Modified G_{250} stain: A potential ethno-phytochemist mobile screening tool for circular peptide drug discovery from nature

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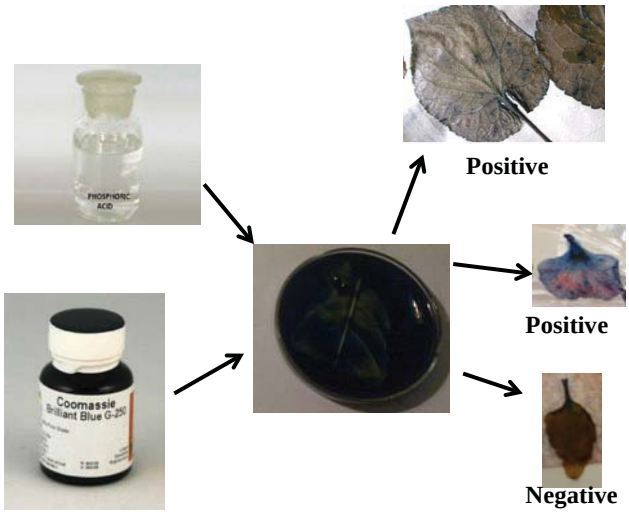
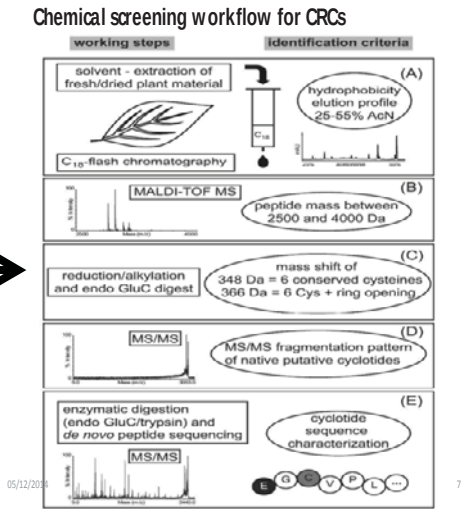
Nature's abundant tropical flora will continue to maintain its relevance and remain a huge source of chemical agents and lead compounds. Plant biodiversity provides natural products scientists starting points for the development of most needed drugs. For instance, the discovery of cyclotides from African plant *Oldenlandia affinis* (Rubiaceae) have recently attracted much research attention due to their occurrence, abundance in nature, varied biological activities, proven stability profiles, sequence plasticity and wide applications in pharmaceutical and agricultural fields. The plant was ethnomedicinally used to aid childbirth until the isolation of a uterotonic circular peptide (Kalata B1) from it. Since then, rigorous screening effort has been directed towards the discovery of other cyclotide-containing plants in African ethnomedicine but limited by several factors including lack of fast and efficient preliminary screening method. A fast and efficient discovery approach will involve a preliminary field screening to select potential cyclotides plants for a confirmatory mass spectrometric experiment.

Here we show the potential of modified Coomassie brilliant blue G (G_{250}) stain as a choice preliminary mobile screening tool for the discovery of cyclotides in ethnomedicinal plants by the phyto-chemist. The G_{250} has been popular for staining proteins in polyacrylamide gel electrophoresis. The stain, modified using phosphoric acid has been used to preferentially stain circular peptides on TLC plates with success. We report a direct colour reaction with fresh leaves of cyclotide-containing plants from the field which were confirmed using thin layer chromatography and mass spectrometric experiment.

Preliminary field screening (plant selection)



Confirmatory lab screening (cyclotide discovery)



This makes it possible for the phytochemist to select likely cyclotide-positive plants directly from the field before the more laborious laboratory screening experiment. This can potentially fast track circular peptide drug discovery effort especially by African scientists.

Keywords

G_{250}, cyclotides, ethnomedicinal plants