

GMMA as an Alternative Carrier for a Glycoconjugate Vaccine against Group A *Streptococcus*

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Supplementary Table S1. Input parameters and assumptions used for techno-economic modelling in SuperPro Designer.

Parameter use	Parameter class	Parameter name	Value	Unit
CapEx calculation	Direct Cost (DC)	Piping Cost	35	% of TEPC
		Instrumentation Cost	40	% of TEPC
		Insulation Cost	03	% of TEPC
		Electrical Facilities Cost	10	% of TEPC
		Buildings Cost	250	% of TEPC
		Yard Improvement Cost	15	% of TEPC
		Auxiliary Facilities Cost	40	% of TEPC
		Unlisted Equipment Purchase Cost (UEPC)	30	% of TEPC
		Unlisted Equipment Installation Cost	50	% of UEPC
	Indirect Cost (IC)	Engineering Cost	25	% of DC
		Construction Cost	35	% of DC
	Other Cost (OC)	Contractor's Fee	5	% of (IC + DC)
		Contingency	10	% of (IC + DC)
	Miscellaneous	Working Capital – to cover expenses for	30	days
		Start-up and Validation Costs	30	% of DFC
		Up front R&D	0	US\$
		Up front royalties	0	US\$
		Maintenance: equipment specific multipliers		

OpEx calculation	Facility dependent	Depreciation: contribution from each equipment's undepreciated purchase cost		
		Insurance	1	% of DFC
		Local taxes	2	% of DFC
		Factory expenses	5	% of DFC
	Labour	Basic operator labour rate (BOLR)	22	USD × hour ⁻¹
		Benefits factor	40	% of BOLR
		Operating supplies factor	10	% of BOLR
		Supervision factor	20	% of BOLR
		Administration factor	60	% of BOLR
		Lumped operator labour rate	75	USD × hour ⁻¹
		Adjusted basic operator labour rate*	50.6	USD × hour ⁻¹
		Direct labour time utilisation - batch	60	%
		Direct labour time utilisation - continuous	70	%
	Lab, QC, QA	Laboratory, quality control, quality assurance	15	% TLC
	Utilities	Standard electricity	0.1	US\$ × (kW×h) ⁻¹
		Chilled water	0.4	US\$ × tonne ⁻¹
		Cooled water	0.1	US\$ × tonne ⁻¹
		Steam	12	US\$ × tonne ⁻¹
	Miscellaneous	Fixed R&D	0	US\$ × year ⁻¹
		Variable R&D	0	US\$ × g MP ⁻¹
		On-going process validation	0	US\$ × year ⁻¹
		Other fixed	0	US\$ × year ⁻¹
		Other variable	0	US\$ × g MP ⁻¹
Overall economic evaluation	Time valuation	Construction period	20	months
		Start-up period	4	months
		Project lifetime	20	years
		Inflation	4	%
		NPV interest - Low	7	%
		NPV interest - Medium	9	%
		NPV interest - High	11	%
	Financing	Loan interest for DFC	9	%
		Loan interest for working capital	12	%
		Loan interest for up front R&D	12	%
		Loan interest for up front royalties	12	%
		Loan period for DFC	10	years
		Loan period for working capital	6	years
		Loan period for up front R&D	6	years
		Loan period for up front royalties	6	years
		DFC outlay for 1 st year	30	% of DFC
		DFC outlay for 2 nd year	40	% of DFC
		DFC outlay for 3 rd year	30	% of DFC
		DFC outlay for 4 th year	0	% of DFC
		DFC outlay for 5 th year	0	% of DFC
		Straight line depreciation period	10	years
		Salvage value	5	% of DFC
	Production level	Operating capacity for each year	100	%
		Product failure rate	5	%

		Disposal cost	0	US\$ × g MP ⁻¹
	Miscellaneous	Income tax	40	%
		Fixed advertising and selling expenses	0	US\$ × year ⁻¹
		Variable advertising and selling expenses	0	US\$ × g MP ⁻¹
		Variable running royalty expenses	0	US\$ × g MP ⁻¹

Abbreviations used in Supplementary Table 3: CapEx – capital expenditure; OpEx – operating expense; TEPC – total equipment purchase cost; UEPC – unlisted equipment purchase cost; DFC – direct fixed capital; DC – direct cost; IC – indirect cost; OC – other cost; TLC – total labour costs; BOLR – basic operator labour rate; g MP – gram of main product.

*calculated based on benefits, operating supplies, supervision cost and administration cost.