

### Review 1 and 2: Industry environment

Reviews provided by Dr Kristina Hetherington (Senior Scientist) Keracol Ltd, Leeds UK



### Review 3: Industry environment

Review provided by Dawn Thompson (senior process chemist) Revive Eco, Leeds UK

REVIVE

### Review 4: Academic environment

Review provided by Shokry Bastorous (Instructional Lab Technician) Academic review - California USA

### Review 1 - Industry environment

Plant material (~6kg) is placed into the jacketed reactor and extraction proceeds depending on the plant material used and solvent (~12L) used. Due to sustainability considerations temperature of extraction of 80°C is never exceeded and time of extraction rarely longer than 2h.

Solvent	Ethanol*	Water	Ethanol/Water* (80:20)	Acetone
<i>bp [°C]</i>	78	100		56
<i>Extraction T [°C]</i>	80	100	80	65
<i>Time [h]</i>	2	2	4	1
<i>V [L]</i>	12	12	12 (total)	5
<i>% solvent loss (total)</i>	-1.2%	-3.0%	-1.8%	-1.2%

For solvents labelled with \* = these extractions were done using 6kg of dry orange peel material, and a small percentage of the solvent loss is due to solvent absorption into the peel that is not usually recovered.

Please note: the water was hard to get out of the extract material as it soaks in. We roughly estimated 1.2% is lost with the material.

### Review 2 - Industry environment

The CondenSyn MAXI was tested during extraction of plant materials using ethanol at 80°C. Testing of the CondenSyn MAXI was done during two extractions on the babchi seeds – solvent use in these extractions is recycled therefore it is imperative we collect as much solvent back as possible. These extractions provide us with the material used in our own Dr. Craft skincare range.

Solvent	Solvent Amount (l)	Temp. (°C)	Time (h)	Solvent Recovered (l)
<i>Ethanol</i>	9	80	1	*8.6 (95%)
<i>Ethanol</i>	9	80	1	8.9 (98%)

\* take into account potential 5% absorption of solvent into the seeds (0.45 l)

Overall, the CondenSyn MAXI performed very well and was easy and safe to use. Therefore we highly recommend their use with 20L reactors.

Reviews provided by Dr Kristina Hetherington (Senior Scientist) Keracol Ltd, Leeds UK

# CondenSyn MAXI

## Customer testing



### Review 3 - Industry Environment

Image courtesy of **Revive-Eco**

Utilising the CondenSyn MAXI with a 20L vessel to scale-up an innovative patent-pending process that allows them to strip out an oil from waste coffee grounds which has a very similar fatty acid profile to palm oil.

REVIVE



“This CondenSyn waterless condenser fits beautifully into our ethos at Revive where we strive to find new possibilities in old problems, and because it’s waterless we are quite literally saving thousands of litres of water per run. It’s also a lot a lot safer and a lot easier to run in the laboratory than a water condenser as we’ve eliminated the risk of water tubing leakages or accidents. All-in-all, the ReactoMate reactor and the CondenSyn MAXI truly allow us to make our green process sustainable”.

### Review 4 - Academic Environment

GB-C-MAXI-350-P-A24: 350mm model with plain inner, 24/40 cone

Chemical	Boiling Point	Ambient Degree	Starting Volume	Final Volume	Boiling Period & Heater Setting	Comments
Distilled Water	100°C	23°C	1500 mL	1480 mL (98.6%)	10 minutes	At boiling point, condensation occurred at the second ring of the condensation column
Ethanol	78°C	23°C	1500 mL	1475 mL (98.3%)	10 minutes	At boiling point, condensation occurred at the third ring of the condensation column
Hexane	69°C	22°C	1500 mL	1470 mL (98%)	10 minutes	At boiling point, condensation occurred at the fourth ring of the condensation column

Review provided by Shokry Bastorous (Instructional Lab Technician) Academic review - California USA