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Evaluation of film forming properties of bambara and ofada rice starches

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Statement of the Problem: Natural materials offer a number of advantages which include biodegradability, availability, non-toxicity and reduced cost. The physicochemical properties of two natural starches, from Ofada rice (*Oryza glaberrima*) and Bambara groundnut (*Vigna subterranean*) have been investigated, with the aim of developing oral dissolving films of Naproxen from blends of the starches and Carbomer.

Methodology: Native starches were extracted from Ofada rice (NO) and Bambara nut (NB), and were modified by pregelatinization. The physicochemical properties of NO, NB, modified Ofada rice starch (PO) and Bambara starch (PB) were determined. Binary mixtures of the starches with Carbomer were prepared at the ratios of 1:1, 1:2, 1:3 and 1:4. Formulations containing Naproxen and Starch/Carbomer blends were prepared. Oral dissolving films were produced from the formulations, using the solvent extraction method. The films produced were evaluated. Results obtained were analyzed, using ANOVA.

Findings: The degree of packing and cohesiveness was improved in the two starches by pregelatinization. Flow properties of native Ofada rice starch was also improved by pregelatinization whereas native Bambara starch had better flow than the pregelatinized form. The rank order of particle size is PO > PB > NB > NO ($p < 0.05$). Photomicrographs of the starches revealed that particles of the pregelatinized starches are larger, more irregularly shaped and more aggregating than the native starches. Starch/carbomer blends of ratio 3:1 produced films of good quality. Drug release of 85 to 98% was obtained from the film formulations

Conclusion and Significance: The two starches, in their native forms had similar physicochemical properties. Pregelatinization improved the properties of Ofada rice starch better than in Bambara starch. Naproxen oral dissolving films of good physical, mechanical and release properties were produced from blends of Ofada rice and Bambara starches with carbomer.