



# Microbiological quality and sensory evaluation of *Soumbara*-type fermented condiments produced from alternative legumes to *nééré*

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## ABSTRACT

**Objectives :** The increasing scarcity of *Parkia biglobosa* (*nééré*) seeds threatens the sustainability of traditional *Soumbara*, a fermented condiment widely consumed in West Africa, production. This study aimed to evaluate the microbiological quality and sensory acceptability of *Soumbara*-type fermented condiments produced from alternative legumes, soybean (*Glycine max*), *Bambara* groundnut (*Vigna subterranea*) and cowpea (*Vigna unguiculata*), using spontaneous and controlled fermentation processes.

**Methodology and results :** Five experimental formulations, including single-legume and mixed-legume products fermented with or without *Bacillus* starter cultures (*Bacillus subtilis* vav15 and *Bacillus velezensis* vav16), were compared with traditional *nééré*-based *Soumbara*. Microbiological analyses showed that all fermented products had satisfactory sanitary quality, with aerobic mesophilic counts below 10<sup>4</sup> CFU/g, low coliform levels, and absence of *Salmonella spp.*, *Staphylococcus aureus* and *Pseudomonas aeruginosa*. Sensory evaluation conducted with 60 untrained consumers revealed significant differences among formulations ( $p < 0.05$ ) for taste, texture and overall acceptability. The soybean-*Bambara* groundnut formulation fermented with starter cultures recorded the highest scores for taste ( $5.47 \pm 1.92$ ) and overall acceptability ( $5.57 \pm 1.63$ ), comparable to those of traditional *Soumbara*.

**Conclusion and application of results :** The results demonstrate that soybean and *Bambara* groundnut are suitable alternatives to *nééré* for the production of *Soumbara*-type fermented condiments. Using controlled fermentation of mixed-legume formulations with selected *Bacillus* starter cultures yields condiments that achieve microbiological safety and sensory qualities comparable to traditional *Soumbara*. This innovation reduces reliance on *Parkia biglobosa*, enhances the value of locally available legumes, and supports sustainable artisanal and semi-industrial production of fermented seasonings in Côte d'Ivoire.

**Keywords :** *Soumbara*, fermented condiments, alternative legumes, *Bacillus* starter cultures, sensory acceptability, food safety.