



select<sup>®</sup>  
adsorbent technology



# ADSORBENT TECHNOLOGY

For Edible Oils & Biodiesel

Select® is a specially modified, natural silicate for the removal of soaps, metals and phospholipids to help in the production of clean, quality edible oils and biodiesel feedstock that meet the most demanding specifications.

Our Select products originate from a unique mineral deposit located near Ochlocknee, Georgia. The minerals in this region feature a large, highly active surface area well suited for the removal of impurities from oil streams.



# PROVEN & RELIABLE PERFORMANCE

- Strong affinity for adsorbing soaps, phospholipids, and trace metals
- Potential reduction in bleaching clay use
- Effective on a variety of feedstock oils
- Promotes higher flash point, lower cloud point, and effective glycerin removal in biodiesel

# select<sup>®</sup>:edible oil

adsorbent technology

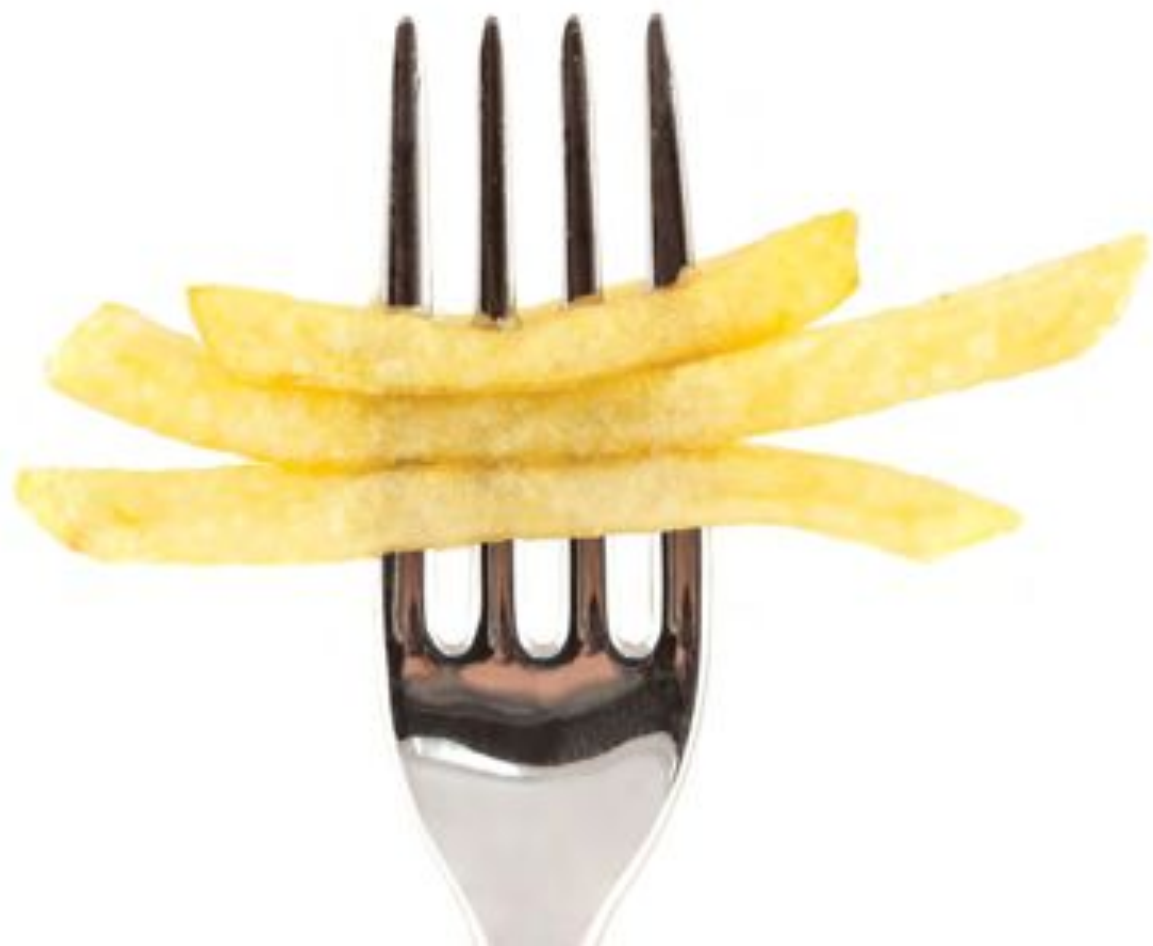
## PRODUCTS

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select:350

select:450

Our edible oil purification technology maximizes the adsorption of impurities that negatively impact oil quality. Using Select purification technology may also allow for the reduction of bleaching earth use in your process.



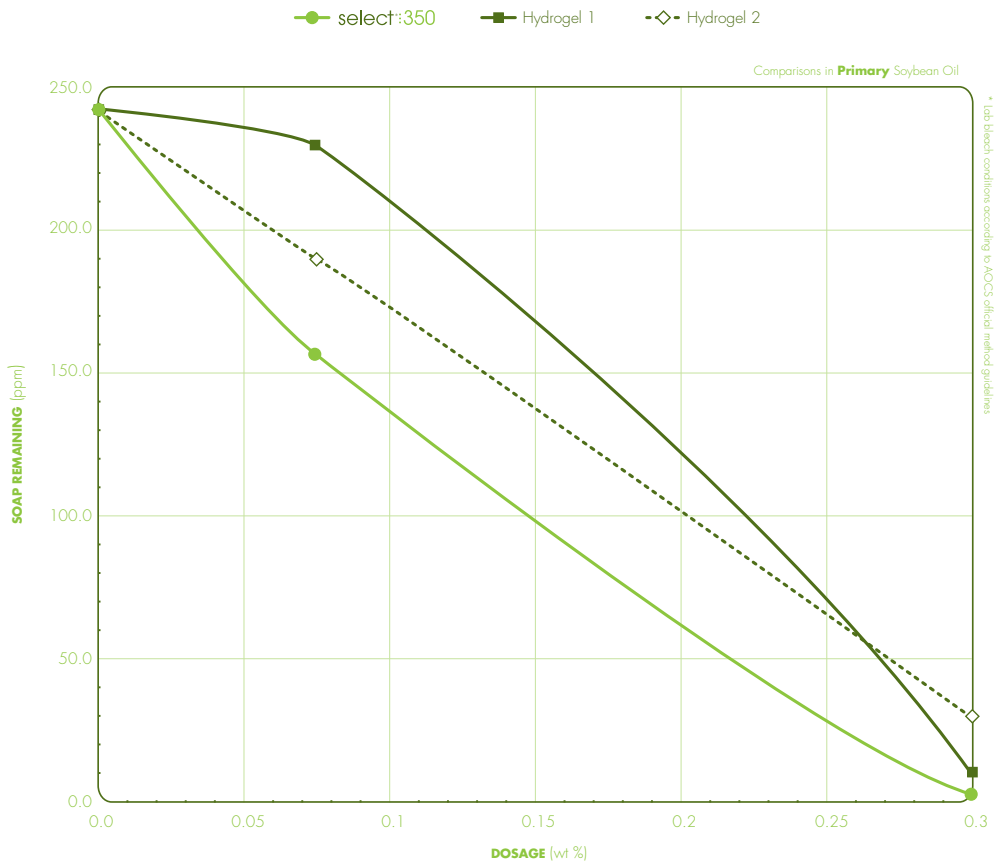
# ADSORPTION

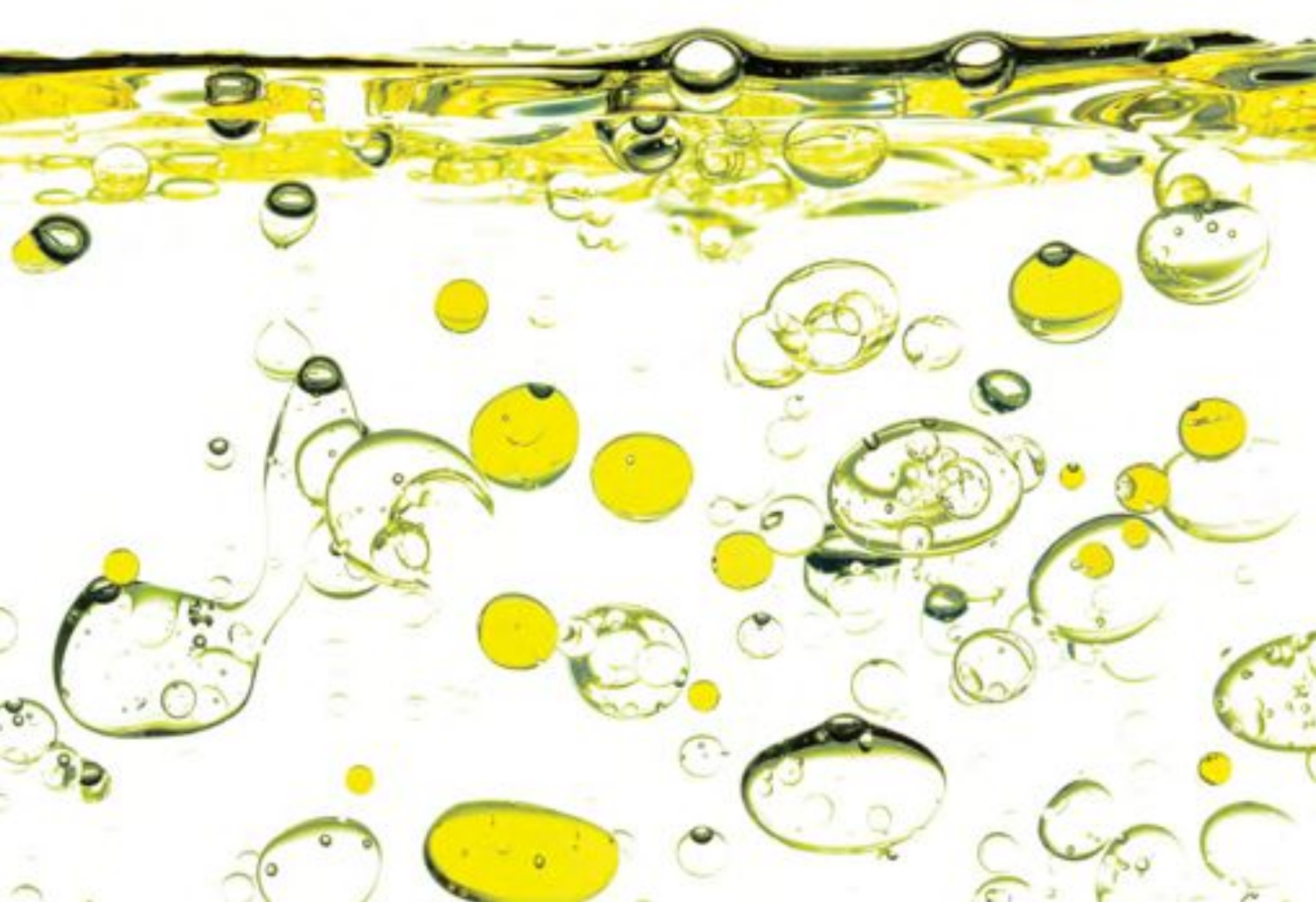
## Phosphorus, Trace Metal & Soap

Select adsorbents offer better phosphorus, metals and soaps removal than competitive products as evident in these charts.

Canola original	350 select	Hydrogel 1	Hydrogel 2	Pretreat ADSORBENT
8.7	0.0	0.0	2.4	P (ppm)
3.0	0.3	0.4	1.1	Mg (ppm)
15.9	0.1	0.7	6.1	Ca (ppm)
0.0	0.0	0.0	0.0	Fe (ppm)







# PROCESSING OPTIONS

## For Edible Oils

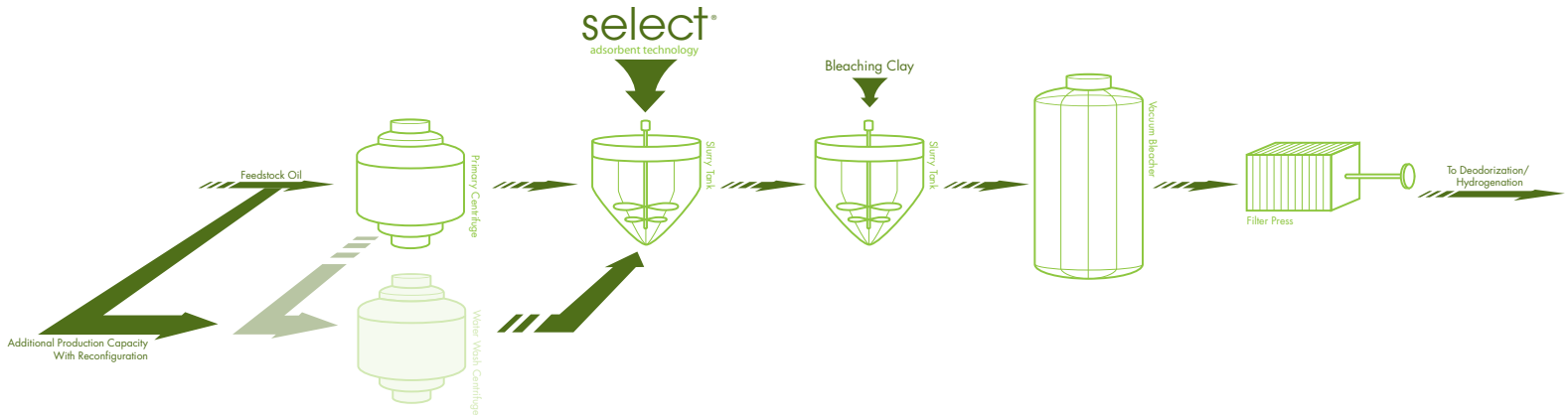
Select offers flexibility to customize and simplify your edible oil production process. By treating with Select, the water wash centrifuge can be eliminated or reconfigured as a second primary centrifuge, allowing for increased production.

Select adsorbents are also well suited to physical refining processes where free fatty acids are removed by distillation in the deodorization stage.

The following pages illustrate how Select fits into refining processes and details the optimum conditions and process benefits for each refining method.

# CENTRIFUGE RECONFIGURATION

## Process Diagram



- 1** A pretreat of phosphoric or citric acid is recommended for maximum removal of Phosphorous, Calcium, and Magnesium.
- 2** The recommended dosage of Select can either be added continuously or in a batch process (adequate agitation is necessary to keep the slurry mixture in suspension).
- 3** Material may be filtered in a single filtration system (with bleaching clay) or filtered in a dual filtration system prior to bleaching clay addition.

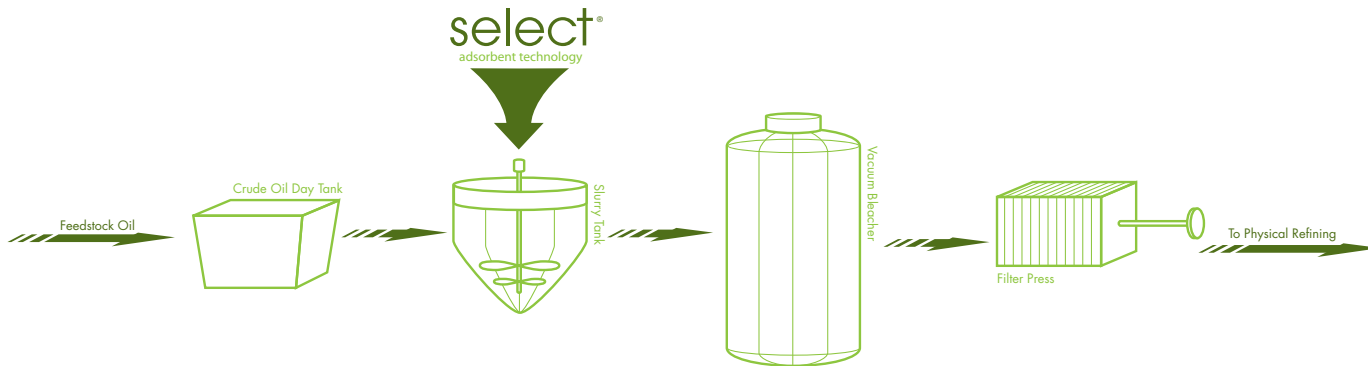
## Optimum Conditions & Process Benefits

350 select	450 select	<b>ADSORBENT</b>
0.05% - 0.15%	0.05% - 0.15%	Dosage (wt./wt. oil)
160° F - 180° F 70° C - 80° C	160° F - 180° F 70° C - 80° C	Oil Temperature (at Addition) (degrees)
20 - 30	20 - 30	Slurry Tank Residence Time (minutes)
0.15% - 0.30%	0.15% - 0.30%	Oil Moisture (wt./wt. oil)
100 - 500	100 - 500	Recommended Soap Level of Oil (post Primary Centrifuge, prior to Select Addition) (ppm)

- Reduction of operating and disposal costs
- Improved finished oil quality
- Potential to increase production capacity

# PHYSICAL REFINING

## Process Diagram



- 1** Oil pretreated with 500-1000 ppm citric acid or phosphoric acid.
- 2** For continuous processes, add Select 350 at the recommended dosage, upstream from the bleaching clay addition system. \*
- 3** For a batch processes, add Select 350 at the recommended dosage, followed by bleaching clay addition after 20 minutes. \*

\* Both procedures require adequate agitation to keep the slurry mixture in suspension

## Optimum Conditions & Process Benefits

<b>350</b> select	<b>ADSORBENT</b>
0.1% - 0.5%	Dosage (wt./wt. oil)
167° F - 185° F 75° C - 85° C	Oil Temperature (at Addition) (degrees)
20 - 30	Slurry Tank Residence Time (minutes)
0.15% - 0.30%	Oil Moisture (wt./wt. oil)

Physical refining is a recommended method for use in the production of palm oil.

# select<sup>®</sup>:biodiesel

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## PRODUCTS

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select:biodiesel

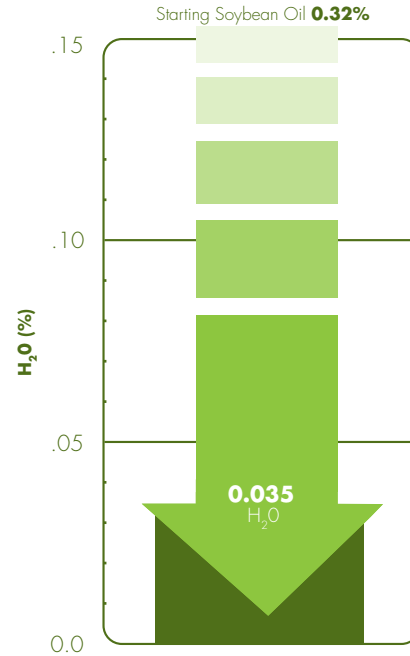
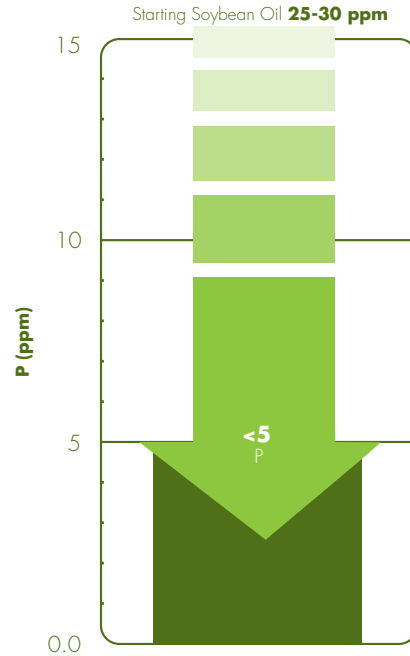
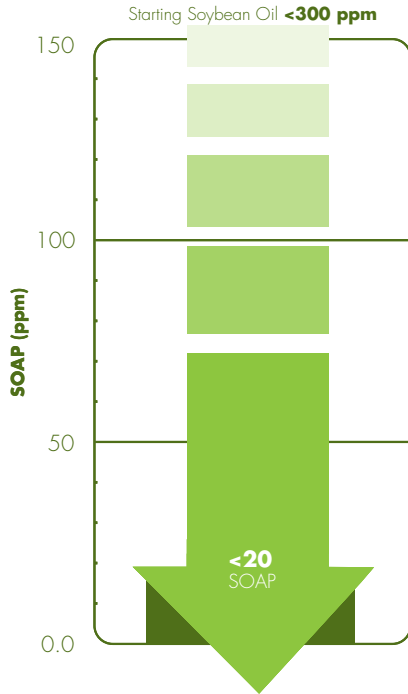
Our selective adsorbent for biodiesel is a natural silicate designed to attract and bind unwanted compounds helping your fuel to pass industry specifications.

Select for Biodiesel removes unwanted soaps, metals and other impurities from feedstock oils with or without the use of a water wash centrifuge.





# EFFECTIVE AT A LOW DOSAGE



## CONDITIONS

0.15%  
DOSAGE RATE

30 minutes  
RESIDENCE TIME

175° F  
79.4° C  
OIL TEMPERATURE

210° F  
VACUUM DRIED  
& FILTERED

select:biodiesel

## Optimum Conditions

Select effectively removes problematic soaps from feedstock oil streams at a low dosage.

For optimal efficiency, soaps off the primary centrifuge in the refinery should be in a working range of 100 to 500 ppm. Soap levels in oil dictate sorbent dosage, working ranges of 0.1% to 0.3%.

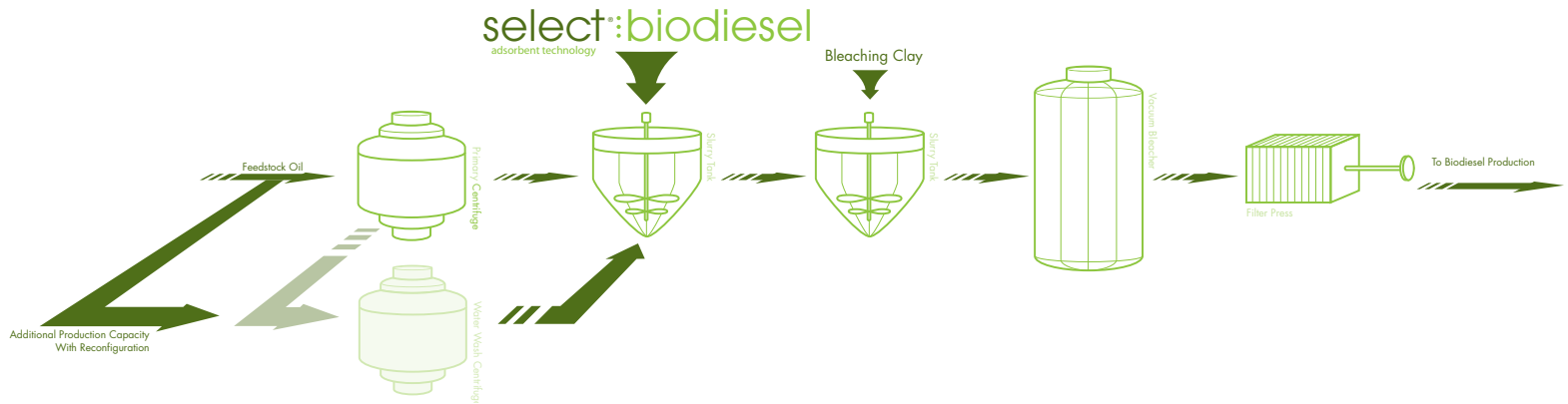


# PROCESSING BIODIESEL

Select's role in biodiesel production is to purify feedstocks and allow for efficient conversion into biodiesel fuel. The diagram on the following page illustrates the options for using Select to purify feedstocks.

# REFINING FOR BIODIESEL

## Process Diagram



1 Caustic refine oil to reduce free fatty acids (FFAs)

# Optimum Conditions In Feedstock Oils

biodiesel  
select

## ADSORBENT

100 -500

Control Soaps (Off Primary Centrifuge)  
(ppm)

0.025

Dosage Range (per 100 ppm Soap)  
(wt.%)

20 - 30

Contact Time  
(minutes)

165° F - 185° F  
73.89° C - 85° C

Oil Temperature  
(degrees)

0.1 - 0.3  
INTRODUCING  
SORBENT

Oil Moisture  
(%)

0.05 - 0.10  
FILTERING  
SORBENT

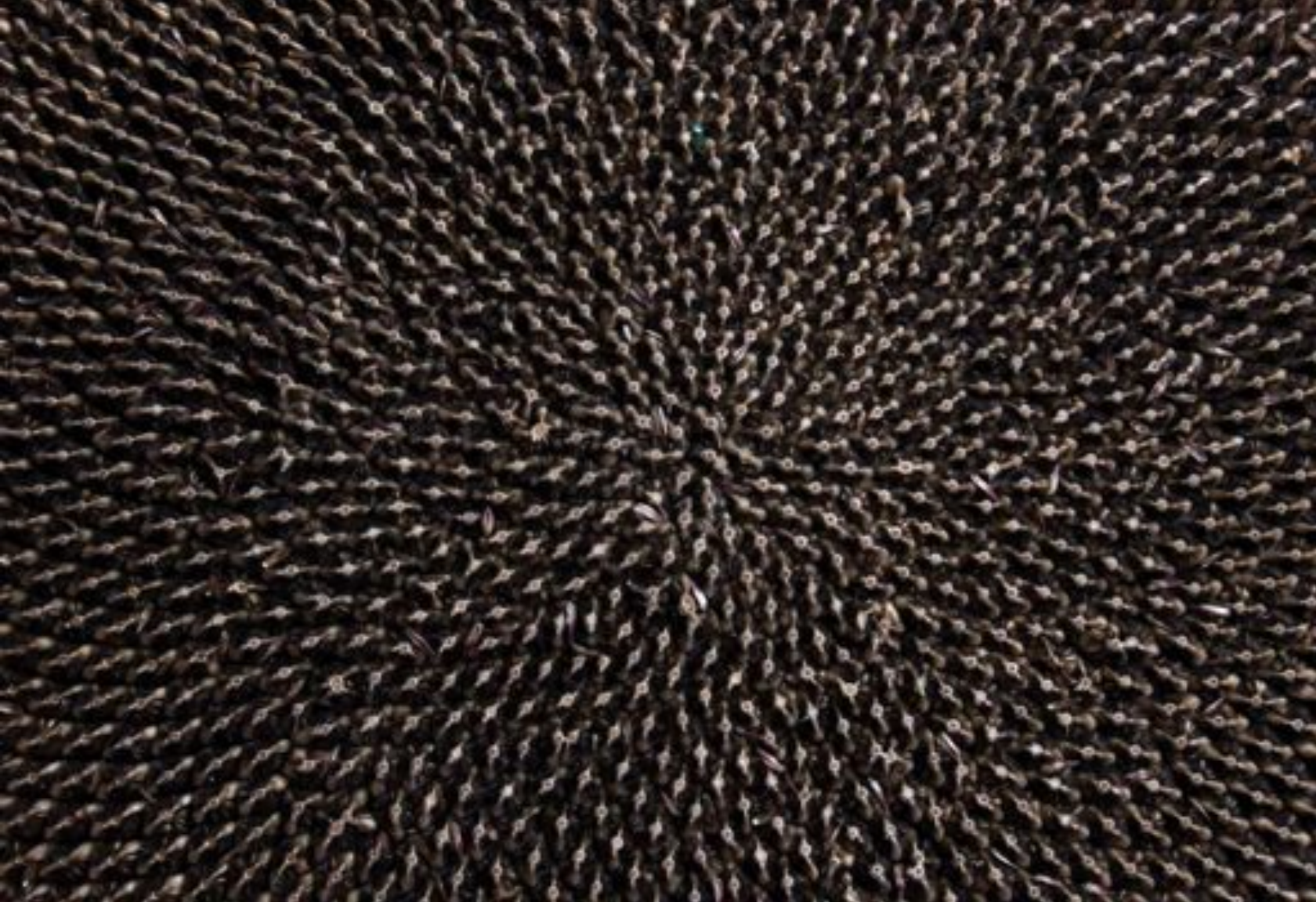
# PRODUCT OPTIONS & SPECIFICATIONS

## Typical Properties

This chart represents an overview of the Select product line. Finished product characteristics may vary. Contact us if you require more detailed information on our products.

350 edible oil	450 edible oil	select biodiesel	Product
<5.0	10.50	<5.0	Free Moisture wt. % @ 105°C
3.6	3.2	3.6	pH (5% suspension)
20.00	20.00	20.00	Particle Size (> 75 Microns) wt.%





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# THE TRUSTED SOLUTION

Customers around the world count on  
Select's adsorbent properties to help meet  
product specifications.

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