Feasibility Analysis of Beverages Herbal Products of The Medicinal Plant as a Material Community Empowerment

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Abstract: Herbal beverages produced, sold, and consumed by the public as a secondary requirement. Results of a preliminary study on home-made herbal medicine industry showed microbial contaminants on the threshold based on the Indonesian National Standard. This indicates that the knowledge society in the processing of herbal medicine is still low. The purpose of this study: 1) determine the feasibility of herbal beverages made public based on total plate count molds, 2) determine antibacterial of various herbal beverages, 3) determine the effectiveness of dissemination to the public. Laboratory experimental research methods. The results showed that: 1) there is a difference feasibility herbal beverages based on figures molds, 2) there is a difference antibacterial of any species of plant material herbal beverages, 3) Increased empowerment economically weak rural communities were implemented through character education program is described as a clean and healthy living behavior.

Keywords: Feasibility, herbal beverages, medicinal plant.

Health is a primary need for every human being. One of the factors that support in meeting those needs required a healthy lifestyle. The primary requirement to support a healthy lifestyle is the food. The consumption of food products needs to pay attention to quality in the form of feasibility and safety, so as not to be a problem. Public health issues can be anticipated to improve the quality of human resources.

The survey results (Lutfin et al., 2016) regarding the Clean and Healthy Lifestyle ("PHBS") in several districts of Malang Regency which includes districts Wagir, Tumpang, Poncokusumo, Bantur, Turen and Pujon low. Data revenue per capita is low, mostly eyed-income farm workers. There is a small percentage of people are already working to make herbal drinks from plants in the vicinity to support their economic needs, but still very simple processing method and not pay attention to the feasibility and safety of the product. Preliminary study on community-made herbal medicine sold shows the total plate count (TPC) mold exceed the threshold stipulated Indonesian National Standard, which amounted $3x10^2$ colonies/gram. Should the effort to improve the knowledge, skills and support their earnings to increase the value of the community's economy. One form of community empowerment through the use of plants as a medicinal plant products in accordance with national standards of Indonesia (SNI).

Related to a clean and healthy life behavior, quality requirements herbal product that enables done by the people is the manufacture of crude drugs for the prevention of microbial contamination. Criteria of microbial contamination in SNI include Total Plate Count (TPC) microbes, Most Probable Number (MPN) Coliform bacteria, *E. coli*, Salmonella, *Clostridium perfringens*. The maximum limit microbial contamination ALT $2x10^2$ colonies/mL. Based on preliminary research in six districts have been identified in plants that has potential as a drug and is abundant.

The abundance of plant species that exist in every different locations, namely in the district Bantur found predominant interest shelled (*Ixora paludosa*), in the district Turen Red

Andong plant (*Cordyline fructicosa* L.), District Poncokusumo Prei onion plants (*Allium porrum*), District Wagir plant Hyacinths (*Himenocallis littoralis*), District Tumpang plant Croton (*Codiaeum variegatum*). Abundance of existing plants has not been utilized to the maximum by the villagers.

Each plant has a different bioactive compounds. Various bioactive contained in plants such as eugenol, saponins, alkaloids, polyphenols (Hintz et al. 2015). Bioactive compounds contained in function as immunomodulatory (Carmona-ribeiro et al. 2014), antioxidant (Hintz et al. 2015), antifungal (Hintz et al. 2015; Voravuthikunchai & Howe 2014; Ostrosky-zeichner 2016), and antibacterial (Działo et al. 2016; Voravuthikunchai & Howe 2014; Hintz et al. 2015). These bioactive compounds can be used for the treatment of various diseases, including diseases caused by bacteria.

Some diseases caused by bacteria and usually affects the general public include upper respiratory tract infections (Indonesia: ISPA), and gastrointestinal infections (enteritis). Bacteria that cause respiratory diseases, among others, *Klebsiella pneumoniae*, *Corynebacterium tuberculosis*, *Pseudomonas spp*, *Proteus spp*, *Haemophilus influenza*, *Bordetella pertussies*, *Staphylococcus aureus* (Madigan et al. 2012). Some of the bacteria that cause enteritis, for example *Salmonella thyposa*, (Hintz et al. 2015; Nair et al. 2016; Field & Boat 2012; Zhou et al. 2015; Carmona-ribeiro et al. 2014), *Shigella* desentriae (Carmona-ribeiro et al. 2014; Hintz et al. 2015; Nair et al. 2016), *Campylobacter jejuni*, and *Clostridium difficile* (Field & Boat 2012; Zhou et al. 2015; Carmona-ribeiro et al. 2014). Indicator used to test the antibacterial activity is the cause of ARI *Staphylococcus aureus*, for enteritis is *Escherichia coli*. Causing pathogens tested dysentery with *Shigella disentriae*.

The use of synthetic drugs is constantly can cause disease agents (pathogens) resistant to the drug (Spellberg et al. 2012, Ribeiro and Carrasco, 2014). Side effects of other synthetic drugs include: allergy, nausea, vomiting (Field & Boat 2012; Review, 2011; Review, 2016), diarrhea (Review, 2011.; Field & Boat 2012; Zuo et al. 2015; Review, 2016), hepatotoxic, nephrotoxic (Luk & Simkin, 2005.; Review, 2011.; Carmona-ribeiro et al. 2014; Field & Boat 2012; Fuursted et al. 2016; Review, 2016) etc. Habits of the rural poor consume synthetic antibiotic medication only until clinical symptoms disappear. However, not discipline to take medication as physician recommends that a cure to completion. The reason the price of expensive drugs, then the rest can be used again if the symptoms reappear. Ways of taking the wrong drugs will affect accelerate immune disease agents to the drug. Based on the behavioral habits of drugs by poor people who are not good, it is necessary to find the solution of the problem.

Efforts to reduce the side effects of synthetic drug use can be done with natural treatments that utilize plants around the efficacious drugs. Wanafarma use of plants as herbs can reduce the side effects of synthetic drugs such as who has researched some experts (Voravuthikunchai & Howe 2014; Moreno-hernández et al. 2014; Review, 2016; Działo et al. 2016). Place of residence targeted communities studied are in the forest, therefore it needs to be disseminated use of the medicinal plant crops to empower communities. Community empowerment is done in order to improve the education of characters through (Indonesia: PHBS).

Microbiology laboratory FMIPA UM has the competence that support for testing the quality of the product simplicia made public by using TPC and antibacterial tests. The research objective 1) determine the feasibility of herbal drinks made public based on total plate count molds, 2) determine antibacterial of various herbal drinks. 3) determine the effectiveness of dissemination to the public.

METHODS

Research methodology there are 2 stages: the first stage of laboratory experiments, and the second stage of qualitative research community empowerment. Location microbiology laboratory experiments conducted at the UM Department of Biological Science from June till October 2016. The tools used consisted of sterilizer autoclave, oven dried, needle inoculation, Petri dishes, culture tubes, and material culture Media Potato Dextrose Agar (PDA).

The second phase of qualitative research that aims to empower the community. This phase is done after socialization PHBS through various media, namely (a) Leaflet / Poster/Calendar, intended for literate societies, (b) Video/Multimedia for the illiterate, (c) Booklet/Book Smart/Books Popular Science, for educated people (either regular or packet A). Data analysis techniques, carried out with the target community situation analysis that can be extracted through triangulation of data (observations, questionnaires and interviews). Data were collected before and after the socialization of PHBS Data were analyzed descriptively.

RESULT

Data from the first phase of the research, covering a total plate count of mold and antibacterial activity of the medicinal plant crops. Details of the data presented in Table 1 and Table 2.

Table 1. Total Plate Count Fungi Simplisia medicinal Plants

Repeated	Root	Bark	Leaf	Fruit
1	fc	fc	fc	220
2	290	fc	fc	340
3	120	fc	fc	230
4	100	fc	fc	210
5	fc	fc	fc	410
6	fc	fc	fc	150
Mean	170	fc	fc	260

Description: fc, meaning too little to count

Table 2. Antibacterial Power Plant Crude Steeping Soka (*Ixora paludusa*)

Repeated	50%	25%	12,50%	0%
1	15	40	Mc	Mc
2	10	42	Mc	Mc
3	8	60	51	Mc
4	3	48	Mc	Mc
5	18	25	mc	mc

Description: mc, meaning too many to count

The results of the second phase of the research, observations related to research on weak economic community. Rural communities in the Bromo Tengger Semeru National Park Malang district, they are located in the plateau area average altitude of 2000 meters above sea level. Including forestry areas that tend to be cooler with average air temperature of about (0-20)°C,

and spread over six districts. The results of the identification of some plant diversity that has potential as a drug (medicinal plant crops) is abundant. Medicinal plant plants scattered in every district has a distinct dominance. The difference is in the district Bantur widely found flowers soka (*Ixora paludosa*), in the district Turen Red Andong plant (*Cordyline fructicosa* L.), District Poncokusumo Prei onion plants (*Allium porrum*), District Wagir plant Lilium (*Himenocallis littoralis*), and in District Tumpang there are plants croton (*Codiaeum variegatum*).

Abundance of plant species that exist at each site was high and allowed to grow in the forest, foliage dusty and looked very unkempt, and has not been utilized to the maximum by the community. The results of the analysis of bioactive ingredients of the medicinal plant crops dominant in six districts showed no antimicrobial potential. Results of laboratory exploration of the feasibility test in vitro by total plate count of fungi against simplisia organ parts roots and bark not meet quality standards.

Data questionnaire, about the livelihoods of target communities that are poor in general (85%) work as agricultural laborers (Rehusisma et al, 2016). Interview data showed that public knowledge about the benefits of different types of local plant less, Behavior Clean and Healthy Lifestyle (PHBS) in general is low (Restiani et al, 2016). The collected data is analyzed to formulate an advanced program planning, therefore, directed to achieve adherence to community empowerment through Character Education Program through PHBS.

DISCUSSION

They have been isolated from tubers, leaves, pods, seeds, and flowers. Defensin gene expression can be developmentally regulated or influenced by external stimuli. Pea, tobacco, radish, and *Arabidopsis* have defensin genes that are expressed upon pathogen infection (Hintz, 2015).

The patients with a single hospital admission were more similar to those with no admissions than to the multiple admission group. This trend was seen for all five mold allergens studied (Table 2). The frequency of sensitization to any individual mold ranged from 26% (*Alternaria*) to 41% (*Cladosporium*) in the severe asthma group compared with 0–10% in the milder asthma groups (Ronand, 2005).

Antimicrobial resistance can be defined as the ability of microorganisms to counteract the effects of one or more antimicrobials, they initially sensitive. Several types of disease agents that are resistant to antimicrobials among other fifteen isolates Salmonella non-typhoidal enterica serovar belonging to resistant to Azithromycin (6 -16 mg/L)(Nair et al. 2016). This study aims to assist people applying weak economy and health behavior, while informing some phenomena research results were compared with expert research on the use of herbal remedies. Several studies have shown that the use of herbal medicines to reduce the risk of nausea, vomiting and allergies since the plant has saponins, phenolic, anti-inflammatory and antioxidant (Alam et al. 2011; Działo et al. 2016; Luzia & Jorge 2014; Carmona-ribeiro et al. 2014; Zuo et al. 2015; Field & Boat 2012; Zhou et al. 2015). The compounds were found in some parts of the plant to act as a defense mechanism to protect plants against infectious organisms. The causative agent of infectious diseases in plants is bacterial or mold. Using the principle of control microorganism has a cell structure and physiology are similar, as a result of these microorganisms can be controlled with antimicrobial herbs.

Simplisia quality standards-based drinks can be referenced using the same criteria in the national standard of quality requirements bottled tea beverages. Such criteria include, among others, color, aroma, flavor, metal contamination and microbial contamination (Indonesia: SNI, 1992). Criteria metal contamination of crude drugs derived from plants that are located in mountainous areas overlooked for much of the industry, as well as color, aroma, and taste.

Microbial contamination is contained in beverages and foodstuffs, if it exceeds the standard threshold, it can indicate that the material is not suitable for consumption by the user community.

Microbial contamination can be either digits mold and Total Plate Count (TPC) bacteria. TPC value that exceeds the threshold indicates that microbial contamination in food or beverages that tested high. The food that has been contaminated by the amount of mold that many if consumed by people, it can result in intoxication. Intoxication is the inclusion of metabolites of molds are toxic to humans. Metabolites include aflatoxins (Pandey & Natarajan 2015; Andersen et al. 2011; William B. Whitman 2009), ochratoxin (Andersen et al. 2011), fumonisin, patulin, zearalenon (Gallo et al. 2013). The clinical symptoms of people infected by the fungus metabolites, similar to symptoms of poisoning synthetic drugs, such as nausea, vomiting, diarrhea, hepatotoxicity, nefrotoxic (Stoev & Denev 2013; Rosenblum Lichtenstein et al. 2015).

Improving the quality of human resources into a common regional targets. Government through the President of the Republic of Indonesia Regulation Number 8 Year 2012 Date January 17, 2012 has set nine levels of qualification of human resources. Description of each level of qualification based on the ability to implement the kinds of tasks, knowledge, and volume responsibilities.

Character education for rural people needs to be done in order to improve their well-being to the whole person according UUD'45 formation. The government has established through the Regulation of the Minister of the Interior of the Republic of Indonesia Number 1 Year 2013 About the Community Empowerment. Embodiments of the whole man is a prosperous man in body and soul, is done through Empowerment and Family Welfare Movement (Indonesia: PKK). Public welfare may materialize for their healthy humans. Criteria healthy spiritual and physical, includes faith and devoted to God Almighty, noble and virtuous, healthy and prosperous, advanced and independent, gender equality and equity as well as legal and environmental awareness.

Empowering communities through character education of rural communities economically weak. Manifestations have appeared during mentoring. Learning is done directly in the community, by first knowing the characteristics of the community. The characteristics of the economically weak rural communities generally tend to be very passive. They depend on the natural resources that exist and according to geographical location. People living in rural areas near the coast is the main livelihood as fishermen, who are in the agricultural area eye-quest is farming and livestock breeding, and which are in plantation farming and gardening. They generally go and accept what the appropriate circumstances of his life line. System in a rural community still seems that every citizen to know each other, work together, help each other, and guyub harmony. Such traits can actually benefit society for the preservation of the local environment. But in terms of global competition economic level society is still far behind than the average national income per capita.

The results of the study after the character education in rural communities can be realized from “PHBS” indicator. One indicator with due diligence analysis of herbal products processed communities based on total plate count (TPC) microorganisms. Initially before the assistance obtained TPC test mold in the processed crude drugs of plant organs. ALT value simplisia roots and bark of plants is still not viable. ALT value indicates that the utilization of part of plant organs, especially the bark and roots are more at risk of fungal contamination. Excessive number of fungal contaminants in the plant opens opportunities affects the health of humans who consume the products of medicinal plants, namely the presence of toxins called mycotoxins.

Mycotoxins are the result of secondary metabolites of fungi that are difficult to remove because heat resistance (resistant to very high temperatures> 100°C) (poisoning mycotoxins in humans can cause clinical symptoms include nausea, vomiting, diarrhea, liver damage (Ronan et al, 2005). Based on research antibacterial power plant medicinal plant dominant, enough potential to be further explored. exploration results indicate that the abundance of plant species of the medicinal plant that exist in every location has not been utilized to the maximum, and the community in producing crops of the medicinal plant is still traditional. Based on some of the data results research that has been done, it is necessary to improving the welfare of weak economic community through community empowerment, particularly education code clean and healthy life ("PHBS").

Weak economy in rural communities tend to passively manage the environment, it is because they feel they have no land for a place to stay and to be managed. Society of these groups need to be considered, and motivated to meet their needs in order to prosper. Improving the welfare of rural communities require an empowerment strategy that can motivate them to participate undertake a program of joint activities of other communities, so as to improve its economy. One of the program to improve the economic standard of society by utilizing natural resources means the use of the medicinal plant crops.

The first step the introduction of community empowerment through awareness of plant utilization program of the medicinal plant, used to infuse character education a healthy life. Villagers were weak economic level empowered to participate and implement programs of the medicinal plant plant utilization. Communities were given the opportunity to participate in managing the plant wanafarna produce a decent product or meet quality standards. Ways of crop management is done aseptic technique, from the stage of the selection of the plant, picking, sorting, washing, drying, packaging, up to a product ready for sale / is ready for consumption.

The second step is empowerment assistance for implementing program activities. Assistance is intended as a stage monitoring from a short distance, because researchers can jointly participate rural communities and actively implement the program. The pattern of assistance to implement healthy living can be done through anjangsana directly into every home with PKK cadres, based on data from KK to each Dasa Wisma, or to the Village Hall. During the mentoring role as coach researcher who also monitor how much of the active role of rural communities implement PHBs. Mentoring is not just giving lectures, presented papers, or advocating the form of suggestions, but by example PHBS together with the community. It is hoped that researchers can emulate the attitude of PHBS that are directly applied together rural communities.

Healthy lifestyle which can be exemplified is how to perform aseptic techniques during the processing plant medicinal plant. Some forms of PHBs that can be done together with the community when assistance is to clean hands before and after work using hand sanitizer, reducing contamination of the material by covering the mouth and nose using a mask, cover the head hair using a cup or headgear, sterilize workspaces using tool fogging spray disinfectant, sterilizing drinking water, etc.

Empowerment third is the evaluation of program results. Program evaluation is needed to determine the achievement of the objectives of rural community development programs through PHBS that have been planned. Some of the criteria evaluated programs that have been described in program planning. Objectives The planned program is to produce a model of character education through the character of rural communities clean and healthy living. Results of character education can not appear directly in a short time through academic knowledge, but may be facilitated by conditioning a supportive environment.

Character education has been achieved is a positive behavioral change regarding some aspects of life in a person as a citizen of the rural community as a whole. Some indicators of

achievement of community empowerment in this research is the realization of the positive behavior of individual people who previously did not appear when the initial observation.

Positive behavior of individuals covering a religious character, democratic, tolerant, caring environment / social, honest, smart and tough. Each character has manifested itself can be described through parameters or indicators PHBS. Empowerment characters that have been built in rural communities economically weak among e.g.

1. Religious, the formation of character is built through a pattern of daily life while linking religious values. Community given understanding of the diversity of living things were created by God and is associated with the role and benefits of each. Communities assisted to discuss the merits of various plants that are around. Plants used for food consumption as vegetables, fruits, as well as medicinal plants that naturally have been provided by God the creator. Therefore, humans are required to maintain as a result of naturally self-cultivation.
2. Honest. Natural human instinct has an honest character, so its application in rural communities easily realized. However, the formation of this character should be linked through the use of the environment, especially in the surrounding of the medicinal plant that used productively and responsibly.
3. Care, the character is realized through the management of waste and waste. Solid waste sorted out between organic and plastic waste, then recycled and not disposed of carelessly. Liquid waste processed first using the building's septic tank gradually, or to clean up water to maintain the beauty and sustainability of the Unitary Republic of Indonesia.
4. Tolerance, respect those who play an active role in the public health movement.
5. Democratic. Demonstrate the ability to prevent the risk of disease, protect themselves from the threat of disease.
6. Courtesy. The responsibility of citizens to plant drugs (medicinal plant) growing, cultivating, caring for, cleaning up of pests and diseases.
7. Smart and Tough. Cultivating medicinal plant optimally to improve the economic value.

Therefore, in the evaluation of the program made the model through non-formal education. Outline the concept of character education model of rural communities through healthy behavior can be seen in Figure 1.

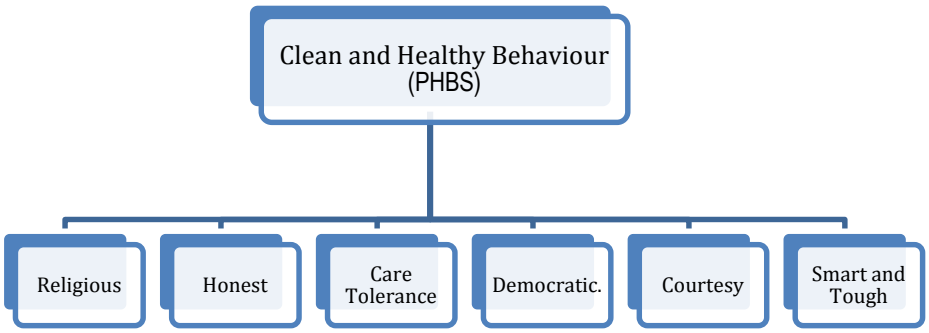

Figure 1. Model of Character Education Healthy Living Rural Communities in Malang

CONCLUSION

Based on the description of the results and the discussion above, it can be concluded as follows. 1) there were a difference feasibility herbal drink based on figures molds, 2) there are differences in anti-bacterial power of each species of plant herbal beverage ingredients, 3) Increased empowerment economically weak rural communities were implemented through

character education program is described as a clean and healthy living behavior. There were religious, honest, care, tolerance, democratic, courtesy, smart and tough.

Recommendation

The formation of character education to increase community empowerment weak economy should be facilitated through the medium of socialization, coaching, training, competition reserved healthy menus, healthy home race, and so forth.

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