MICROWAVE AIDED RAPID PRODUCTION OF OLEYLAMIDE

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INNOVATIVE TECHNOLOGY – MICROWAVE IRRADIATION

The use of microwave irradiation in chemicals preparation was first introduced in late 1980s. It has advantages over conventional methods of preparing chemicals as it reduces the preparation time from hours to minutes; thus, it is more cost-effective.

In the aspect of environment, this technology is *greener* as the energy loss in the process of heating chemicals is minimal compared to conventional methods, which again explains the rapid preparation of chemicals as 80% of the electrical energy supplied is converted to microwave energy, in which most of it will be eventually absorbed by the raw materials.

MPOB has evaluated the potential of using microwave irradiation to replace conventional method of producing oleylamide.

PROCESS OF PRODUCING OLEYLAMIDE

The raw materials for producing the oleylamide are oleic acid and urea, which Malaysia has abundant supply of them from the palm oil and petrochemical industries respectively. The oleylamide manufacturing involves two processes, namely the reaction step and the purification step. The reaction step involves condensation between oleic acid and urea upon heating by microwave irradiation in the presence of a catalyst. Carbon dioxide, ammonia gas and biuret are produced as by-product. The product of this step is known as crude oleylamide. The total reaction time is about 30 min. The purification step involves recrystallizing the desired product from the crude oleylamide using solvents until the purity of the product is about 90%. The purified oleylamide is suitable to be used as an additive (slip agent) in polyethylene and polypropylene film production.

CHEMICAL REACTION

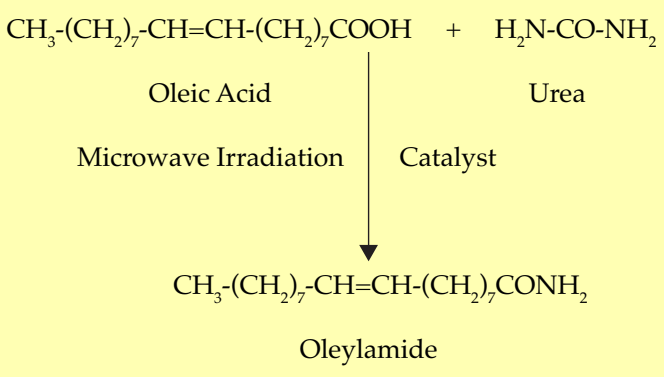

TABLE 1. PROPERTIES OF PALM-BASED OLEYLAMIDE

Properties	Palm-based oleylamide	Commercial oleylamide
Appearance	White waxy solid	White waxy solid
Purity	90% min	92% min
Acid value (mg KOH g^{-1})	3 max	1 max
Iodine value (g I_2/100 g)	80-90	80-90
Melting point (° C)	73 - 75	70-76

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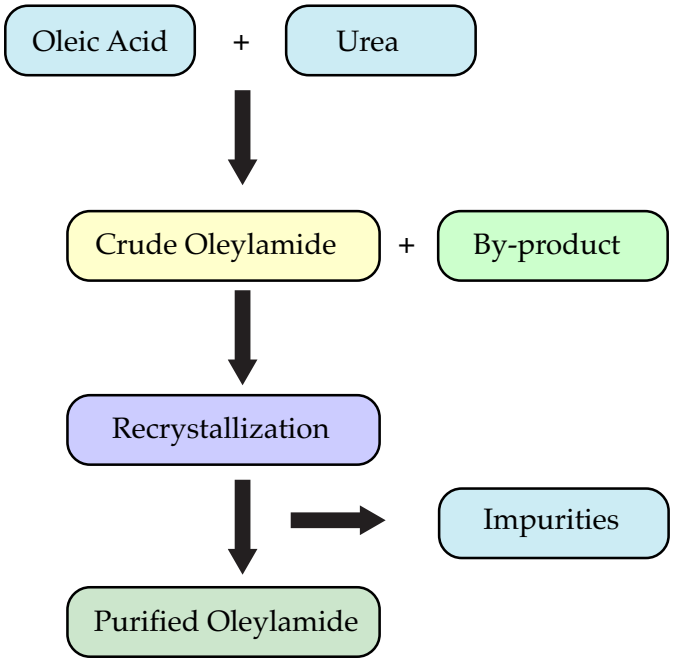
ADVANTAGES OF MICROWAVE AIDED RAPID PRODUCTION OF OLEYLAMIDE

- Cost-effective - rapid production of oleylamide;
- Energy saving - less energy loss to environment - greener process; and
- Raw materials (oleic acid and urea) are readily available locally.

FLOW CHART OF OLEYLAMIDE PRODUCTION



CONCLUSION

Microwave technology has enable a cost-effective and energy saving production of palm-based oleylamide, which is comparable to commercial product if not better in terms of quality.

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