

การเตรียมความพร้อมของประเทศไทยต่อการจัดการความปลอดภัยของสารเคมีด้านผลิตภัณฑ์ สำหรับผู้บริโภคโดยระบบสากล GHS เพื่อเข้าสู่ประชาคมเศรษฐกิจอาเซียน

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บทคัดย่อ

งานวิจัยเชิงคุณภาพนี้มีวัตถุประสงค์เพื่อศึกษา 1) การเตรียมความพร้อมของภาครัฐ ภาคเอกชน และภาคประชาชนในประเทศไทย ต่อการจัดการความปลอดภัยของสารเคมีด้านผลิตภัณฑ์สำหรับผู้บริโภคโดยระบบสากล GHS เพื่อเข้าสู่ประชาคมเศรษฐกิจอาเซียน และ 2) ปัญหาอุปสรรคและข้อเสนอแนะต่อการจัดการด้านความปลอดภัย กลุ่มตัวอย่างมาจากภาครัฐ ภาคเอกชน และภาคประชาชนซึ่งประกอบด้วย ผู้แทนที่เกี่ยวข้องที่เลือกอย่างเฉพาะเจาะจง จำนวน 20 คน เพื่อการสัมภาษณ์เชิงลึก และผู้แทนคณะกรรมการประสานนโยบายและแผนการดำเนินการว่าด้วยการจัดการสารเคมีที่เกี่ยวข้องกับด้านนโยบาย แผนยุทธศาสตร์การจัดการสารเคมีแห่งชาติ และด้านกฎหมายภายใต้พระราชบัญญัติวัตถุอันตรายที่เลือกอย่างเฉพาะเจาะจงจำนวน 15 คนเพื่อการอภิปรายกลุ่ม โดยใช้เครื่องมือวิจัยที่ผ่านการตรวจความตรงของเนื้อหาจากผู้เชี่ยวชาญ 5 ท่านประกอบด้วย 1) แบบสัมภาษณ์เชิงลึกแบบมีโครงสร้าง และ 2) ประเด็นในการอภิปรายกลุ่ม วิเคราะห์ข้อมูลโดยการวิเคราะห์เนื้อหาของการสัมภาษณ์เชิงลึกและการอภิปรายกลุ่ม ผลการวิจัยพบว่า 1) ภาครัฐและภาคเอกชนต้องเตรียมความพร้อมทั้งกฎหมาย บุคลากร งบประมาณ วัสดุอุปกรณ์และการบริหารจัดการ ส่วนภาคประชาชนต้องเตรียมความพร้อมด้วยการพัฒนาศักยภาพความรู้ความเข้าใจในฉลาก และ 2) ปัญหาอุปสรรคและข้อเสนอแนะที่สำคัญเกี่ยวกับระบบสากล GHS คือ (1) การจัดอบรมของเจ้าหน้าที่ภาครัฐของหน่วยงานหลัก และสถานประกอบการขนาดกลางและขนาดเล็ก (2) การเพิ่มความรู้ความเข้าใจฉลากของผลิตภัณฑ์สำหรับผู้บริโภคของประชาชน (3) การตั้งศูนย์ข้อมูลสารเคมีแห่งชาติ และ (4) การจัดประชุมระดับนานาชาติของประชาคมเศรษฐกิจอาเซียนเพื่อการปรับฉลากตามระบบสากล GHS

คำสำคัญ : การเตรียมความพร้อม การจัดการความปลอดภัยของสารเคมี ผลิตภัณฑ์สำหรับผู้บริโภคในบ้านเรือน ระบบสากล GHS ประชาคมเศรษฐกิจอาเซียน

***ผู้รับผิดชอบบทความ**

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Thailand Preparedness on Chemical Safety Management by Implementing GHS on Consumer Products towards ASEAN Economic Community

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Abstract

The objectives of this qualitative research were: 1) to explore the preparedness of the government, private, and public sectors in Thailand on chemical safety management by Globally Harmonized System of Classification and Labeling of Chemicals (GHS) on consumer products towards ASEAN Economic Community (AEC) and 2) to find problems, obstacles, and to offer suggestions for this management. Research respondents from 3 parties including government, private, and public sectors were selected by purposive sampling. They comprised twenty representatives relating to this management for in-depth interview and fifteen representatives of the Sub-Committee for Policy and Plan Co-Ordination on Chemical Management, National Strategic Plan on Chemical Management, and Laws under Hazardous Substance Act (1992) for focus group discussion. The research tools, which their content validity were verified by 5 experts on GHS, consisted of: 1) the structured in-depth interviewing form; and 2) the topics for focus group discussion. The data were analyzed by content analysis. These findings revealed that: 1) the government and private sectors should continue their preparedness on laws, personnel, budgets, materials and devices, and management. However, the public sector had to prepare GHS-based products labeling comprehensibility; and 2) suggestions for solving significant problems and obstacles were included : (1) providing of training on GHS for the main government officers and the small and medium-sized enterprises; (2) raising comprehensibility of product labels among consumers; (3) establishing National Chemical Agency as GHS-based chemical information center ; and (4) organizing the international forum of AEC for the development of labels in accordance with GHS.

Keywords: Preparedness, Chemical safety management, Household consumer product, GHS, ASEAN Economic Community

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Introduction

Globally Harmonized System of Classification and Labeling of Chemicals (GHS)⁽¹⁾ in 4 sectors in Thailand has been prepared and organized by the relevant agencies with an aim to improve chemical hazard communication towards various target populations. The competent agencies responsible for GHS implementation include important organizations; the Ministry of Industry, which is responsible for industrial chemicals, the Ministry of Agriculture and Cooperatives, which is responsible for chemicals in agricultural use, the Ministry of Transportation, which is responsible for transported chemicals, and the Ministry of Public Health, which is responsible for household consumer products.

In Thailand, an introductory enforcement of GHS in industrial sector has been issued since March 13, 2012, through the Notification of Ministry of Industry (2012)⁽²⁾ on Classification System and Hazard Communication of Hazardous Substances which chemical producers, or importers of substances and mixtures have to comply with GHS^(3,4). This regulation declares that hazardous chemicals for industrial sector

have to be classified and provided with labels and safety data sheets in GHS format. Besides, the transition periods of substances and mixtures are within 1 and 5 years, respectively. Therefore, it could be expected that Thai people would have low health risk from industrial chemicals usage.

According to the Notification of the Ministry of Industry (2012),⁽²⁾ Food and Drug Administration (FDA) has implemented GHS over hazardous substances/products for household and public health use, through the Notification of Ministry of Public Health on Classification System and Hazard Communication of Hazardous Substances under FDA control (2015)⁽⁵⁾. The Notification has been effective since March 20, 2015, with transition periods within 1 and 5 years for substances and mixtures, respectively⁽¹⁾.

Since Thailand has moved towards ASEAN Economic Community (AEC) in 2015, the Hazardous Substance Control Group under Cosmetic and Hazardous Substance Control Bureau of FDA, the main responsible organization, has been continually performed potential development and preparedness in various aspects of GHS to many of those involved. However, there have been

various problems from previous GHS implementation. Therefore, it is essential to study preparedness activities by the governmental, private and public sectors related to GHS and consumer products in Thailand, in order to support free trade of chemicals among ASEAN countries, to raise Thai product standard level, as well as to promote the products with international standard for health, environment and chemical safety among Thai and ASEAN consumers.

This research aimed: 1) to explore the preparedness of the governmental, private, and public sectors in Thailand on chemical safety management by GHS on consumer products towards ASEAN Economic Community (AEC); and 2) to find problems, obstacles, and to offer suggestions for this management.

Research Methodology

I. Respondents

(1) Respondents for in-depth interview: Twenty representatives of the relevant agencies/organizations related to chemical safety in consumer products were purposively selected according to the Fourth National Strategic Plan on Chemical Management (2012-2021) as follows:

Governmental sector: the relevant

representatives from FDA, Department of Industrial Works (DIW), Department of Agriculture (DA), Department of Labor Protection and Welfare, Office of the Consumer Protection Board, Thai Industrial Standards Institute (TISI), and Office of Industrial Economics.

Private Sector: the relevant representatives from the Federation of Thai Industries (FTI), Thai International Freight Forwarders Association, Hazardous Substances Logistics Association (HASLA), and Industrial Estate Authority of Thailand (IEA).

Public sector: the relevant representatives from Consumer Protection Association, Foundation for Consumers, Thailand Environment Institute (TEI), Ecological Alert and Recovery-Thailand (EARTH), Safety and Health at Work Promotion Association (Thailand) and the Network of Patient Groups from Work and of the Environment.

(2) Respondents for focus group discussion: Fifteen representatives of the Sub-Committee for Policy and Plan Co-Ordination on Chemical Management relating to the Fourth National Strategic Plan on Chemical Management (2012-2021) and Laws under Hazardous Substance Act (1992) were purposively selected and

suggested by Thai FDA based on their relevance and willingness to address their information.

Governmental sector: the relevant representatives from FDA, DIW, Office of the Protection Board, Customs Department, Department of Livestock Development, Department of Land Transport, and Department of Science Service.

Private sector: the relevant representatives from FTI, Hazardous Substances Logistics Association, Port Authority of Thailand, Thai Crop Protection Association, and Center of Excellence on Hazardous Substance Management.

Public sector: the relevant representatives from the Network of Patient Groups from Work and of the Environment.

II Research Tools

The research tools consisted of the structured in-depth interviewing form and the topics for focus group discussion. Content validity was verified by the GHS experts with the Item Objective Congruence Index (IOC) not less than 0.67.

This research was approved by the Human Research Ethics Sub-Committee, School of Health Science, Sukhothai

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The relevant representatives of chemical safety on consumer products were in-depth interviewed and the data were subsequently analyzed for focus group discussion. Thereafter, focus group discussion was arranged for the sub-committee representatives and the data were further summarized as the policy feedback on chemical safety management by implementing GHS on consumer products under FDA control. Finally, this feedback would be presented to the sub-committee afterwards for research summary.

Results

The preparedness of the governmental, private, and public sectors in Thailand for chemical safety management by GHS towards ASEAN Economic Community (AEC) could be summarized from in-depth interview and focus group discussion as follows:

(1) Law Preparedness should be done for Chemical Safety Management by Implementing GHS on Consumer Products towards ASEAN Economic Community

<i>Governmental Sector</i>	<p>1) Two Public Health Ministry's Notifications on Classification System and Hazard Communication of Hazardous Substances under Food and Drug Administration (2015) and Labelling of Hazardous Substance under Thai FDA (2015) were addressed within 1 and 5 years transition period for single substances and mixture, respectively.</p> <p>2) Review of control on some household hazardous substances with over control by lowering or cancelling control levels.</p> <p>3) According to the AEC, convenience and flexibility are necessary for chemical transit (for products exporting only, not included products importing to Thailand). Other relevant laws, e.g. the Hazardous Substance Act, should also be concerned and revised.</p> <p>4) DIW has announced and published the guideline for confidential business information (CBI) on the Department website. It provides the guidance for any companies who need DIW certification. All product ingredients would be declared, whereas self-certification can be done through customs pathway without DIW approval.</p> <p>5) Department of Land Transport has issued various laws relating to safety on land transport of hazardous substances in accordance with European Agreement Concerning the International Carriage of Dangerous Goods by Road (ADR) and GHS. Moreover, drivers must have the special driving licenses and knowledge on hazardous substances transport.</p>
<i>Private Sector</i>	<p>1) Organization and personnel policies would be obviously formulated. Therefore, knowledge and understanding would be adequately provided towards the relevant personnel in each sector.</p> <p>2) The Ministry of Agriculture and Co-Operatives and the Ministry of Labor have to accelerate relevant laws and regulations.</p> <p>3) According to the national control law of GHS-based products, the correct informative labels should be applied to both the import products (with Thai label) and the domestic products.</p>
<i>Public Sector</i>	<p>1) Pollutant Release and Transfer Registers Law (PRTR Law) should be formulated.</p> <p>2) Knowledge and understanding of rules and regulations between the government and private sectors should be consistent.</p>

(2) Personnel Preparedness should be done for Chemical Safety Management by Implementing GHS on Consumer Products towards ASEAN Economic Community

<i>Governmental Sector</i>	<p>1) Government officers of the relevant organizations formulating GHS-based laws have not yet received unique GHS knowledge.</p> <p>2) Department of Labor Protection and Welfare is still lack of personnel with GHS knowledge and understanding. The department has not yet monitored companies' compliance with the Regulation on Management Standard and Performance on Safety, Health, and Environment at Work with Hazardous Chemicals (2013).</p> <p>3) There are some problems of GHS implementation all over the country. In order to fulfill GHS knowledge for government officers in regional offices, the GHS trainings should be provided by regional universities.</p> <p>4) The government sector has to provide GHS training to the SMEs. This should be done with co-payment from the private sector or should receive some support from the large companies.</p> <p>5) GHS expert directory and network are crucial. Code of conduct should be available and provided. The directory should include the experts from the government, private, and public sectors.</p> <p>6) FDA should provide handbook on criteria of chemical hazard classification for officers and establish database of products, such as the safety data sheet (SDS) of the similar products, from one company since the database may be useful for other companies as well. It will result in decreasing of the budget for new chemicals classification. Moreover, it would lessen officers workload.</p> <p>7) FDA should provide service clinic for preparation of chemical –based product labels or consultation center for any manufacturers who are willing to pay this service fee.</p> <p>8) Thailand should be the catalyst to push GHS implementation to be the AEC policy target, which will lead to improvement of chemical management in this region.</p>
<i>Private Sector</i>	<p>1) Many companies, particularly SMEs which employ the informal labors, and the chemical-based community products enterprises. They have inadequate GHS knowledge, due to the problems in budget support and manpower.</p> <p>2) Department of Labor Protection and Welfare has to provide GHS knowledge to the officers, trade unions, formal and informal labors, as well as foreign workers.</p>
<i>Public Sector</i>	<p>1) Government officers have to communicate with people regarding household chemical safety. Some women, who lack of knowledge relating to community chemicals, have usually been involved through the direct sale.</p> <p>2) Chemical knowledge should be provided toward trade unions and labors. Some companies conceal the information of hazardous chemicals. Some foreign workers of NGOs have limitations of getting knowledge because of the language barriers. The Labor Network Councils have not yet known about GHS. Thus, GHS should be provided through trade unions and labor network.</p>

(3) Budget Preparedness should be done for Chemical Safety Management by Implementing GHS on Consumer Products towards ASEAN Economic Community

<i>Governmental Sector</i>	<p>1) Preparation of budget for GHS training is essential for creating capable government officer network to monitor the GHS-related law enforcement.</p> <p>2) Preparation of GHS training budget is also required for building capacity of manufacturers, in particular SMEs, and community product enterprises, to implement GHS, notably in the scope of chemical mixtures.</p> <p>3) Preparation of budget is needed for GHS knowledge dissemination towards workers who involve in chemicals handling.</p> <p>4) Preparation of budget is necessary for dissemination of GHS information to consumers through multiple channels of communication.</p> <p>5) There should be some budgets for facilitating GHS knowledge exchange in AEC.</p>
<i>Private Sector</i>	Chemical Industry Group of FTI has to prepare the budget for providing GHS knowledge and training, possibly with relevant government organizations, to assist SMEs and chemical-based community product business entities in terms of GHS training for capacity building.
<i>Public Sector</i>	Relevant public organizations have to prepare the budget for providing public relation media on GHS-based chemical safety.

(4) Preparedness of Materials and Devices should be done for Chemical Safety Management by Implementing GHS on Consumer Products towards ASEAN Economic Community:

<i>Governmental Sector</i>	<p>1) Concerned government laboratories should emphasize on physical hazard assessment in order to support the tests for law enforcement of GHS implementation, product registration of the private sector, development of GHS-based label and safety data sheet (SDS) for both domestic products and those of AEC, and appealing for consumer right by the public sector.</p> <p>2) Potential development of university laboratories with quality and standardization to support GHS implementation should be performed.</p> <p>3) Private laboratories providing GHS test service have to be promoted through GHS-service accreditation.</p> <p>4) Various GHS learning media on chemical-based consumer products to the public have to be developed and widely disseminated.</p>
<i>Private Sector</i>	<p>1) Potential development of manufacturers with large laboratory supporting GHS implementation should be done.</p> <p>2) GHS-based hazard communication in companies for their own workers should be promoted.</p>
<i>Public Sector</i>	<p>1) All laboratories in the Ministry of Industry, the Ministry of Public Health, Ministry of Agriculture and Co-Operatives, the Ministry of Science and Technology, and Universities have to be developed in terms of instruments, personnel, and skills.</p> <p>2) FDA has to provide GHS media for consumers corresponding with actual GHS labels in the market with existing law enforcement. The media should contain safety knowledge of household chemical products, product ingredients and their toxicities, product use, product advantages, possible danger, hazard protection, and personal protective equipment, etc.</p> <p>3) The Ministry of Labor should provide or promote development and construction of GHS learning media for workers, particularly, proper handling, storage, and chemical safety.</p>

(5) Management Preparedness should be done for Chemical Safety Management by Implementing GHS on Consumer Products towards ASEAN Economic Community:

<i>Governmental Sector</i>	<p>1) Various government organizations in each Ministry should be connected and then disclose pathway to approach their databases for relevant private organizations in order to increase information networks through existing private association such as FTI, Thai International Freight Forwarders Association, HASLA etc. DIW should be the main organization in providing harmonized information network program for deployment by other organizations.</p> <p>2) There are 6 lists of hazardous substances under DIW regulation, however, the list no. 5.6 reveals some substances or mixtures which have not been controlled by any organizations. Therefore, the producers or importers have to register for those substances if they are produced or imported for more than 1 metric ton per year. These registrations would be recruited as an information for existing domestic chemical list.</p> <p>3) National Chemical Agency as GHS-based chemical information center should be established in Thailand.</p> <p>4) DIW should allow manufacturers to have single submission with an aim to reduce chemical permission step or to process through DIW only. This submission would be effective in 2017 by information network linkage of 6 organizations.</p> <p>5) The Customs Department should focus on National Single Window of Chemicals based on World Customs Organization (WCO) tariff.</p> <p>6) Acceptance of test data results and accreditation of ASEAN laboratories should be promoted.</p> <p>7) A center for chemical information and policy monitoring in ASEAN should be established in Thailand in order to update the information and to promote Thailand to be the regional leader.</p>
<i>Private Sector</i>	<p>1) FTI has provided trainings on Product Safety Summary from ICCA Global Product Strategy with application of risk assessment to the company members.</p> <p>2) Center of Excellence on Hazardous Substance Management has collected chemical information under various relevant organizations for manufacturers' utilization.</p>
<i>Public Sector</i>	<p>1) National Chemical Agency should be established for providing Inventory Chemical Database. It should be an independent organization which is under the supervision of the national committee consisting of representatives from relevant government organizations, private sector, public sector and civil societies. This agency would be responsible for developing chemical information network.</p> <p>2) Knowledge on GHS-based laws should be provided to people since it is consumers' right to know the chemical safety information.</p> <p>3) Relevant organizations should monitor GHS-based products with complete chemical hazard information in order to promote consumers reading skill over product labels critically.</p> <p>4) People have to gather for consumer protection network to conserve consumer rights or to inform about non-conformed GHS products.</p> <p>5) The relevant government organizations should introduce the GHS Agenda into regional forums, particularly AEC, in order to promote implementation of GHS over consumer-based products.</p>

Discussion

DIW is the main organization in implementing GHS policy for developing chemical safety management in Thailand. Even though workload of the agency's officers is high, the community communication is hard to be implemented. The concerned manufacturers have to emphasize on chemical risk assessment in their companies.

FDA has been continuously implementing GHS in terms of formulating relevant legislation, training provision as well as information dissemination through various media. Awareness raising and comprehensibility development of Thai consumers has been done by provision of media and addition into educational curricula, refreshment of trainings among the GHS relevant FDA officers. A number of technical contributions from related agencies towards GHS implementation, and contents of multi-level training courses could be seen in documents and CD-ROM from UNITAR-Thailand Workshop Training and Capacity Building for the Implementation of the GHS in 2011⁽⁶⁾. Currently, DA has accelerated legislation formulation on regulation of agricultural

products. Additionally, FDA has integrated GHS development agenda into the Fourth National Strategic Plan on Chemical Management (2012-2021). Application of GHS in Thailand resulted in international standardization of chemical classification and labeling, protection of domestic consumer products, and facilitating Thai products to compete in international business. Moreover, development of national chemical safety has been sustainably promoted. In the future, Thailand should evaluate the effectiveness of national implementation of GHS by using the tools as suggested by Peterson *et al.*⁽⁷⁾. Chemical Industry Council has been contributing to GHS deployment by provision of meeting, seminar, and training, which collaborated with Responsible Care Project of FTI. HASLA has assisted in training company members, provided brochure to Map Taphut community, and distributed handbook of household product labeling. The Council is currently translating ICCA Guidance on Chemical Risk Assessment-Global Product Strategy (GPS), which will be used as training materials, to provide knowledge of international chemical safety management for the industrial manufacturers.

Private sector addressed the policy for GHS using in national chemical safety management as follows: 1) the government and private sectors should have closed collaboration such as in the workshop on ASEAN-JAPAN CHEMICAL SAFETY DATA (AJCSD) in Thailand; 2) chemical information database should be linked between the government and private sectors as well as the one-stop service of chemical submission which is now provided by DIW. In the future this service would be transferred to a central chemical agency; 3) risk-based labeling of household consumer products, implementation timeline and prioritized types of products according to GHS Purple Book should be determined; 4) according to the AEC, imported products has to be labeled in Thai as the domestic ones. Up till now there is no organization responsible for GHS-based label and SDS investigation. Law enforcement should be done based on hazardous type in some products, not covering all product types. Moreover, not only imported products should be attached with the risk assessment profile, but also the domestic products produced by Thai manufacturers; and 5) if Thailand is the first one in AEC to implement GHS-

labeled products, this would accelerate other ASEAN countries to follow.

Department of Labor Protection and Welfare has to control chemical business employers to pay attention on their workers who are at risk of chemical exposure. Another role of this department is related to disseminate GHS knowledge through www.oshthai.org for Thai employers and employees, whereas www.aseanoshnet.org is for AEC and other countries.

Problems, Obstacles, and Policy Suggestions to Chemical Safety Management on Household Consumer Products

1. The relevant respondents from the government, private, and public sectors have the concordant opinions that potential development among officers of main government organizations is needed. Since they have changed their duty, resulting in discontinuous GHS tasks. In addition, GHS knowledge and understanding is still lacking, therefore, the effectiveness of consultation with manufacturers is doubtful.

Policy Suggestions: Capacity development among concerned officers should be done in many ways such as

continuous trainings, provision of handbook for government officers who are in charge of consultation with manufacturers. There is a need for the establishment of GHS expert directory. These experts should be capable of delivering consultation towards business entities, with regard to chemical hazard classification, labelling and SDS development. In addition, National Chemical Agency should be established as the GHS-based chemical information center.

2. The relevant respondents has the concordant opinions that officers in the private sector which are under the regulation of Chemical Industry Council. In particular, the large and transnational companies have GHS knowledge and understanding from the Council's training or receive the information from the international companies. However, SMEs, packaging companies, and the community product companies still need technical development and supportive budgets for GHS implementation.

Policy Suggestions: The relevant government organizations should provide knowledge and trainings on hazard classification of mixture, relevant laws, and GHS-based implementation phase

by using networks of their own organizations or collaboration with other organizations as well as local universities or Industrial Estate Authority of Thailand.

3. People do not have an adequate knowledge and understanding on GHS.

Policy Suggestions: Dissemination and promotion of knowledge on product labels reading should be carried out before and after law enforcement of mixtures with existing labels in the markets. Moreover, media with modern information technology, community consumer networking, social asset in community, curriculum and subjects for students have to be provided. Receiving trainings on hazard communication and having previous experiences with chemical labeling were the most imperative factors. Training on chemical labeling should be integrated into the school curriculum⁽⁸⁾.

4. Lack of National Chemical Agency for GHS Implementation.

Policy Suggestions: National Chemical Agency should be established and responsible for: 1) inventory chemical database management, chemical registration based on chemical safety information, and chemical information linkage from relevant organizations for mutual deployment; (2)

chemical safety database; (3) labeling and SDS database collecting from chemical registration which are disclosed ; (4) the center for translation of label and SDS into various languages; and (5) the expert directory.

5. Pace of Law Change and Promotion of GHS towards AEC

Policy Suggestions: GHS-based consumer protection should be raised as the critical agenda in the international conferences of AEC in order to make each country perceived and have equality of chemical safety standard in chemical related business.

6. Adoption of GHS-Based Consumer Product Label

Policy Suggestions: Household chemical-based consumer product labels have to be implemented according to the Notifications of Ministry of Public Health on Classification System and Hazard Communication as well as labeling of Hazardous Substances under Food and Drug Administration (FDA) control (2015)⁶. Labels must have critical GHS components and comply with other requirements such as font size which should not be smaller than 1 mm. for more simplified reading. The manufacturers should use bold alphabets for clarity and use Tahoma font for area

saving etc. In case of lacking space on label, attachment is allowed to provide further information about chemical hazards and relevant precautions.

In conclusion, Thailand preparedness on chemical safety management of GHS-based consumer products needs much contribution from 3 parties including government, private, and public sectors. Problems and obstacles from the previous implementation have to be solved in order to move forward towards ASEAN Economic Community with awareness of chemical hazard.

Conflict of Interests :

The authors declare no conflict of interests.

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