

The effect of concurrent vaccine administration for peste des petits ruminants, capripox and contagious caprine pleuropneumonia on immune response of goats and sheep

Alex Mabirizi^{1,3}, Joseph Nkamwesiga¹, Paul Lumu², Kristina Roesel², Charles Drago Kato³, Henry Kiara¹

1. International Livestock Research Institute 2. Ministry of Agriculture, Animal Industries and Fisheries
3. Makerere University

Introduction

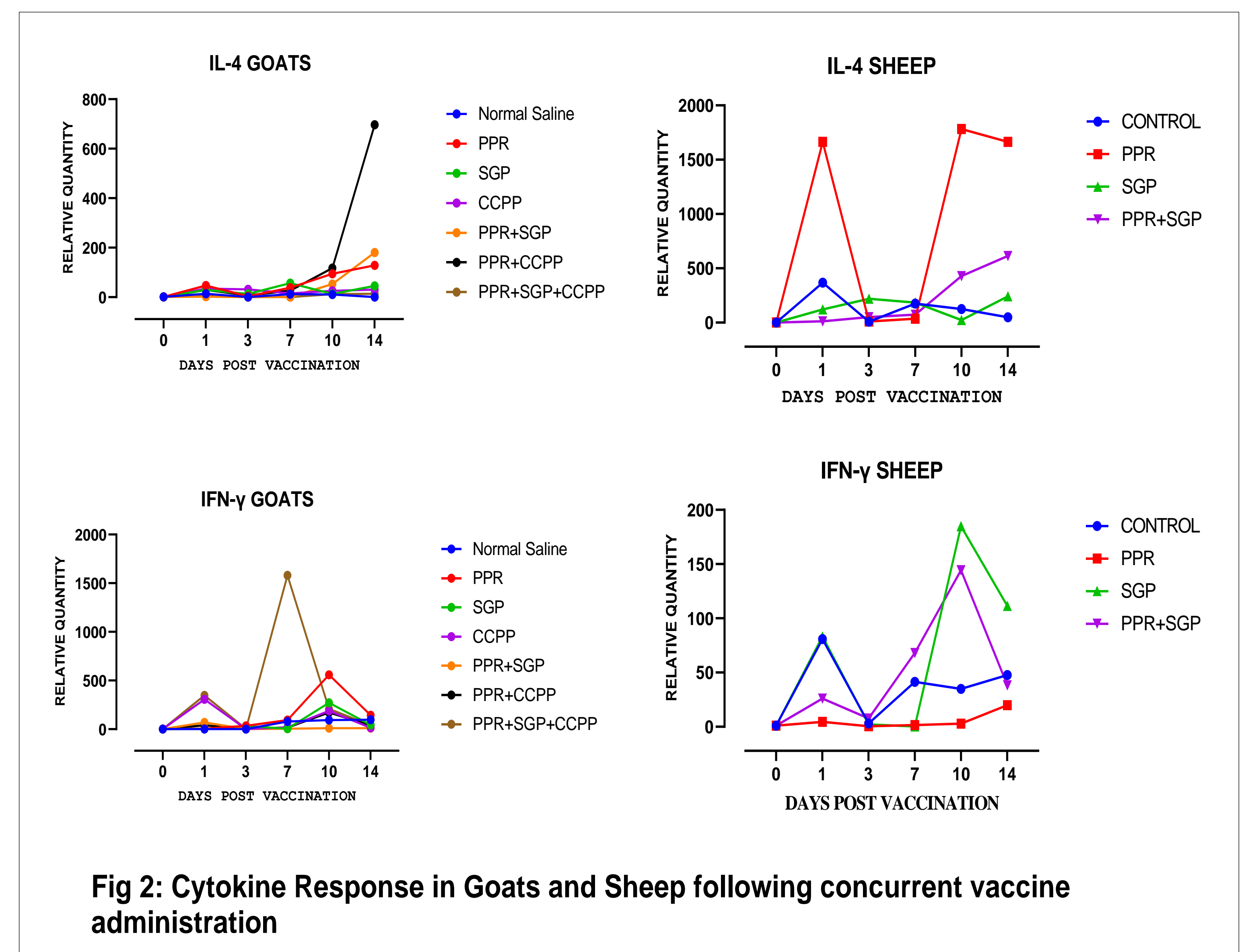
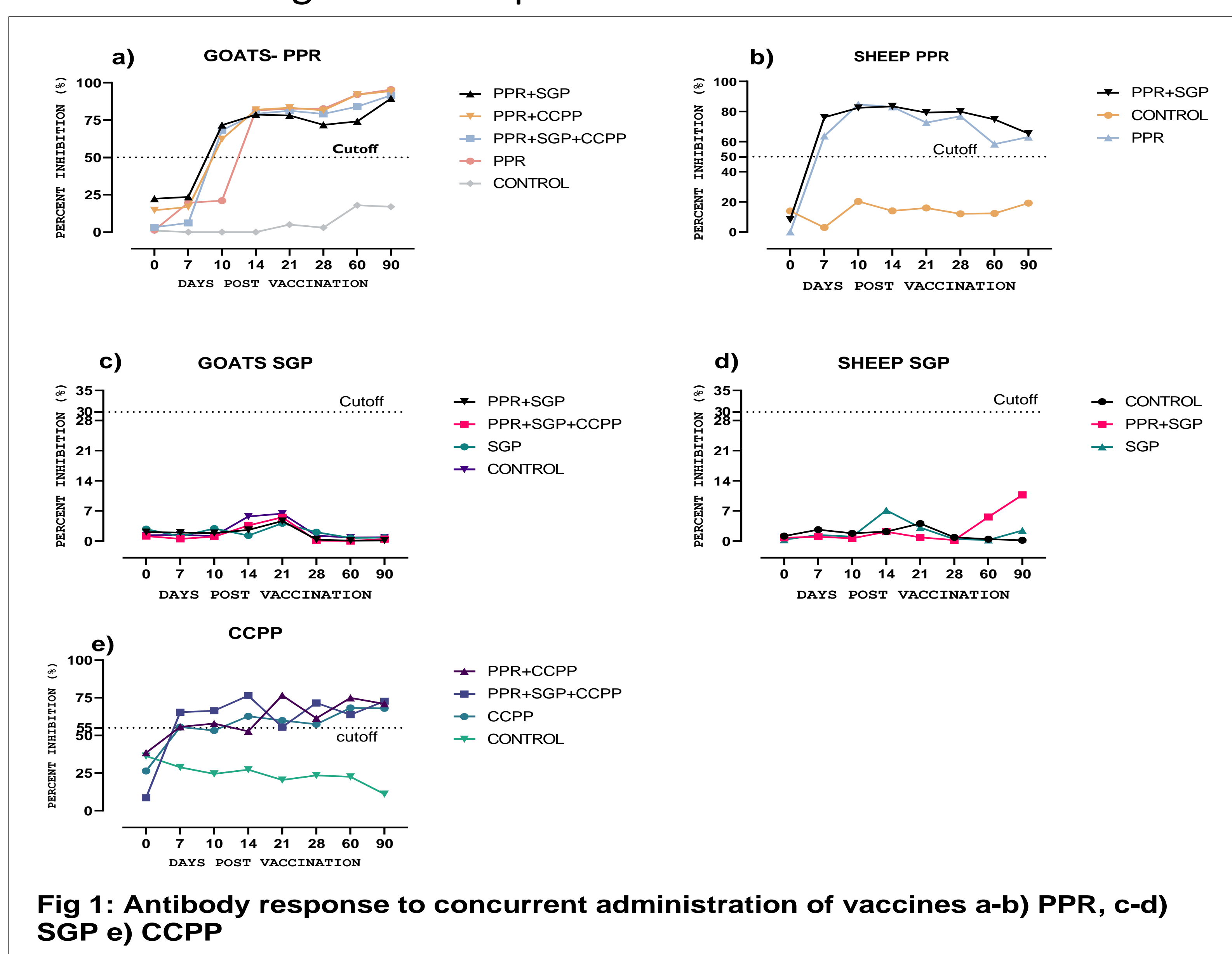
Small ruminants are threatened by diseases such as Peste des Petits Ruminants (PPR), Contagious Caprine Pleuropneumonia (CCPP), and Sheep and Goat Pox (SGP) despite the availability of vaccines. Concurrent administration of vaccines reduces the cost of vaccination by up to 70% but there is a knowledge gap about the effect it has on the immune response to the individual vaccines. This study was conducted to assess the effect of concurrent vaccine administration of PPR, CCPP and SGP on the safety and immunogenicity of the individual vaccines in goats and sheep.

Methods

Twenty-one (21) Mubende breed goats and twelve (12) local breed sheep were inoculated with different combinations of either PPR, CCPP or SGP vaccines and monitored over a 90-day period. Commercial ELISA kits were used to determine antibody response against the vaccines while a Real Time Quantitative PCR was used to quantify Interleukin-4 and Interferon gamma cytokines.

Findings

In goats and sheep, concurrent administration of PPR, SGP and CCPP resulted in no significant adverse effects. In goats, concurrent administration resulted in significant production of anti-PPR antibodies ($p=0.000$), anti-CCPP ($p=0.031$) antibodies from the control but without significant differences from those inoculated with a single vaccine. The SGP vaccine did not lead to significant production of antibodies compared to the control group, but it led to significant increase in IL-4 production ($p=0.0455$) compared to the control. In sheep, concurrent administration of PPR and SGP led to significant production of PPR antibodies ($p=0.000$) from the control with no difference from the group inoculated with PPR alone. The SGP vaccine did not lead to seroconversion in sheep but led to a substantial increase in IFN gamma compared to the control.



Conclusions & limitations

The concurrent administration of vaccines is safe and efficacious with no effect on the immune response to the individual vaccines. The SGP vaccine (KGSP 0240) a Neethling strain, did not lead to seroconversion in 93% of the animals but induced cytokine response in both goats and sheep implying it mainly acts via the cell mediated immunity and may confer protection without leading to production of antibodies. The animals were not challenged to ascertain immunity against Sheep and Goat pox, also pregnant animals were not included in the study.

Contribution to Uganda's livestock development agenda

This work contributes to the National PPR Control and Eradication Strategy seeking to control transboundary diseases of goats and sheep as part of the PPR Eradication agenda by 2027.

Project Benefits: Trainings such as; Participatory Disease Surveillance, QGIS Software training, Project Impact Pathways training, ECO-PPR field epidemiology and sampling protocols, Effective Science Communication, Ethics in Research, Stipend, Tuition

ILRI thanks all donors and organizations which globally support its work through their contributions to the [CGIAR Trust Fund](#).

Corresponding author ALEX, MABIRIZI
A.mabirizi@cgiar.org
ILRI c/o Bioversity International
P.O. Box 24384, Kampala Uganda
+256 392 081 154/155



MAAIF
Ministry of Agriculture
Animal Industry and Fisheries



Bundesforschungsanstalt für Tiergesundheit
Federal Research Institute for Animal Health



Bundesinstitut für Risikobewertung



This document is licensed for use under the Creative Commons Attribution 4.0 International Licence. September 2022.