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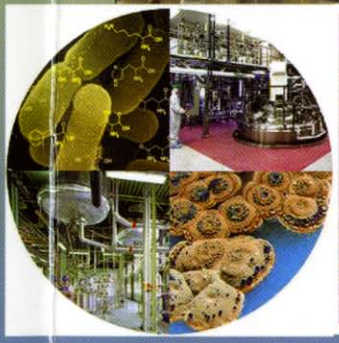
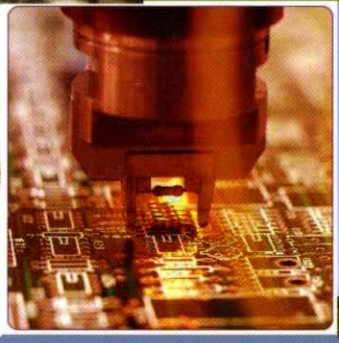

KERIE

Quality Research for Human Services and Development

Production of high quality halal gelatins through enzymatic process

BTE - 01

Dr. Irwandi Jaswir, Dr. Mohamed Elwathig Saeed Mirghani, Assoc. Prof. Dr. Hamzah Mohd Salleh, Faridayanti Siddik, Noor Yuslida Hazahari

Gelatin is one of the most widely used food ingredients. Its applications in food industries are very broad including enhancing the elasticity, consistency and stability of food products. Gelatin is also used as a stabilizer, particularly in dairy products and as a fat substitute that can be used to reduce the energy content of food without negative effects on the taste. Besides the food industry, gelatine is also useful in medicine, pharmaceutical and photographic industries. It was reported that 41% of the gelatin produced in the world is sourced from pig skin, 28.5% from bovine hides and 29.5% from bovine bones. However, factors such as the outbreak of BSE (a.k.a. mad cow disease) and increasing demand for non-mammalian gelatin for halal and kosher food markets have revived the interest in gelatin from fish raw materials. We have successfully extracted gelatins from the skin of four local marine fish, namely "kerapu" (*Epinephelus sexfasciatus*), "jenahak" (*Lutjianus argentimaculatus*), "kembung" (*Rastrelliger kanagurta*), and "kerisi" (*Pristipomodes typus*) by an enzymatic process using transglutaminase. Transglutaminase significantly reduced the duration of extraction and improved the properties of fish gelatins. The marine-based gelatins were comparable to the gelatins from other animals previously reported. They appeared snowy white in color with crystal-like and light texture. In terms of Bloom strength, the gelatin produced from "kerapu" was found to be the strongest one compared to others, with the Bloom value of more than 2000 g. The gelatins extracted in this study contained almost all essential amino acids, with glycine being the most predominant one. An FTIR spectroscopy study was conducted to differentiate between halal marine fish gelatin and non-halal pig gelatin.

Omega-3 and Omega-6 Fatty Acids as Food Supplements from Marine Fishes of Tuba Island, Langkawi, Malaysia

BTE - 02

Dr. Irwandi Jaswir, Dr. Mohamed Elwathig Saeed Mirghani, Assoc. Prof. Dr. Hamzah Mohd Salleh, Farida Osman

Fish lipids are well known to be rich in long chain ω-3 polyunsaturated fatty acid (PUFA), especially eicosapentaenoic acid (EPA) and docosahexaenoic acid (DHA). These fatty acids play a vital role in human nutrition, disease prevention, and health promotion. In addition, DHA and arachidonic acid (AA), an ω-6 PUFA, are structural components of cell membrane phospholipids and precursors of eicosanoids, which play important roles in the development of the central nervous system including the eye retina. Many studies have shown that fish oil supplementation increases the DHA content of blood components. This study evaluated total lipid contents and fatty acid composition of 13 marine fish species namely, "jenahak" *(Lutianus agentimaculatus)*, "kebasi" *(Anadontostoma chacunda)*, "duri" *(Arius cumatramus)*, "tenggiri batang" *(Scomberomorus commersoni)*, "kembong" *(Rastrelliger kanagurta)*, "kintan" or "sebalah" *(Psettodes crumei)*, "kerisi" *(Pristipomodes typus)*, "kerapu" *(Epinephelus sexfasciatus)*, "gelama kling" *(Sciaena dussumieri)*, "malong" *(Congresax talabon)*, "laban" *(Cynoglossus lingua)*, "yu 9" *(Scolidon sorrakowah)* and "bagi" *(Aacnthurs nigrosis)* commonly found off Tuba Island, one of the islands surrounding the popular tourist destination Langkawi in Malaysia. All fish showed a considerable amount of unsaturated fatty acids, particularly those with 4, 5 and 6 double bonds, and therefore have great potential to be processed as food supplements. Two physiologically important ω-3 polyunsaturated fatty acids (PUFAs), i.e. eicosapentaenoic acid (EPA) and docosahaexaenoic acid (DHA), made up of more than 50% of the total PUFAs. The fish also contained significant amount of arachidonic acid (AA). Based on DHA, EPA and arachidonic acid (AA) contents, "gelama kling" was found to be the best source (23, 11 and 7%, respectively) followed by "kerapu" (21, 10, 9%) and "sebalah" (19, 14, 4%) for ω-3 and ω-6 PUFA. For saturated fatty acids, palmitate was found to be the major one in all types of fish studied.