



**Final Year Project Showcase Batch-2017
Year 2021**

<p align="center">Department: Textile Engineering Programme: Textile Engineering</p>																								
1	Project Idea	Development and Characterization of Stingray Leather for Manufacturing of Leather Incorporated Textile Products.																						
2	Process	<p>The aim of this study and research is to develop the stingray leather from its raw form and to characterize its mechanical properties in the textile product i.e. safety gloves and biker pants.</p> <p>To achieve this, it required raw stingray in significant amount for its development into the stingray leather and a particular wearing area where it can be used with its standout reliable properties. The comparison of the mechanical properties of cow leather with stingray leather will be done.</p>																						
3	Outcome	<p>Stingray leather is successfully manufactured from raw stingray skin with desirable appearance and softness as desired. Three mechanical properties including cut, abrasion and puncture resistance were tested and results were compared with the goat and cow leather. It was found that the mechanical properties of stingray leather are far more better than the cow leather and can be used in textile products like safety gloves in industrial use to attain significant cut resistance, abrasion resistance and puncture resistance. It can also be used in jeans on the knee points to avoid knee injuries causes due to bike accidents in common.</p> <p>Apart from this there can be many more applications of stingray leather which needs to be work upon in future.</p>																						
4	Evidence (Theoretical Basis)	<p>TEST RESULTS</p> <p>Abrasion Test was conducted on Martindale according to Standard EN388: 2016 and No Abrasion Impact was found concluding as Level 4 according to following table.</p> <table border="1" style="margin-left: auto; margin-right: auto;"> <thead> <tr> <th colspan="2">Abrasion</th> </tr> </thead> <tbody> <tr> <td>100 Cycles</td> <td>LEVEL – 1</td> </tr> <tr> <td>200 Cycles</td> <td>LEVEL – 2</td> </tr> <tr> <td>2000 Cycles</td> <td>LEVEL – 3</td> </tr> <tr> <td>8000 Cycles</td> <td>LEVEL – 4</td> </tr> </tbody> </table> <p>Puncture Test was conducted on Testometric M250-3CT according to standard EN388: 2016 Standard and peak force of 127-133 N was found concluding Level 3 according to following table.</p> <table border="1" style="margin-left: auto; margin-right: auto;"> <thead> <tr> <th colspan="2">Puncture Test</th> </tr> <tr> <th>Peak Force (N)</th> <th>Level</th> </tr> </thead> <tbody> <tr> <td>20 Newton</td> <td>LEVEL – 1</td> </tr> <tr> <td>60 Newton</td> <td>LEVEL – 2</td> </tr> <tr> <td>100 Newton</td> <td>LEVEL – 3</td> </tr> <tr> <td>150 Newton</td> <td>LEVEL – 4</td> </tr> </tbody> </table> <p>Cut Test was conducted on SATRA Cut Evaluator STM 610 according to standard EN ISO 13997: 1999 and No Cut was appeared concluding Level F according to following table.</p>	Abrasion		100 Cycles	LEVEL – 1	200 Cycles	LEVEL – 2	2000 Cycles	LEVEL – 3	8000 Cycles	LEVEL – 4	Puncture Test		Peak Force (N)	Level	20 Newton	LEVEL – 1	60 Newton	LEVEL – 2	100 Newton	LEVEL – 3	150 Newton	LEVEL – 4
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			Performance Level	Weight (Newton) needed to cut through material with 200 mm of blade travel
			A	>2
			B	>5
			C	>10
			D	>15
			E	>22
			F	>30

5	Competitive Advantage or Unique Selling Proposition			
a	Cost Reduction of Existing Product	<p>Raw stingray skin from Pakistan is exported to Thailand, China, Malaysia etc. where it is processed into the stingray leather and multiple exotic articles are made from it and sold at very high prices, in fact Pakistan had to import the exotic wallets, decorative articles etc. at a very high price.</p> <p>The significance of the research is that the processing of raw stingray skin into leather and product development can be done in Pakistan which can be exported at a very decent price as compared to raw skin which is exported in tons at very cheap rates.</p>		
b	Attainment of SDGs	SDG#8, Decent Work and Economic growth		
c	Capture New Market	Using stingray for its mechanical properties is the unaddressed segment.		
6	Target Market	<p>Target market can be protective textiles where products made from stingray for can be used for safety garments e.g. gloves.</p> <p>It can be used in men jeans on the knee points to avoid knee injuries causes due to bike accidents in common.</p>		
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10	Pictures (If any)			