Final Year Project Showcase Batch-2021
For the Year 2025

Department of Chemistry Name of Programme: BS Chemistry		
1	**Project Idea**	**Derivatization of natural product enabling bio activity.**
2	**Process**	In this project one vinylic ether and four ester derivatives of Oleanolic acid (OA) have been synthesized. Ether derivative was purified by normal filtration method on filter paper and ester derivatives was purified through column chromatography. Synthesized compounds were analyzed by Fourier Transform Infrared (FTIR) and ^{1}H-NMR Spectroscopy. All the compounds were evaluated for their antibacterial and antifungal activities.
3	**Outcome**	Oleanolic acid is a persuasive analogue of the oleanane triterpenoid class of antibiotics. Studies on the structure and activity relationships (SAR) indicate that the chemical structure of OA is suitable for the antibacterial and antifungal activities. Moreover, all the aromatic ester derivatives and vinylic ether derivative of OA were found to be more active than the aliphatic ones. With respect to our group's SAR focused on repositioning drugs as antimicrobial therapy, we believe that the C-3 hydroxyl group and C-21 carboxyl group is also critical for antimicrobial activity. However, replacing the –OH group with C=C and -COOH group with -COOR (an ester) led to the increased activity.
4	**Evidence (Theoretical Basis)**	Oleanolic acid is a pentacyclic triterpenoid widely found in plants, including fruits and vegetables. Its extraction and purification is made easier by the use of different techniques and chromatography equipment. Many studies have shown the deteriorative effects of oleanolic acid (OA) on different diseases and their symptoms. In addition, oleanolic acid helps in the design of new semi-synthetic triterpenoids which can be truly important in the treatment of many diseases. There are some new advances in the design and OA that change the structure of OA to make it more soluble, easier to absorb, and stronger. Some of these derivatives have also been therapeutic candidates in a number of clinical trials.
5	**Competitive Advantage or Unique Selling Proposition** (Cost Reduction, Process improvement, Attainment of any SDG (Sustainable Development Goal), increase of market share or capturing new market or having superior performance over a competitor. In summary, any striking aspect of the project that compels the industry to invest in FYP or purchase it. Some detailed description is required in terms of how, why when what. You can select one or more from the following dropdown and delete the rest of them) Please keep relevant options, delete the rest of them, and correct the sequence	
a	**Cost reduction of existing Product**	The costs will be significantly reduced if we increase production to a bulk scale. These types of compounds are so easy to produce, and are quite inexpensive. It will be pocket friendly when we produce it on bulk scale. These derivatives are so simple and cost effective antioxidants
b	**Process Improvement which leads to superior product or cost reduction,**	OA, being a natural antioxidant, is a valuable element in the fight against the various diseases. Previously many derivatives

	efficiency improvement of the whole process (e.g. What is the issue is current process and what improvement you suggests)	of OA has been reported. The aim of this work is a comprehensive analysis of the research on the antiomicrobial potential of OA and its derivatives, as well as to present its mechanisms of action and possible clinical applications. This is the first report of the synthesis and activity of OA vinylic ether derivatives.
c	**Attainment of any SDG** (e.g. How it is achieved and why it is necessary for the region)	SDG#3 Good Health and Well Being During our literature survey we basically work on environment friendly chemicals and during the period the chemicals that are use in our project is quite more environment friendly.
d	**Expanding of Market share** (e.g. how it expand and what is the problem with the current market	It will capture a new market by fulfilling essential needs in the pharmaceutical industry. The process is environmentally friendly, requires minimal equipment and materials, and has a low synthesis cost. Overall, the benefits far outweigh the production costs, and it offers high utility with the flexibility to be modified as needed.
e	**Capture new market (**e.g. Niche market or unaddressed segment**)**	These derivatives provide a strong scientific foundation for developing OA-based compounds as antimicrobial agents for the pharmaceutical industry. They have the potential to capture a new market by meeting essential industry needs. The process is environmentally friendly, requires minimal equipment and materials, and has a low synthesis cost. Overall, the benefits far exceed the production costs, and the derivatives are highly useful with the flexibility for further modification.
f	**Any Environmental Aspect** (e.g. carbon reduction, energy-efficient, etc.)	Since the chemicals used in the synthesis are environmentally friendly, the process will have minimal impact on the environment and will not contribute to pollution.
g	**Any Other Aspect**	--
6	**Target Market** (Industries, Groups, Individuals, Families, Students, etc) Please provide some detail about the end-user of the product, process, or service	OA is a narrow-spectrum bacteriostatic antibiotic with multiple biological activities. In our study, the derivatives demonstrated strong antimicrobial activity. Describing the activity of OA its ether and ester derivatives opens new avenues for research and potential applications in the pharmaceutical industry.
7	**Team Members (Names & Roll No.)**	Summaya Khan CY-21033 Syeda Waniya Qamar CY-21065 Muhammad Taha CY-21020 Muhammad Hammad ur Rehman Siddiqui CY-21051
8	**Supervisor Name**	Dr. Anjum Ayub
9	**Supervisor Email Address**	anjumayub@neduet.edu.pk
10	**Pictures (If any)**