



# AllinAll Research

## Sodium Metabisulphite Free Burgers

### OBJECTIVE:

- To replace metabisulphite in burgers and achieve an additive free, clean label, allergen free (sulphite and gluten free) solution.

### INTRODUCTION:

**Sulphites (E220-E228) are added** to burgers and raw sausages in the form of sodium metabisulphite (SMBS) expressed as SO<sub>2</sub>. Sulphites are used within the meat industry **for their preservative and antioxidant effects**; including inhibition of microbial spoilage, prevention of discolouration and lipid oxidation while extending the overall shelf-life. Sulphites can prevent meat discolouration via stabilising product colour and promotion of the “bloomed” (bright pink/red colour) appearance thereby improving the overall product quality and flavour. Within the EU, the upper limit of sulphites permitted within meat preparations including breakfast sausages or meat burgers (with a minimum vegetable and/or cereal content of 4%) is 450mg/kg (total of all sulphites) (EC 1333/2008). However, the rationale behind removal of sulphites in meat products is due to sulphites being classified as allergens under Regulation (EU) No. 1169/2011 as well as carrying an E number. Sulphites can cause hypersensitivity and respiratory reactions to those susceptible to asthma. Additionally, consumers continue to demand additive free products, free from allergens and products which are considered “clean label”. AllinAll have addressed this and recently developed a natural, clean label, allergen free including sulphite and gluten free solution to resolve this issue. The sulphite free blend uses a combination of natural antimicrobial agents and natural antioxidants which induce the desirable red colour, maintains shelf-life, reduces lipid oxidation and prevents any negative quality effects.

### RESULTS:

- Redness (a\*) indicator of meat freshness, while Chroma (C\*) refers to colour intensity.
- The min colour threshold used as the limit of acceptability for a\* values = 12 which is comparable to a C\* value of 16.
- AllinAll SO<sub>2</sub> free (RD1616A) induced the desirable red colour while discolouration reached unacceptable levels (a\*>12, C\*>16) (Fig. 2) in line with the SO<sub>2</sub> containing control analysed over 6 days display (±2°C) in overwrap packaging so as to not mask meat spoilage.
- Metmyoglobin (MMb) levels above 40%, lead to purchasing rejection at point of sale. MMb% for RD1616A (35.6% MMb) did not exceed 40% by use-by-date compared to the Control SO<sub>2</sub> (34.2% MMb) & Control with No SO<sub>2</sub> (43.7%)(Data not shown).
- TBARs values were used as index of lipid oxidation. TBARs values were below 1 mg MDA/kg for RD1616A which is considered the threshold for detection of rancidity (Data not shown).
- Visual Sensory analysis (AMSA, 2012) showed RD1616A was in line with instrumental colour and was colour stable, comparable to the Control SO<sub>2</sub> (Data not shown).
- AllinAll SO<sub>2</sub> free solution supports microbiological safety as microbial growth did not exceed the upper limit of acceptability for Total Viable Counts (TVC) (6 log CFU/g) (Table 1). In addition, there was a 1 log reduction in Mesophilic TVC inhibition for AllinAll’s SO<sub>2</sub> free solution compared to the control containing SO<sub>2</sub>.
- This solution has been applied in overwrap packaging and Modified Atmosphere Packaging (MAP) systems (5 replicates).

Fig 2. Instrumental colour analysis of beef burgers stored over 6 days display in overwrap packaging (±2°C) (5 replicates).

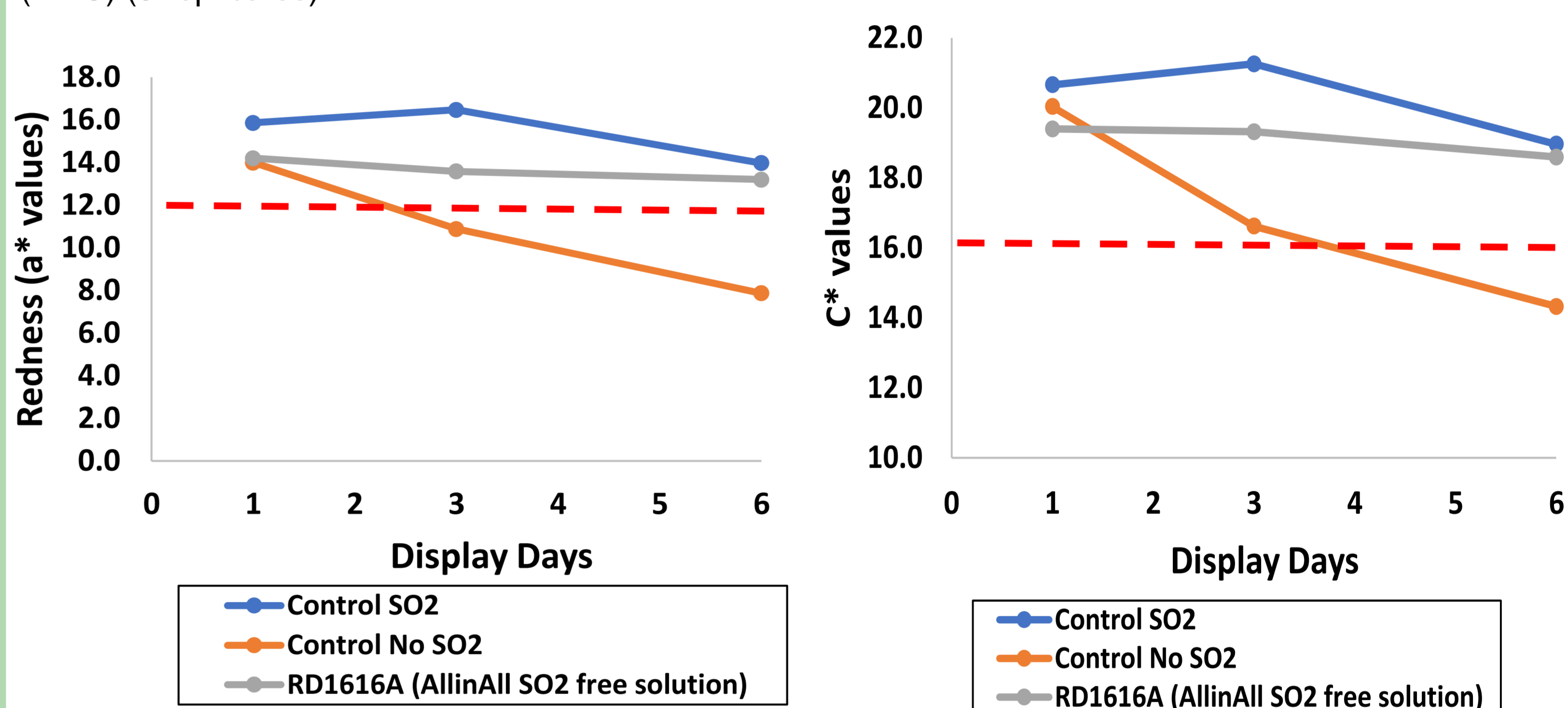


Table 1. Effect of microbiological characteristics for TVCm, Lactic acid bacteria (LAB), Total Enterobacteriaceae Count (TEC), Clostridium perfringens and Pseudomonas spp (Means (log cfu/g)) on beef burgers stored over 6 days display in overwrap packaging (±2°C).

Treatments	Day	TEC	Clostridium perfringens	Pseudomonas spp.	TVCm (Aerobic)	LAB
Control SO <sub>2</sub>	1	3.0	2.0	3.6	4.5	2.7
Control No SO <sub>2</sub>		3.3	1.9	2.9	4.0	3.9
RD1616A (AllinAll SO <sub>2</sub> free solution)		3.0	1.9	3.0	4.3	3.4
Control SO <sub>2</sub>	3	1.9	1.9	3.0	4.8	2.3
Control No SO <sub>2</sub>		2.8	1.9	3.0	4.9	2.9
RD1616A (AllinAll SO <sub>2</sub> free solution)		1.9	1.9	2.9	4.3	2.8
Control SO <sub>2</sub>	6	1.8	1.8	2.8	3.9	2.0
Control No SO <sub>2</sub>		1.9	1.9	2.9	5.8	3.9
RD1616A (AllinAll SO <sub>2</sub> free solution)		1.8	1.8	2.8	2.8	3.9

### CONCLUSIONS & USP'S:

- ✓ Clean label, natural ingredient declaration/ additive Free.
- ✓ Allergen Free- Soya Free, Gluten Free, Sulphite Free.
- ✓ Microbial shelf-life is not comprised
- ✓ Colour stable with discolouration occurring by 6 days storage (±2°C) as to not mask meat spoilage.
- ✓ Inhibition of lipid oxidation.
- ✓ Further studies are being conducted in other communitied meat products which contain SO<sub>2</sub>.

### Contact Us:

AllinAll Ingredients Ltd, 3 Rosemount Park Road, Rosemount Business Park, Dublin 11, Ireland  
For further information please contact:  
Email: [sales@allinall.ie](mailto:sales@allinall.ie) Telephone: +35316263957

Fig 1. Visual colour & discolouration of beef burgers stored over 6 days display in overwrap packaging (±2°C).

