BIO-SURFACTANTS FOR THE PALM OIL MILLING INDUSTRY

Sovereign Innovations Sdn. Bhd

eOx®

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SPEC (Sovereign Palm Oil Extractor - Cleanser)

BIO – SURFACTANT THAT ENHANCES OIL EXTRACTION & CLEANSES POME

Introduction to Sovereign Innovations

- Sovereign Innovations Sdn Bhd (SI) is a Malaysian Bio-Tech company.
- Collaboration with eOx International b.v. of the Netherlands in R&D and Production of Bio-Based Nano-Surfactants using Palm Based Oils.
- Successfully tested Ester Bio-Surfactant solutions are being commercially used in the Agricultural, Fisheries, Industrial and Pharmaceutical sectors locally and internationally
- Distributed & marketed by Bloomina Agrilife Sdn Bhd in Malaysia and Indonesia.

eOx-SOV Lipid Ester Classification

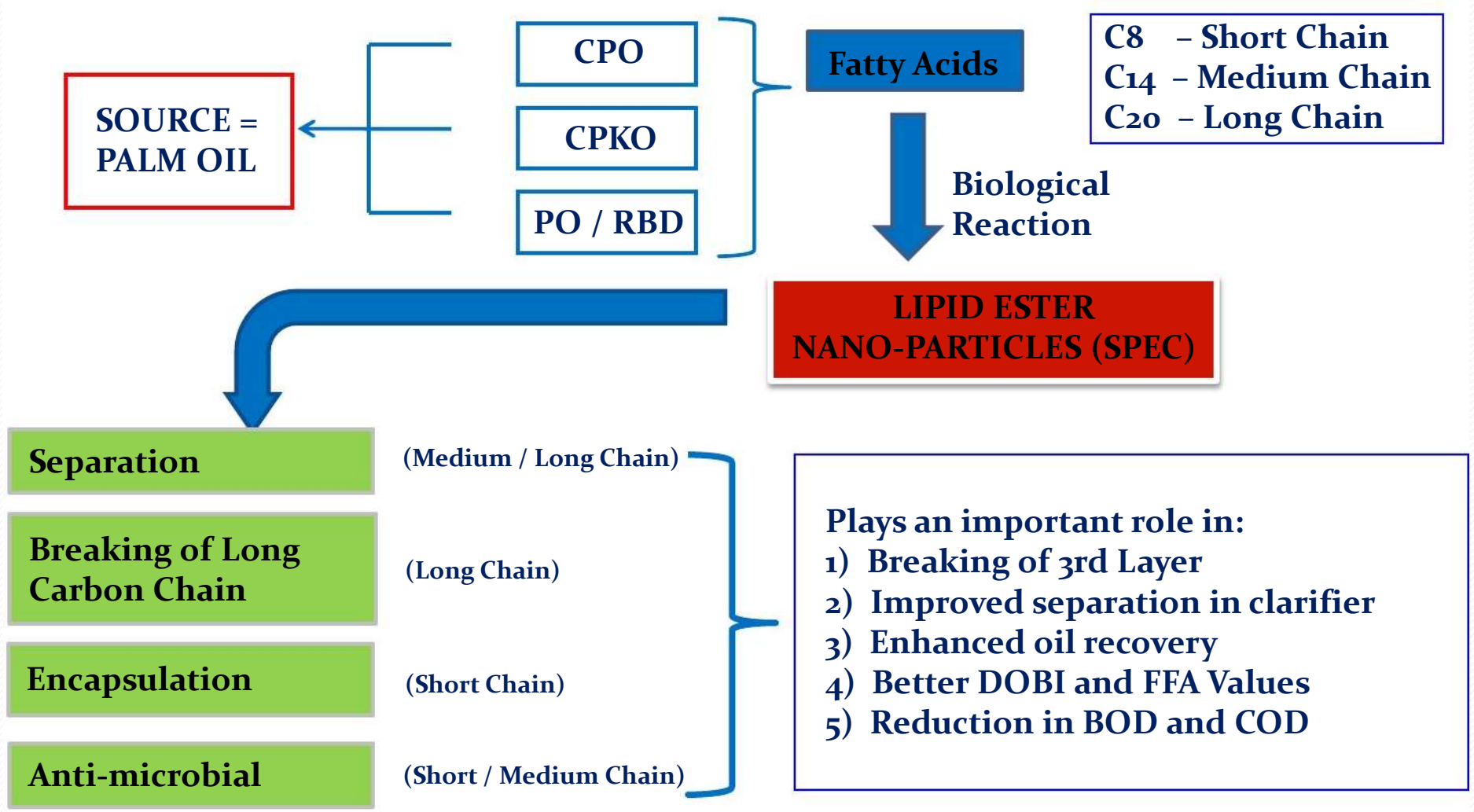
This product is manufactured under the controls established by a Bureau Veritas Certification approved management system that conforms with:

i)HACCP based Food Safety System, June 2006. Bureau Veritas Certification Number – NL0087551-1 and

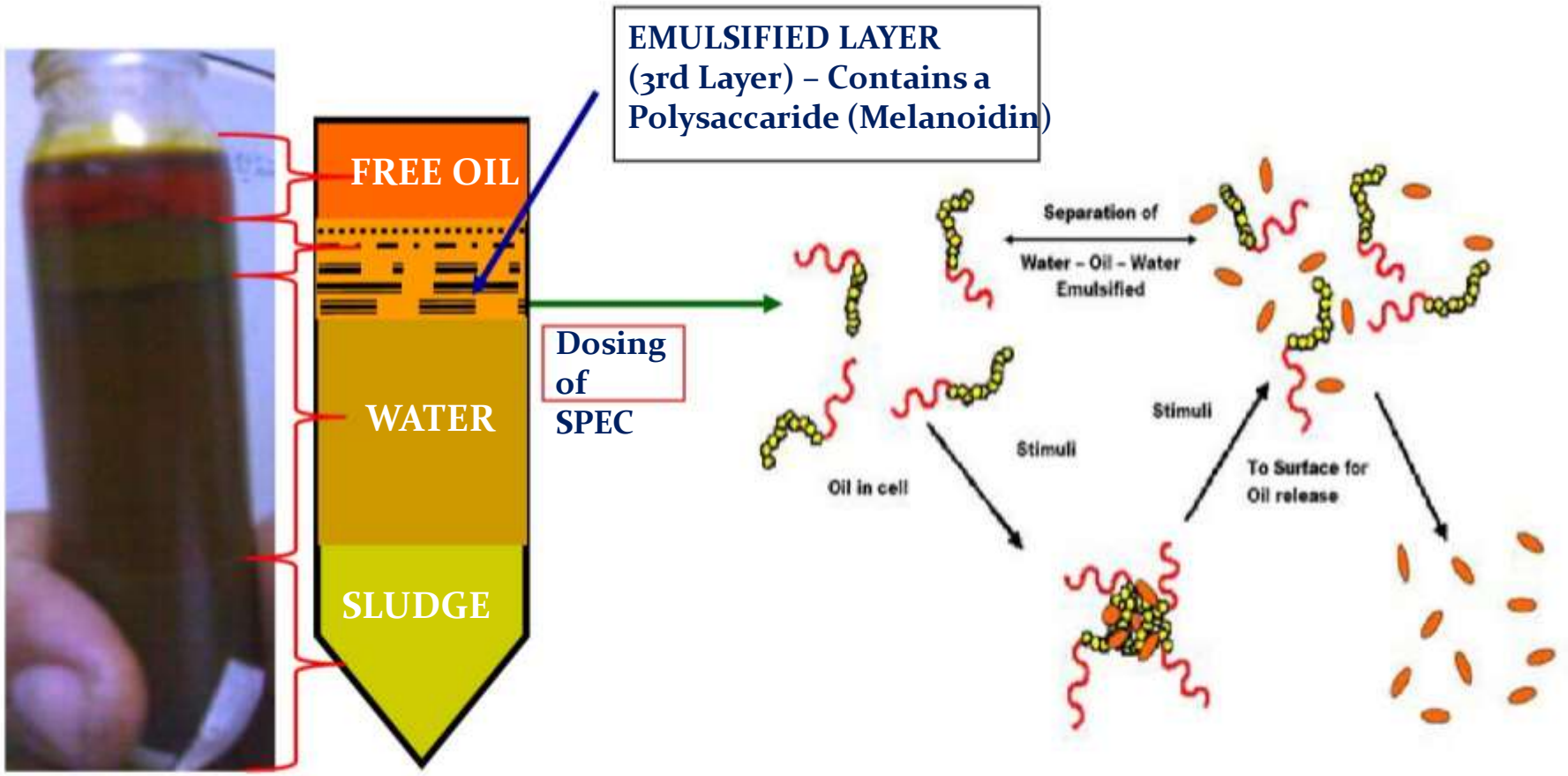
ii) ISO9001:2008 (Bureau Veritas Certification Number – Q209278

SPEC

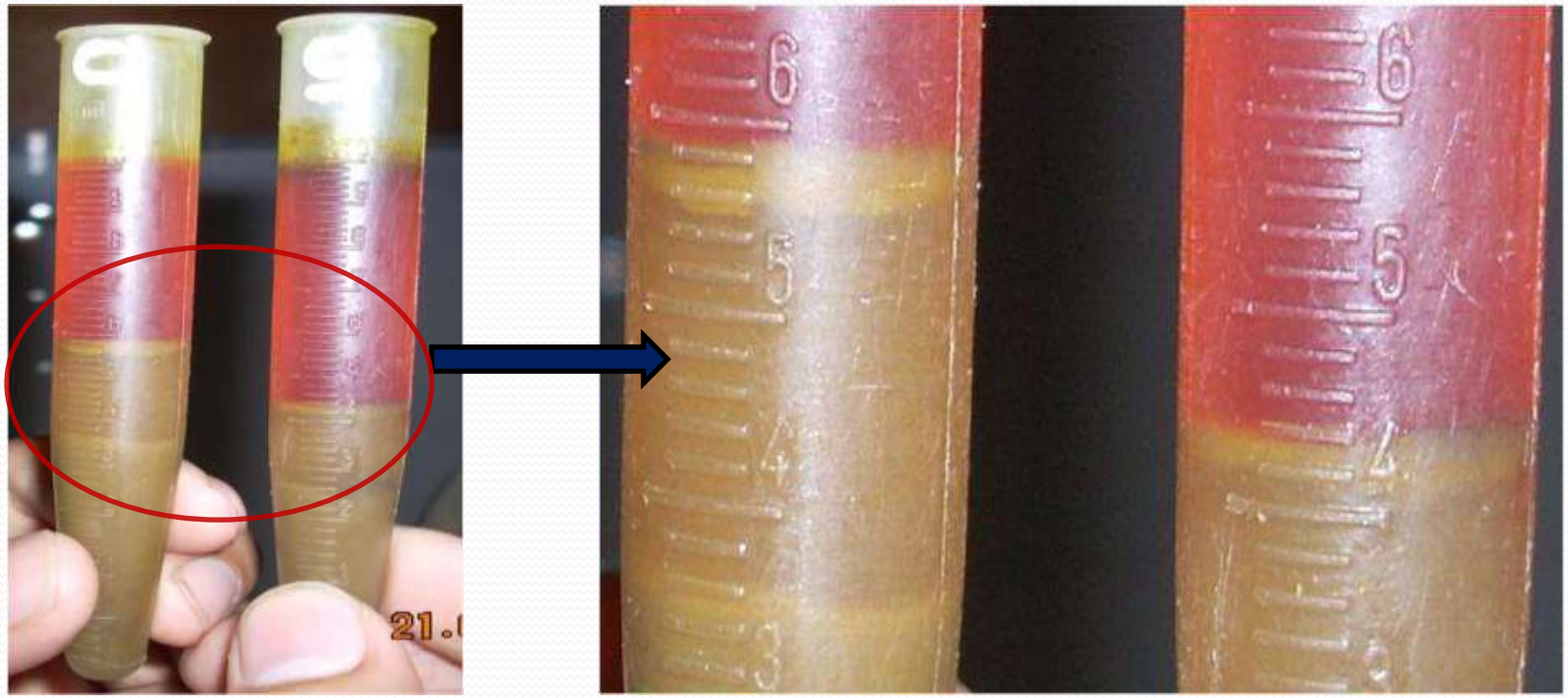
The Role of Fatty Acids in SPEC



Workings of SPEC with Emulsion



Results in Mill Lab Trials - Spin test



Control SPEC Control SPEC

Spin test shows sample dosed with SPEC to be 54% oil content while control (no SPEC dosing) has around 41% oil content.
Smaller 3rd layer can also be seen on sample with SPEC.

SPEC Dosing System into DCO Tank (Trial Sample)

Dosing of SPEC 0.056 –0.062%/ton

Double ball valve to control effective dosing

Simple setup for field trial application. No CAPEX needed. Final Dosing setup depending on mill design and dimensions

Benefits of SPEC

- Revenue enhancement almost immediately
- No CAPEX required
- Increases production (OER) by 0.3% - 0.6% (2 – 4 tons/day) in a typical 40 to 60 ton mill running for 15 hours a day.
- Enhances DOBI and reduces FFA values
- Improves P.O.M.E. cleansing – reduces:

  1) Total Solids (TS)

  2) BOD & COD levels reduced significantly

  3) Reduces Retention Time needed in anaerobic pond
- Improves Biogas quality and economics

CONCLUSION

SPEC + Existing Milling Process
= NEW REVENUE + Other Value Adds

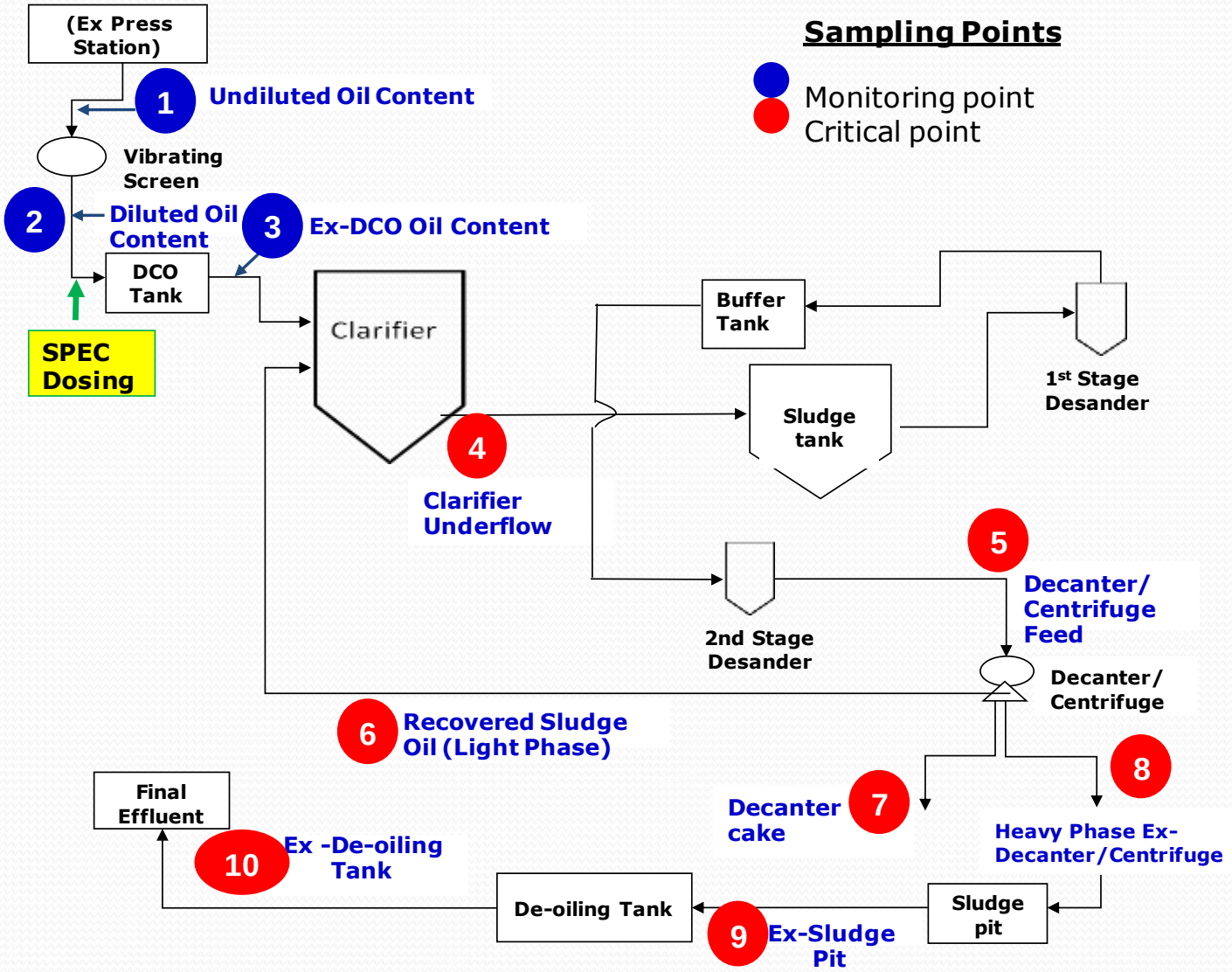
- SPEC enhances Palm Oil Mill revenues whilst increasing compliance with ever more stringent Ecological and Environmental standards – RSPO = Additional Carbon Credits
- SPEC has the ability to recover oil that is currently permanently lost in the milling process
- Cost of SPEC negligible compared to enhanced revenues generated

Mill In-process Sampling and Analysis Procedure

Sampling Point	Samples Analysis
1. Crude Oil Composition ex Press Station (without dilution)	• Spin Test (% Oil, % VM & % NOS)
2. Crude Oil Composition ex Press Station (with dilution) after vibrating screen	• Spin Test (% Oil, % VM & % NOS)
3. Crude Oil Composition ex DCO tank	• Spin Test (% Oil, % VM & % NOS)
4. Clarifier Underflow	• Spin Test (% Oil, % VM & % NOS) • Oil Content Analysis (% Oil (OLWB,OLDB), %VM & % NOS)
5. Ex-Sludge Tank/Decanter Feed Composition	• Oil Content Analysis (% Oil (OLWB,OLDB), %VM & % NOS)
6. Decanter/Centrifuge Light Phase	• Spin Test (% Oil, % VM & % NOS) • Oil Content Analysis (%VM & % NOS)
7. Decanter Cake	• Oil Content Analysis (% Oil (OLWB,OLDB), %VM & % NOS)
8. Decanter/Centrifuge Heavy Phase	• Oil Content Analysis (% Oil (OLWB,OLDB), %VM & % NOS)
9. Ex-Sludge Pit	• Oil Content Analysis (% Oil (OLWB,OLDB), %VM & % NOS)
10. Ex-De-oiling Tank	• Oil Content Analysis (% Oil (OLWB,OLDB), %VM & % NOS)
Others	• OER (%) • Production oil quality - FFA(%), DOBI • Raw Effluent – Test on BOD level

*Oil content analysis using Soxhlet Extraction (Hexane) – Nos. **4,5,7,8,9 & 10**
*Sampling shall commence after **2 hours** of mill operation and to be taken at **two hourly** intervals for spin test and **hourly composite** for hexane test (Oil Content Analysis)

Mill In-process Sampling Points



THANK YOU