak* (*Ficus religiosa*). These three plants have been reported to be able to become agents of diarrhea therapy with their respective mechanisms of actions.

## CONFLICT OF INTEREST

No conflict of interest in this paper. This paper was written independently without being affiliated by another party.

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