

PALM-BASED INDUSTRIAL LIQUID CLEANERS

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Industrial cleaning chemicals are specialised chemicals used to clean and preserve many types of industrial equipment and facilities. They are intended to remove tenacious filth, grime, oil, and other contaminants from machinery, floors, walls, and other industrial surfaces. Industrial cleaning chemicals come in a variety of types, including detergents, degreasers, solvents, and acids. They are designed to meet specific cleaning needs, such as removing tough stains, disinfecting surfaces, and protecting equipment from corrosion and damage. Industrial cleaners contain various chemicals that can have different toxicity levels that are harmful to humans and the environment and pose a challenge due to strict environmental regulations. Palm-based industrial liquid cleaners with clay is a potential replacement for hazardous industrial cleaning chemicals (Figure 1).



Figure 1. Palm-based industrial liquid cleaners with clay.

THE TECHNOLOGY

MPOB has developed a series of formulations of industrial liquid cleaners for all types of surfaces, kitchen tools and utensils, handwash and logistic series such as cargoes, shipping containers and tanks (Figure 2). It can also be used for cleaning *najis* in accordance with Islamic regulations.



Figure 2. Industrial liquid cleaners can be used for all kinds of surfaces, kitchen tools and utensils, handwash and logistic series such as cargoes, ship containers and tanks.

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NOVELTY OF THE TECHNOLOGY

Palm-based industrial liquid cleaners concerning liquid detergent comprising methyl esters sulphonates (MES) and 1%-6% stable clay suspension (Figure 3). This formulation follows the Fatwa of Jabatan Kemajuan Islam Malaysia (JAKIM) and the Malaysian Standard MS 2400:2010 for halal supply chain management, which states that the use of more than 0.6% to 2.5% clay in water is permissible according to the Islamic cleaning principle. The product serves not only as a disinfectant and cleaning agent but also as a *sertu* system (JAKIM, 2013).



Figure 3. Clay powder.

The composition of this invention was tested for stability, cleaning effect and irritation. The physicochemical tests and the efficacy tests have shown that the cleaning ability is superior to that of ordinary liquid and clay and that it is non-irritating. Moreover, it has been analysed as a cleaning agent with antibacterial properties. The deep cleansing efficacy could be due to the synergistic effect of clay as an abrasive and scrubbing agent together with bacterial cell wall destruction mechanism by MES as an anionic surfactant, without any adverse side effects.

BENEFITS AND ADVANTAGES

Palm-based industrial liquid cleaners with clay has:

- Excellent antibacterial properties and passed the microbiological test as the result of microbial plate count for the total bacterial, *E. coli*, *S. thypimurium* and *S. aureus* were not detected (Inhart Laboratory, 2018).

- Excellent cleaning performance based on soiled removal of CS103 (wine), CS 75 (blood/beef) and AS 12 (pigment, groundnut oil and milk). No potential for skin irritation based on *in vitro* reconstructed human epidermis test. Readily biodegradable when tested according to the OECD 301D standard test method.
- A sanitising detergent that achieves a level of cleanliness through the Sharia ritual cleansing and sanitising method, which can be used for *sertu* according to the hygiene level using lightning MVP.
- Suitable and feasible for the Halal Assurance Management System outlined by HAB HALAL JAKIM, including HALAL standards and schemes from the Department of Standards Malaysia.

MARKET ANALYSIS

The industrial cleaning chemicals market is estimated at USD53.50 billion in 2023 and is projected to reach USD67.00 billion by 2028, at a CAGR of 4.6% from 2023 to 2028 (Figure 4). Factors such as workplace hygiene initiatives and increasing concern for a healthier environment are positively driving the growth of the industrial cleaning chemicals market. Furthermore, the rising demand from various applications post COVID-19 pandemic is driving the market. By application, the industrial cleaning chemicals market has been segmented into manufacturing and commercial offices, healthcare, retail and food service, hospitality, automotive and aerospace, food processing, and others (Kamlesh, 2023).

Global Industrial Cleaning Chemicals Market

Market forecast to grow at a CAGR of 4.6%

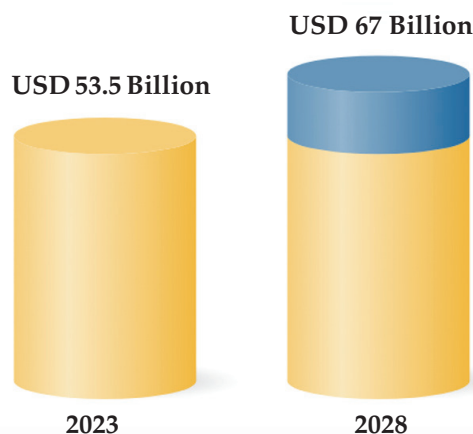


Figure 4. The industrial cleaning chemicals market.

ECONOMIC ANALYSIS

The estimated investment cost for palm-based industrial liquid cleaners with clay is given in Table 1 below:

TABLE 1. ECONOMIC ANALYSIS OF PALM-BASED INDUSTRIAL LIQUID CLEANERS

Economic analysis	Value
Estimated cost of liquid cleaners' plant	RM420 000
Production capacity	90 tonnes per year
Internal rate of return (IRR)	53.32%
Net present value (NPV)	RM867 010
Payback period	3 years

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