Enzyme Formation

$\varnothing \rightarrow KDPG$

$\varnothing \rightarrow PDH$

$\varnothing \rightarrow E_{TCA}$

$\varnothing \rightarrow E_{GNG}$

$\varnothing \rightarrow AlgA$

$\varnothing \rightarrow AlgC$

$\varnothing \rightarrow AlgD$

$\varnothing \rightarrow GTF$

Biosynthesis Route

carbon source + $KDPG$ + PDH $\rightarrow$ acetyl-CoA + $KDPG$ + PDH

acetyl-CoA + E_{TCA} $\rightarrow$ E_{TCA} + oxaloacetate

oxaloacetate E_{GNG} $\rightarrow$ E_{GNG} + fructose-6-phosphate

fructose-6-phosphate + $AlgA$ $\rightarrow$ $AlgA$ + mannose-6-phosphate

mannose-6-phosphate + $AlgC$ $\rightarrow$ $AlgC$ + mannose-1-phosphate

mannose-1-phosphate + $AlgA$ $\rightarrow$ $AlgA$ + GDP-mannose

GDP-mannose + $AlgD$ $\rightleftharpoons$ GDP-mannuronic acid

GDP-mannuronic acid + GTF $\rightarrow$ GTF + alginate

Enzyme Degradation

$KDPG \rightarrow \varnothing$

$PDH \rightarrow \varnothing$

$E_{TCA} \rightarrow \varnothing$

$E_{GNG} \rightarrow \varnothing$

$AlgA \rightarrow \varnothing$

$AlgC \rightarrow \varnothing$

$AlgD \rightarrow \varnothing$

$GTF \rightarrow \varnothing$

Enzyme Key

$KDPG$: ketodeoxyphosphogluconate pathway

PDH: pyruvate dehydrogenase

E_{TCA}: Enzymes involved in TCA cycle

E_{GNG}: Enzymes involved in gluconeogenesis

$AlgA$: phosphomannose isomerase-GDP-mannose pyrophosphorylase

$AlgC$: phosphr-mannomutase

$AlgD$: GDP-mannose dehydrogenase

GTF: Glycosyltransferases involved in alginate polymerization