Bhakkhawat Laoka 2006: Preparation and Properties Studies of Ozonized Cassava Starch. Master of Science (Biotechnology), Major Field: Biotechnology, Department of Biotechnology. Thesis Advisor: Associate Professor Klanarong Sriroth, Dr.Ing. 94 pages.
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Ozone, an oxidizing agent, has been widely used in many industries for different purposes such as wastewater treatment, pulp bleaching and microbial elimination. In cassava starch industry, some oxidizing agents are also used to improve starch whiteness and to prepare oxidized starch, a well-known chemically modified starch for paper industry. In this study, an effect of ozone treatment (0 – 90 mg O_3/ g starch) as an environmentally friendly means to produce starch on cassava starch properties was evaluated. Ozone-treated starches exhibited an improved whiteness and paste clarity (whiteness = 93.6 and 98.0 Kett scale; % Light transmittance at 650 nm = 61.35 and 97.43 for ozone-treated sample with 0 and 90 mg O_3/ g starch, respectively). In contrast, the paste viscosity of ozone-treated starch was lowered (Peak viscosity = 397 and 218 RVU for ozone-treated samples with 0 and 90 mg O_3/ g starch, respectively). As a result of ozone treatment, the molecular structure of starch had been altered as the carbonyl and carboxyl groups increased (the carbonyl content = 0.0099 and 0.0948% and the carboxyl content = 0.0228 and 0.0870% for ozone-treated sample with 0 and 90 mg O_3/ g starch, respectively) while the amylose and amylopectin tended to be depolymerized as indicated by High Performance Size Exclusion chromatograms. Changes in the molecular structure and physico-chemical properties of ozone-treated starches were, in general, corresponded to the properties of commercial oxidized starch prepared by the most commonly used chemical but different degree of modification. In addition the effect of ozone on cassava starch properties was depending on the sulfur dioxide content present in starch. At a low ozone concentration (15 mg O_3/ g starch), the properties of ozone-treated sample with a low level of SO_2 were change more pronounced than that of sample with a high level of SO_2 (peak viscosity = 237 and 367 RVU for ozone-treated starch and 465 and 430 RVU for ozone-untreated starch having 0 and 200 mg SO_2/ kg starch, respectively). In contrast, at a high ozone concentration (90 mg O_3/ g starch), the effect of sulfur dioxide content of starch on ozone modification was lesser compared to the low dose treatment (peak viscosity = 274 and 262 RVU for ozone-treated starch having 0 and 200 mg SO_2/ kg starch, respectively).

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