

BIOMICROGEL[®] REAGENTS FOR PALM OIL EXTRACTION

It will help you to extract more vegetable oils and reduce losses without major capital investments or additional equipment

- ✓ Increases CPO production volume more than 5%
- ✓ Reduces oil losses in heavy phase and solid more than 30%
- ✓ Increases oil extraction in empty fruit bunches more than 10%



BIOMICROGEL® REAGENTS FOR PALM OIL EXTRACTION: PROBLEMS TO BE SOLVED

The process of producing palm oil has not changed for the last 50 years.
We have just improved it so you can earn more and:

- 🌿 Increase OER (CPO extraction)
- 🌿 Reduce oil losses
- 🌿 Make oil processing faster and easier
- 🌿 Save money on expensive equipment
- 🌿 Reduce water consumption
- 🌿 Not affect the quality of the oil or its characteristics



BIOMICROGEL® FOR PALM OIL EXTRACTION: HOW IT WORKS

Biomicrogel® is a new technology for production of biopolymers from agricultural waste

These biopolymers substitute standard synthetic polymers, making oil extraction more efficient, cost-effective and sustainable

Watch Biomicrogel® effect in our YouTube video



Food Grade
CELLULOSE



Food Grade
BEEF PECTIN

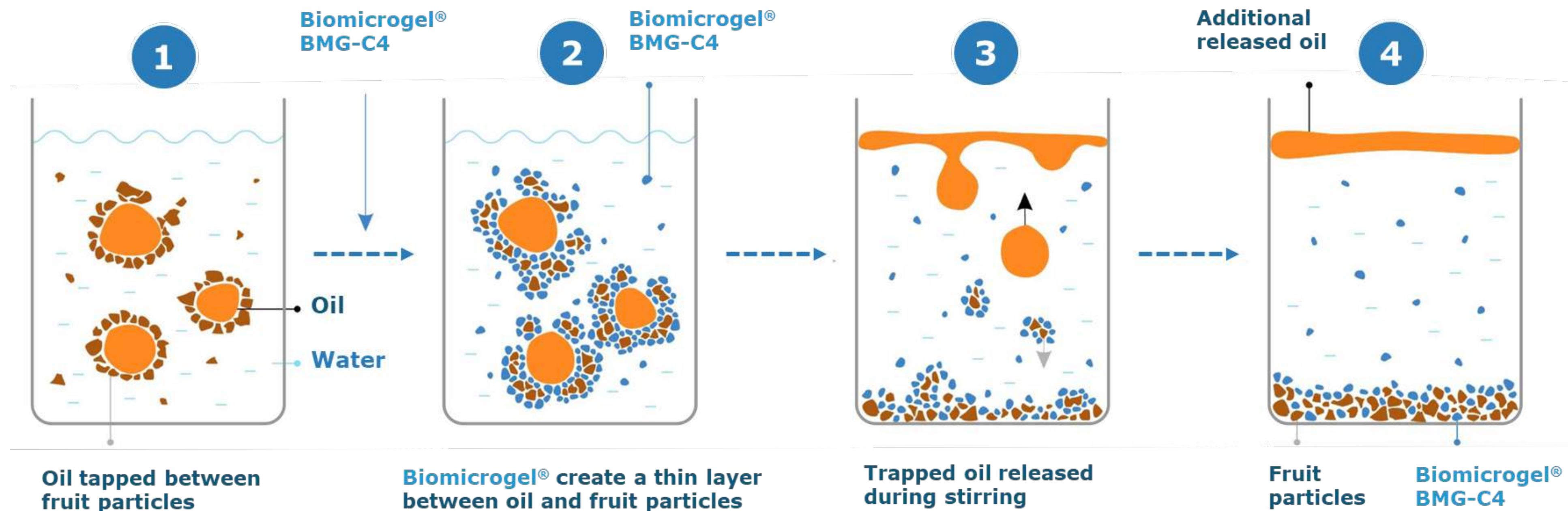


Food Grade
APPLE PECTIN



BIOMICROGEL® FOR PALM OIL EXTRACTION: HOW IT WORKS

Biomicrogel® helps to release oil trapped between fruits residue, boosting oil extraction











- Biomicrogel® added to DCO forms a biopolymer nanolayer on the surface of suspended solids in the sludge, speeds up oil extraction in the clarifier
- Negatively charged biopolymer molecules are attached to positively charged solid particles' surface and repel droplets of oil



BIOMICROGEL[®] FOR PALM OIL EXTRACTION: ADVANTAGES

Biomicrogel[®] presents significant advantages for factories to increase productivity without CAPEX investments and translates in attractive Economic Value Added effect

-  Increases OER extraction by 0.5-1.3 p.p. for CPO, and 15 p.p. for SPO
-  Reduces extraction time and water consumption up to 50%
-  Reduces oil losses in Underflow, Heavy Phase, Cake and Mill effluent (POME)
-  Reduces moisture content in SPO (from 17% to 0.9%)
-  Works with temperatures up to 100°C and does not affect the quality of the oil
-  No changes needed in Mills operating procedures, low implementation and running costs
-  BMG can be dissolved in hot or cold water
-  Works with Empty Bunch Liquor and Palm Kernel Oil



BIOMICROGEL® FOR PALM OIL EXTRACTION: PRODUCTS

Biomicrogels Group offers several solutions in Upstream and Downstream of palm oil extraction process



BMG-C4

Increases vegetable oil extraction and reduces oil losses



BMG-SPO

Extracts 25% more quality SPO twice as fast without additional equipment



BMG Dosing Station

Easy to integrate and operate with low running costs

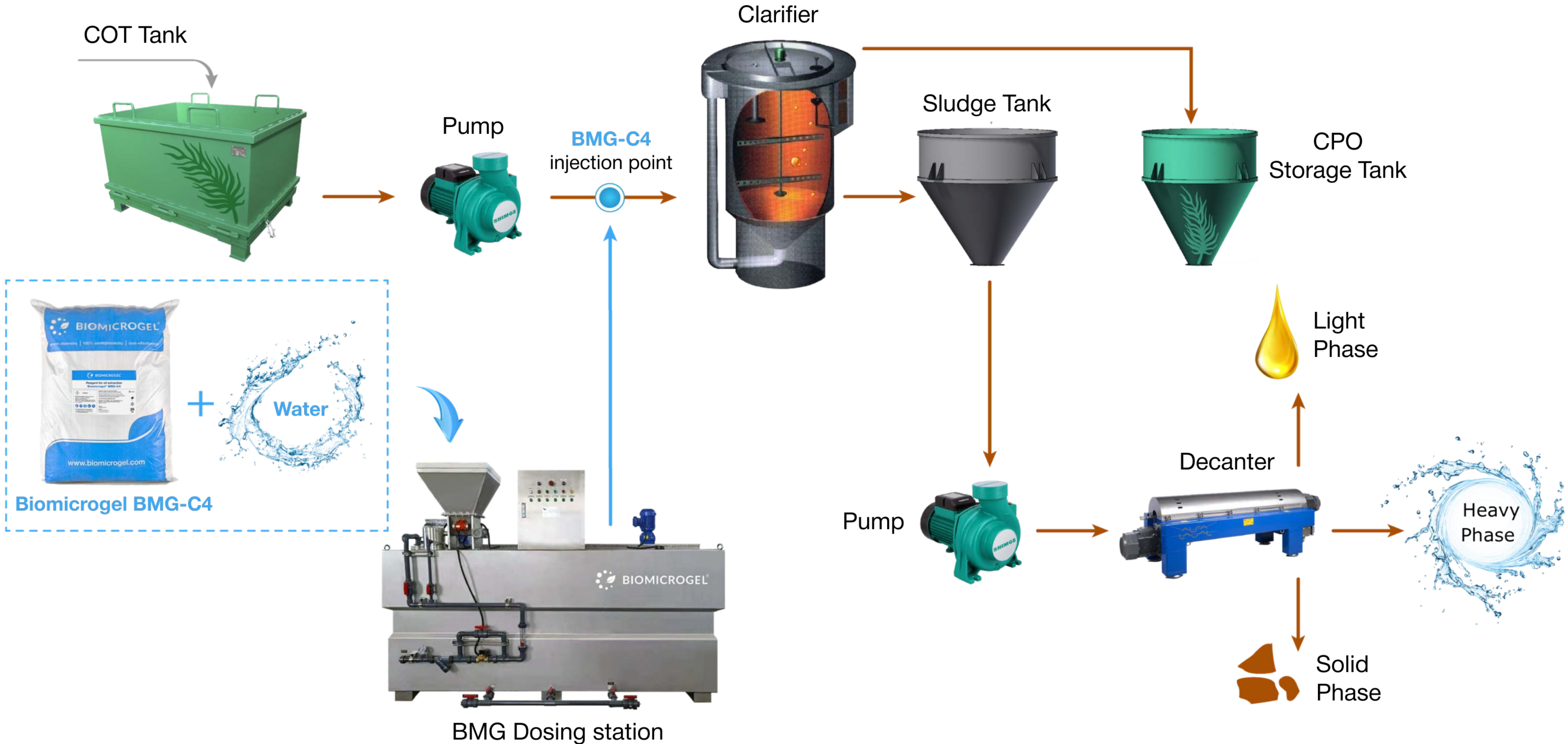


BMG HERO

Recovers 80% of oil in POME



BIOMICROGEL® FOR PALM OIL EXTRACTION: INTEGRATION IN PALM OIL MILL PROCESS

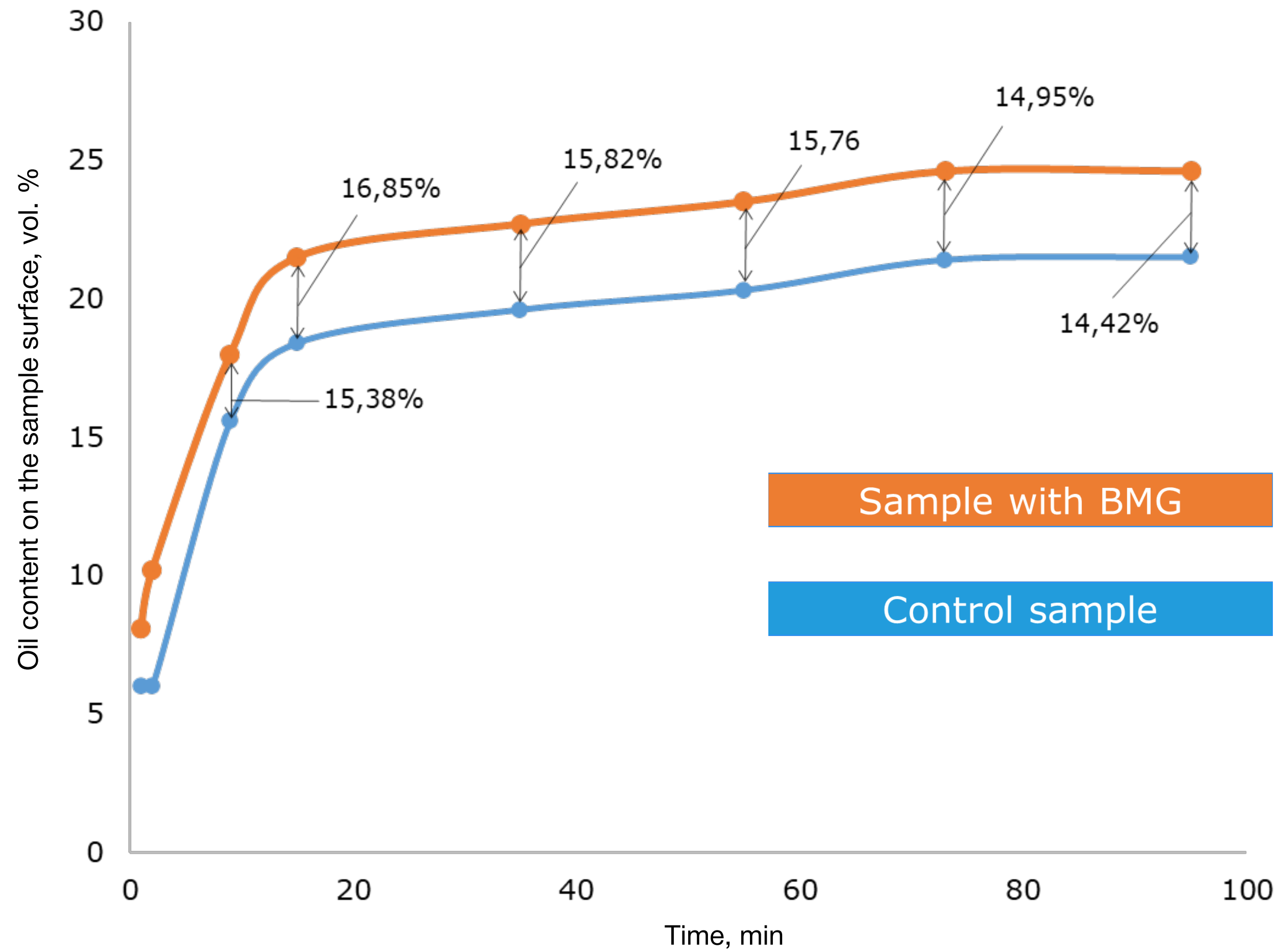


Mills operating procedures remain the same.

BMG solution integrates without major costs and changes to the extraction process



BIOMICROGEL® FOR PALM OIL EXTRACTION: LAB TESTS RESULTS



Oil level vs time curve, 3% BMG solution, Dosing 1 g/l

We carried out multiple tests at Indonesian and Malaysian factories and each of them showed increase in oil extraction by up to **10-80%** after one hour



BIOMICROGEL® FOR PALM OIL EXTRACTION: LAB TESTS RESULTS – SLUDGE PALM OIL

Task

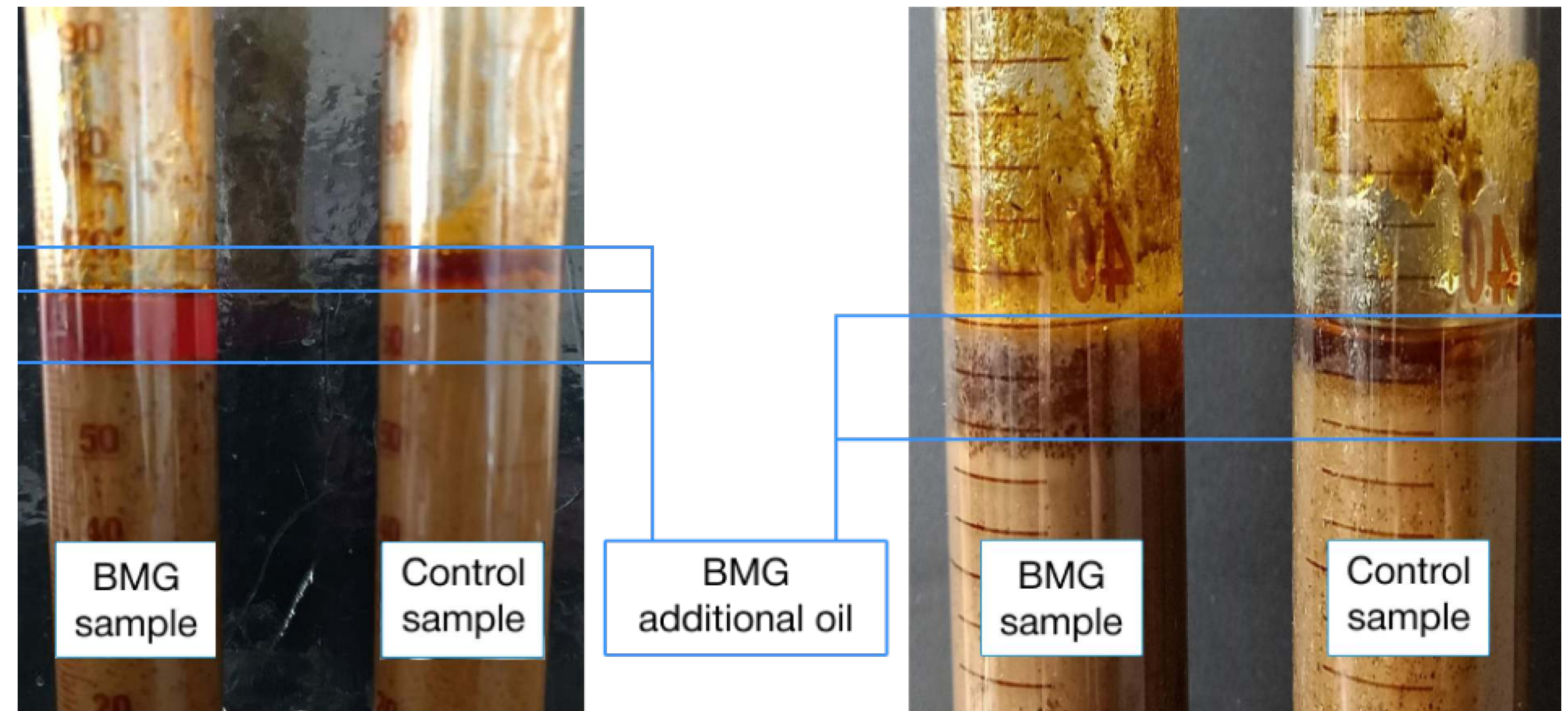
Demonstrate BMG effect in lab tests

Lab test method

- COT and Underflow samples taken
- Biomicrogel® BMG-C4 used in BMG tube
- Control tube and BMG tube placed in the water bath, heated to 90°C

Results

- Increased oil layer in COT sample by 100% after 75 minutes of settling
- 10 mm of oil in Underflow sample vs 5 mm in Control sample after 60 minutes of settling



COT sample

Underflow sample



BIOMICROGEL® FOR PALM OIL EXTRACTION: LAB TESTS RESULTS – SLUDGE PALM OIL

Task

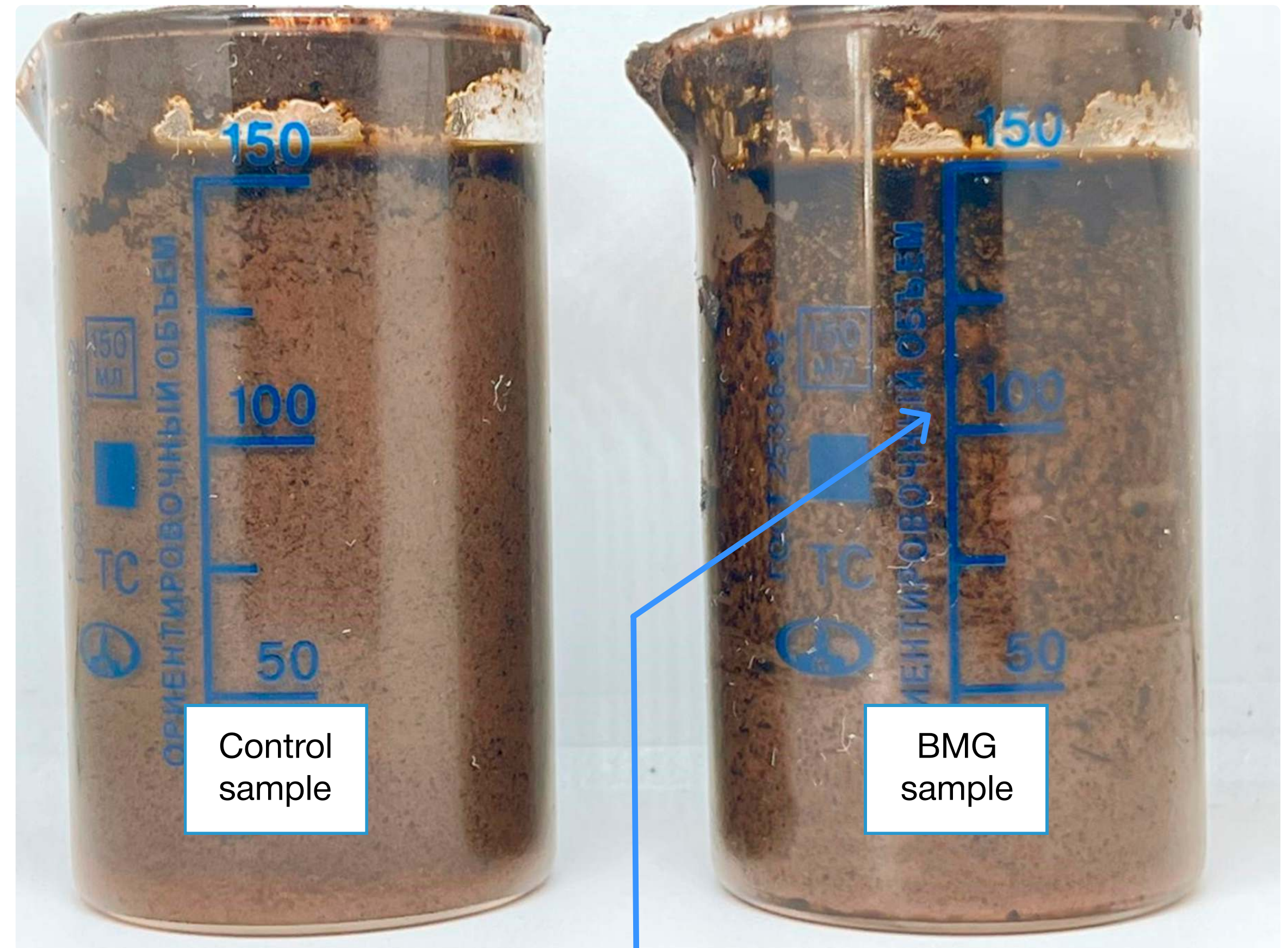
Demonstrate BMG application for Sludge Palm Oil

Lab test method

- Sludge palm oil samples taken
- Biomicrogel® BMG-C4 used in BMG tube
- Control tube and BMG tube placed in the water bath, heated to 90°C

Results

After one hour BMG extracts 28-40% more oil, and oil in sludge looks better separated from solid



Visible oil separation after 1 hour



BIOMICROGEL® FOR PALM OIL EXTRACTION: HERO EQUIPMENT RESULTS

- HERO – High Efficiency Recovery Oil equipment for extracting oil from POME
- 6 contracts signed including Felda and Felkra Groups
- HERO can recover 80% of oil in POME after 1 hour retention time
- Recovered oil in the latest case in Malaysia had FFA 10.09% and moisture 0.44%



BIOMICROGEL® FOR PALM OIL EXTRACTION: PRODUCT EXAMPLE



Physical properties of BMG-SPO

Aggregate state	Powder
Color	Varies from beige to yellow-brown
Bulk density	0.6 - 0.7 g/m ³
pH of 1% water solution	5.5 - 6.5

Package

BMG-SPO is supplied in 20 kg bag



BIOMICROGEL® BMG-SPO

TECHNICAL INFORMATION

Application

BMG-SPO is used as a working solution with a concentration of no more than 1%.

Stirring speed — 900 rpm (until a funnel forms).

Mixing time — 60 minutes (or until completely dissolved)

The working solution is dosed into sludge before the settling stage. Working solution and 25% of water are simultaneously added to sludge. BMG-SPO can be dissolved in the added water, or prepared separately in a smaller volume

Recommended dosage

Recommended consumption of BMG-SPO:

- For dry product — 1 kg/m³ sludge;
- For working solution — 100 l/m³ sludge.

To clarify the optimal dosages of BMG-SPO, it is recommended to conduct laboratory tests and/or industrial trials

Storage

BMG-SPO is recommended to be stored in closed, ventilated warehouses under conditions that prevent exposure to precipitation and dust, protected from direct sunlight, at temperatures from +5 to +35 °C

Guaranteed shelf life in original packaging, subject to transportation and storage rules, is 36 months from the date of manufacture, after opening the package — 7 days, subject to storage conditions. The shelf life of the working solution — 3 days

Safety data

Sodium carboxymethyl cellulose, (CAS-No.) 9004-32-4, (EC-No.) 618-378-6
BMG safety confirmed by independent expertise in test centers in Malaysia and Indonesia

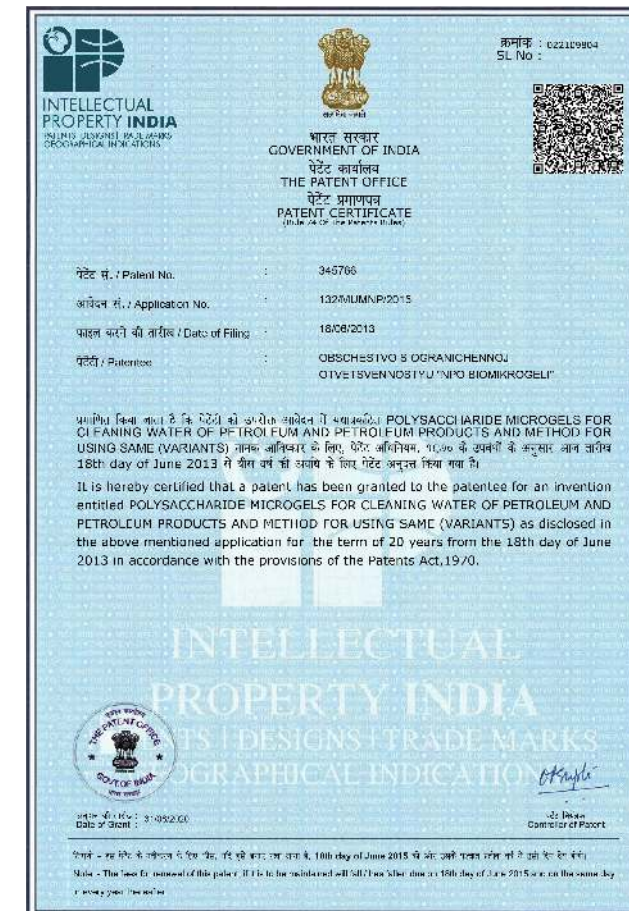


BIOMICROGELS GROUP: ABOUT THE COMPANY

We have been producing industrial reagents for more than 12 years
Registered more than 100 patents globally

Our products are applied for:

-  Home care and cosmetics products
-  Mineral processing
-  Industrial wastewater treatment
-  Vegetable oils extraction



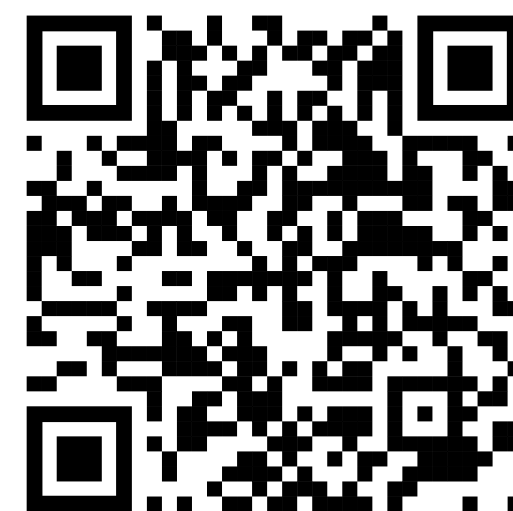
Recognized as a game changer by the Palm Oil leading experts:

BUSINESS **BERNAMA.com**

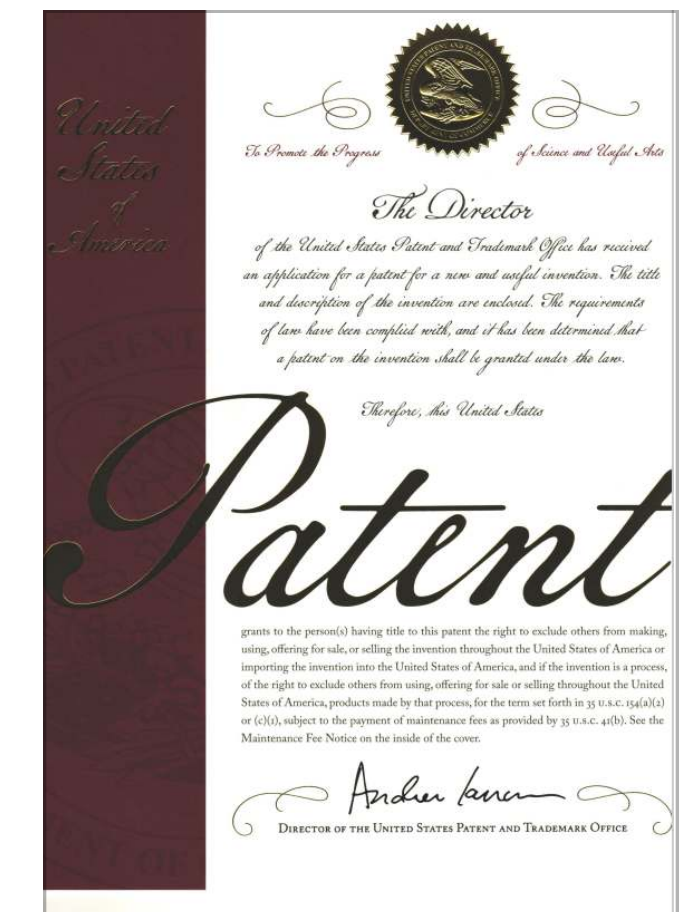
BIOMICROGELS GROUP INTRODUCES PRODUCTS TO OPTIMISE PALM OIL PRODUCTION IN MALAYSIA



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BIOMICROGELS GROUP: ABOUT THE COMPANY

Product development for customer needs

- 🌿 Own research and development center
- 🌿 4 modern laboratories
- 🌿 Doctor and candidates of chemical sciences on staff

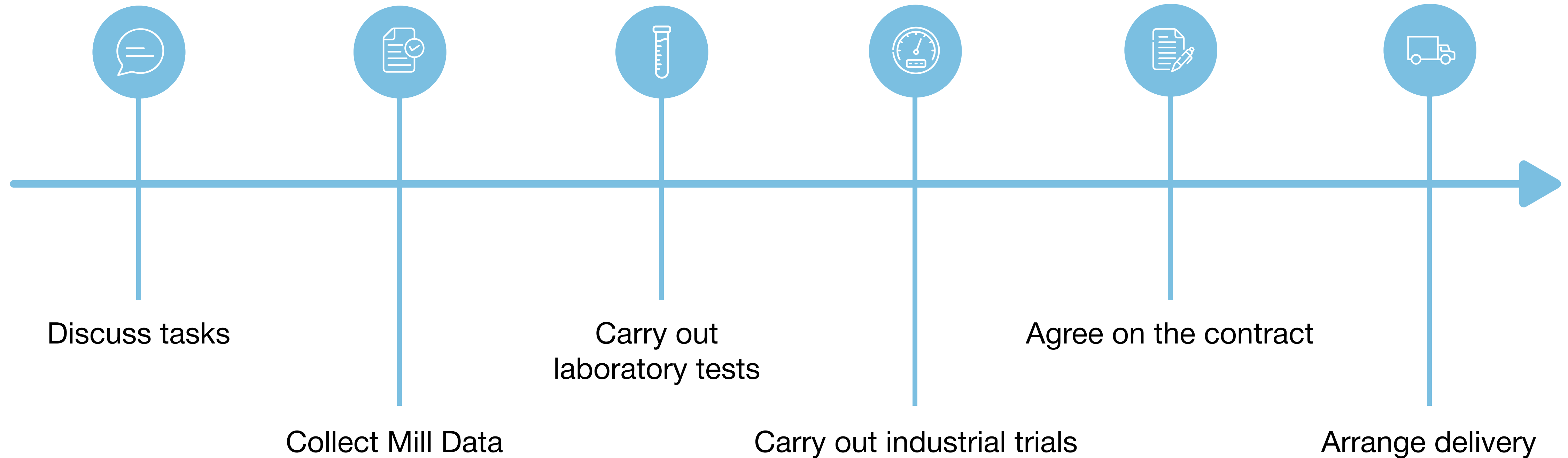
Modern manufacturing

- 🌿 3000 m² production area
- 🌿 10 tons of finished products per shift
- 🌿 600 m² warehouse area



BIOMICROGELS GROUP: BMG IMPLEMENTATION FLOW-CHART

We collect samples, conduct laboratory and industrial tests, and accompany you at all stages
Before delivery, we will prove that Biomicrogel[®] products are guaranteed to solve your tasks



BIOMICROGELS GROUP: AWARDS



Winner in the «Green Development» category
in the BRICS Innovation competition 2023



The Best Tech Company at G20,
Italy 2021



«Seal of quality» of the European program
on implementation of innovations Horizon 2020



Included in the ranking of the 100 most
promising companies in the world



Winner of the international innovation
development program Poland Prize




«Best Technology» at the international
environmental award EWA AWARDS 2020



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