

## *Staphylococcus aureus*

Spa type t021, ST243, CC30

Causes **mastitis** i.e. inflammation (pain, redness, and swelling) in the udder of cows, also contaminating the milk they produce.

### Isolated from



Milk of affected cows



### Genomic Analysis



Revealed genetic markers associated with efflux pumps and genes conferring resistance to quinolones and metallothiols - drugs commonly used against this disease.

### Insights



*Staph. aureus* can escape cow's immune system using evasion proteins. It also has secretion systems, & toxins including enterotoxins and hemolysins!

### Application



Part of the first study to present a comprehensive whole-genome analysis of bovine mastitis-associated *S. aureus* isolates from India!

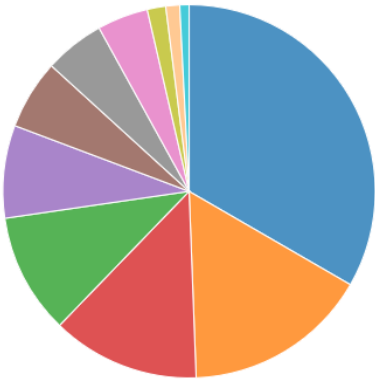
Staphylococcus aureus GCA\_018995185.1

Quality of Genome Assembly and Annotation:

Results from indigenously developed **BHARAT** analysis pipeline: (**B**acterial **H**ybrid genome **A**ssembly and **R**apid **A**nnotation **T**oolset)

Table 1: Assembly Details	
Contigs	39
GC Content	32.73
Contig L50	6
Genome Length	2,732,334 bp
Contig N50	170,521

Table 2: Annotated Genome Features	
CDS	2,593
tRNA	55
rRNA	4



Subsystem (Subsystems, Genes)	
METABOLISM	(83, 534)
PROTEIN PROCESSING	(40, 210)
STRESS RESPONSE, DEFENSE, VIRULENCE	(32, 137)
ENERGY	(26, 181)
DNA PROCESSING	(20, 89)
CELLULAR PROCESSES	(15, 88)
RNA PROCESSING	(13, 52)
MEMBRANE TRANSPORT	(11, 57)
REGULATION AND CELL SIGNALING	(4, 16)
MISCELLANEOUS	(3, 4)
CELL ENVELOPE	(2, 7)

Table 3: Antimicrobial Resistance Genes	
AMR Mechanism	Genes
Antibiotic inactivation enzyme	FosB
Antibiotic resistance gene cluster,cassette,or operon	TcaA, TcaB, TcaB2, TcaR
Antibiotic target in susceptible species	Alr, Ddl, EF-G, EF-Tu, folA, Dfr, folP, gyrA, gyrB, inhA, fabI, Iso-tRNA, kasA, MurA, rho, rpoB, rpoC, S10p, S12p
Efflux pump conferring antibiotic resistance	BceA, BceB, NorA, Tet(38)
Gene conferring resistance via absence	gidB
Protein altering cell wall charge conferring antibiotic resistance	GdpD, MprF, PgsA
Regulator modulating expression of antibiotic resistance genes	BceR, BceS, LiaF, LiaR, LiaS

Table 4: Predicted Antimicrobial Resistance Phenotype	
Antibiotics	
Resistant	
Susceptible	Ciprofloxacin, Clindamycin, Erythromycin, Gentamicin, Methicillin, Penicillin, Tetracycline, Trimethoprim/Sulfamethoxazole

Genome Assembly

