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Exploring the potential of mosambi peel and sago powder in developing edible spoons

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Nowadays, waste disposal is a major problem due to industrialization and urbanization. Agricultural waste and plastic waste disposal have increased heavily in the last few decades. Plastic cutlery is most used for food, but it contains many toxins and carcinogens that are harmful to humans and the environment. Also, agricultural waste dumped or burned in public places leads to environmental pollution. The aim of the study was to develop edible spoons by utilizing mosambi peel waste and sago and to evaluate their proximate composition, water absorption capacity, sensory attributes and their biodegradability. Developed spoons were ready to eat and biodegradable. A total of 11 samples were made of which two samples were considered controls namely, C1 (100% sago) and C2 (100% mosambi). In the remaining samples, the concentration was varied. Spoons were evaluated for their physicochemical properties: moisture (6.67 to 33.33%), ash (6.67 to 8.33%), fat (0.94 to 4.96%), and protein (1.65 to 2.33%). The water absorption tendency of spoons ranged between 56.67 and 172.67% and was found to increase with an increase in mosambi peel powder. Color values were L^* 0.10 to 45.23, for the a^* axis 6.90 to 70.83, and the b^* value ranged between 9.90 and 45.46. The concentration of mosambi peel powder had a significant effect on the color of the spoons. Sensory analysis was performed by using 9-point hedonic scales and S5 was highly acceptable by panellists with an overall acceptability of 8.67 ± 0.577. Spoons were found to be 46 to 60% degraded within 12 days. Based on the results, it can be inferred that utilizing mosambi peel powder along with sago starch could offer a viable and sustainable method for developing edible spoons that hold promising nutritional properties.

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Sustainability spotlight

This research paper sheds light on the pressing environmental challenges arising from waste disposal due to rapid industrialization and urbanization. With a particular focus on agricultural and plastic waste, this study seeks to address the detrimental impact of these waste streams on both human health and the environment. In response to the concerning consequences of conventional plastic cutlery usage, this research endeavors to propose an innovative and sustainable solution in the form of edible spoons. The motivation behind this study is to tackle the increasing accumulation of agricultural waste and plastic cutlery, which contribute significantly to pollution and pose a serious threat to the ecosystem. The researchers aim to harness the potential of mosambi peel waste and sago, creating biodegradable edible spoons. These spoons are designed to be both safe for consumption and ecologically friendly. The results of the study showcase promising findings, with the edible spoons demonstrating substantial degradation rates of 46 to 60% within a mere 12-day period. This indicates their potential to reduce waste accumulation and environmental pollution, making them a viable and sustainable alternative to conventional plastic cutlery.

1. Introduction

Cutlery, which is used worldwide for consuming food, seems simple but is a very useful device. Who exactly invented these is still unknown. Spoons are the oldest pieces of equipment that have been utilized by human beings for eating food. In olden times they were made with natural elements such as wood, animal bones, and seashells. The first known piece of evidence of spoons dates back to 1259 in England.[1] In the 18th century, forks and knives were also introduced. Silver, being non-reactive to foods, was the preferred metal for cutlery until the introduction of stainless steel, which was easy to maintain, non-reactive, and sturdy so preference was given to it. The introduction of plastics in the market brought down the prices of cutlery drastically and made its availability very easy. A lot of varieties and sizes were introduced for people to choose from, such as cups, plates, spoons, forks, knives, *etc.*[2]

With increased urbanization women have started their jobs; they have hardly any time for cooking and washing utensils.[3] So, the demand for plastic containers increased. The value of the

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